LICENCE HOLDER INSIGHTS

National 2005/06 – 2022/23

Fish & Game
NEW ZEALAND

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New Zealand Fish & Game
Licence Holder Insights

Contents

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 national report, all licences purchased from any Fish & Game region are considered when calculating R3. For example, a licence holder who is classified as "recruited" is purchasing their first licence from Fish & Game during the 2005/06 – 2022/23 seasons. Similarly, a licence holder who is classified as "lost" or "in-churn" has not purchased a licence from any region.

Executive Summary

Fishing Licences

The number of licence holders increased through the 2015/16 fishing season, but has been declining since. However, the 2022/23 season saw an increase in the number of licence holders. The 2022/23 season was similar in licence holder numbers to the 2018/19 season.

The proportion of licence holders that are female has increased steadily since the 2005/06 fishing season. Female anglers are more likely to purchase day licences and child's licences than male anglers.

Younger anglers more commonly purchase day, winter, and short break licences, while older anglers more commonly purchase family, long break, and local area licences.

The recruitment rate for anglers has declined, while the reactivation rates and rate of loss have both increased. There was no trend in retention, with an average retention rate of 50.8%.

The average number of years spent "in-churn" for anglers who purchased licences in non-consecutive years was 2.7 years.

Rate of loss was highest amongst anglers aged 18-35, and decreased with age. Rate of loss is increasing annually for anglers aged 26-75, with the most pronounced increase in the 18-55 age range, indicating a loss of working aged adults from the licence pool.

Game Bird Licences

The number of licence holders increased through the 2012 game bird season, but has been declining since by approximately 1% annually.

The proportion of licence holders that are female has increased steadily since the 2006 game bird season. Female hunters are more likely to purchase day licences and child's licences than male hunters.

The recruitment rate for hunters has declined, while the reactivation and retention rates have increased. Retention for game bird hunters is very high, on average 73.0%.

The average number of years spent "in-churn" for hunters who purchased licences in non-consecutive years was 2.6 years.

Rate of churn was highest for hunters aged 18-35 and declined as age increased. This indicates that hunters are most likely to take a temporary hiatus from hunting during the ages most associated with university, early career, and early child rearing.

Rate of loss was increasing for hunters aged 26-55, indicating a loss of working aged adults from the licence pool.

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 purcased 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 2.6 (± 0.004) seasons.
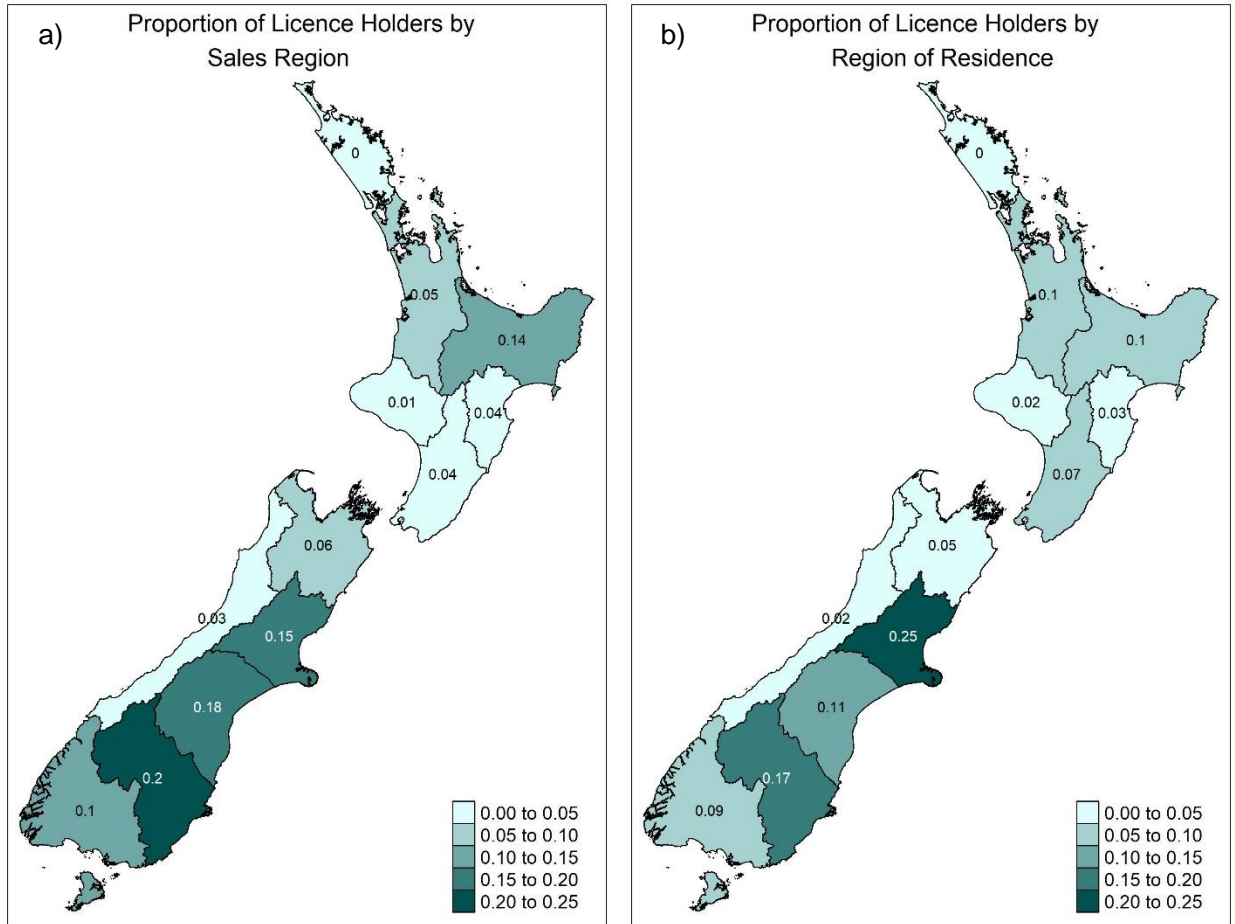

Figure 1. The proportion of New Zealand Fish & Game fishing licence holders by a) Fish & Game region of licence sale, and b) Fish & Game region of reported residence, between the 2018/19 and 2022/23 fishing seasons. During this time period, 22.2% of licence holders did not provide a valid address.

Over the course of the 2018/19 to 2022/23 fishing seasons, 77.8% of licences sold were associated with valid addresses. Of those licence holders which provided a valid address, an annual average of 25.2% lived within the North Canterbury Fish & Game region, followed by Otago (16.6%), Central South Island (10.9%), and Auckland/Waikato (9.9%) Fish & Game regions. Proportion of licence holders by sales region differed from region of residence, with the majority of licences sold being greatest in Otago (20.4%), followed by Central South Island (18.5%), North Canterbury (15.2%), and Eastern (13.7%).

On average, 91.4% (±0.9%) of fishing licence holders self-identified as male while 8.4% (±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 ($F_{1, 16} = 218$, $P < 0.001$). When it came to child's licences, an

average of 67.2% (±0.4%) of licence holders identified as male, while 32.7% (±0.4%) identified as female.
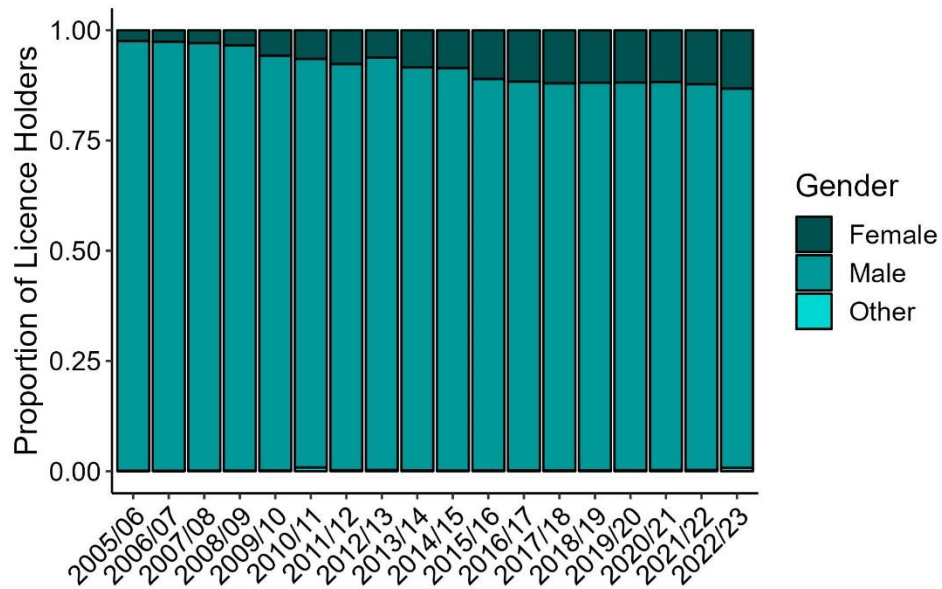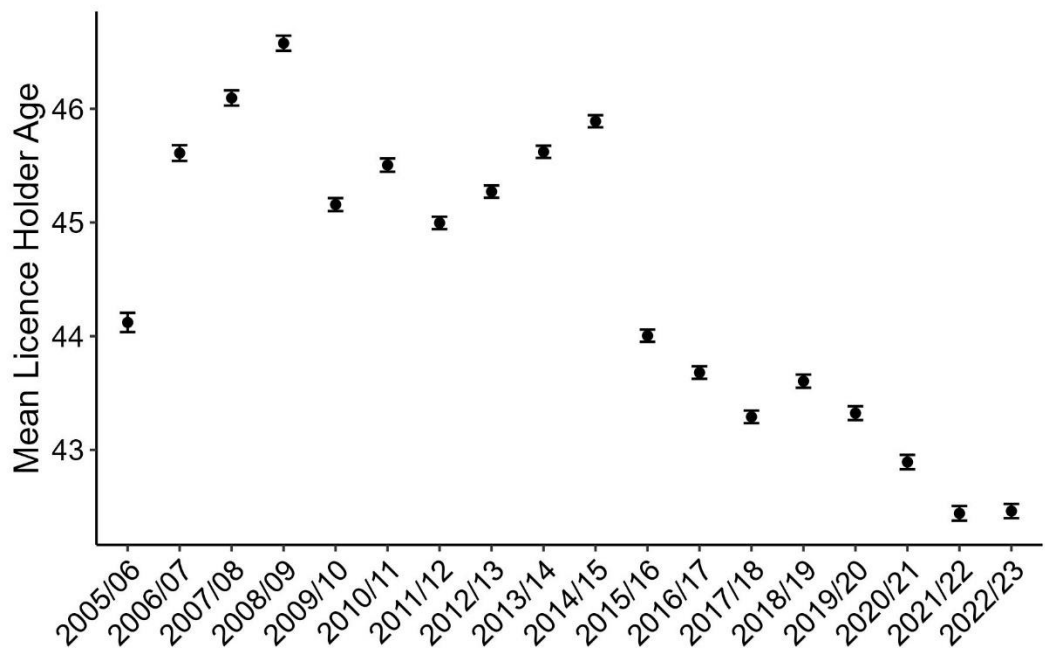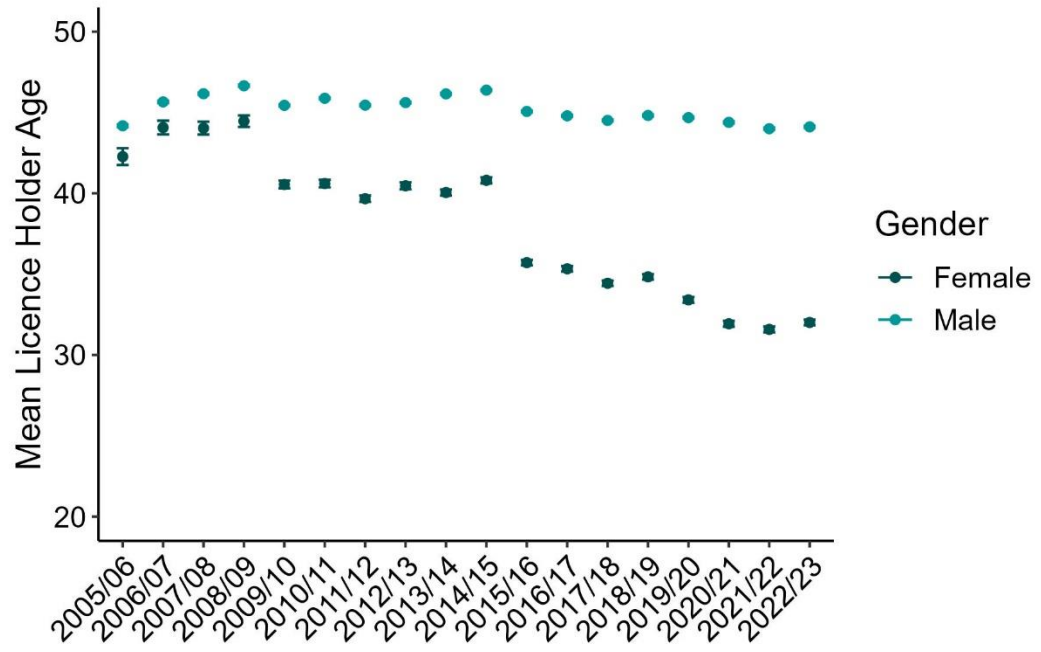

Figure 2. The proportion of licence holders who purchased fishing licences from New Zealand Fish & Game by gender from the 2005/06 through the 2022/23 fishing seasons.

The average number of licences purchased per licence holder did not differ by gender ($F_{2, 51} = 0.49$, $P = 0.61$). However, male anglers on average spent more money on licences than female anglers did ($F_{2, 51} = 27.2$, $P < 0.001$). A higher proportion of licences purchased by female anglers were day licences ($F_{2, 33} = 8.4$, $P < 0.001$), 37.7% compared to 22.3% of licences purchased by male anglers. Additionally, a larger proportion of licences purchased by female anglers were child licences ($F_{2, 21} = 69.7$, $P < 0.001$), 19.6% compared to 5.6% of licences purchased by male anglers.

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

Licence Type	Mean Age	
Child	8.2	± 0.01
Day	40.5	± 0.12
Winter	43.9	± 0.07
Short Break	45.0	± 0.08
Whole Season	41.8	± 0.02
Local Area	46.1	± 0.04
Long Break	48.5	± 0.29
Family	49.9	± 0.02
Loyal Senior	73.0	± 0.03

The mean age of licence holders between the 2005/06 and 2022/23 seasons was 44.3 (± 0.01) years. The mean age has decreased by an average of 0.23 years per year ($F_{1, 1,685,940}$ = 5,690, $P <$ 0.001). On average, female licence holders were 9 years younger than their male counterparts ($F_{2, 1,685,939}$ = 18,494, $P <$ 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 ($F_{8, 1,685,933}$ = 64,900, $P <$ 0.001).

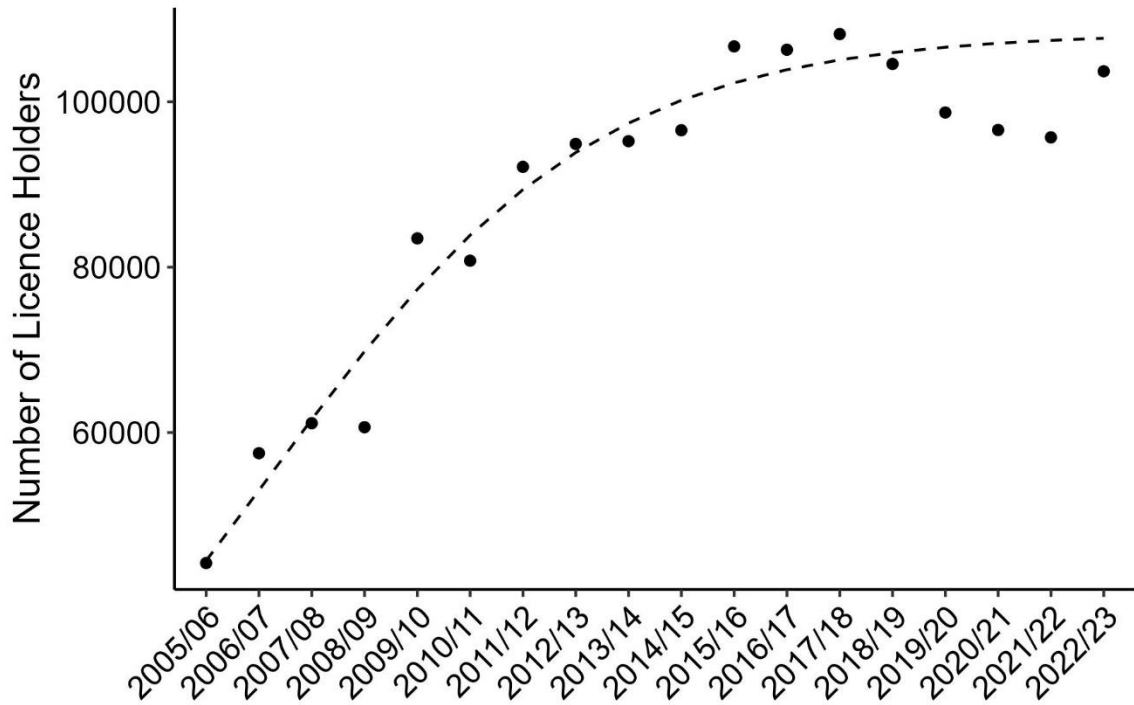Figure 3. The mean age of licence holders who purchased fishing licences from New Zealand Fish & Game from the 2005/06 through the 2022/23 fishing seasons, with error bars representing standard error.

Figure 4. The mean age of licence holders who purchased fishing licences from New Zealand 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 logistic growth curve, excluding the years affected by the COVID-19 pandemic. The relationship in licence holder count fit using a non-linear least squares logistic model estimates the number of licence holders for the 2023/24 season as 107,774, a 3.9% increase from the 2022/23 season, with a prediction interval of 96,546-118,858. The estimated number of licence holders for the 2024/25 season is 107,924, with a prediction interval of 96,624-119,107.

Figure 5. The number of licence holders who purchased fishing licences from New Zealand Fish & Game from the 2005/06 through the 2022/23 seasons. The dashed line represents a non-linear least squares logistic growth model on the number of licence holders over time.

The recruitment rate has declined since the 2008/09 season, at a rate of -0.8% per year ($F_{1, 12}$ = 12.7, P = 0.004).
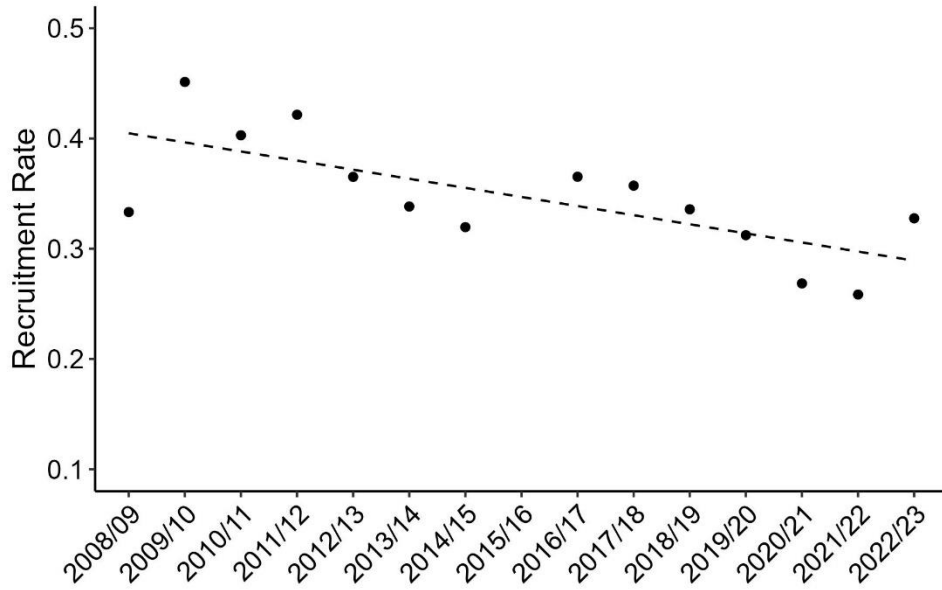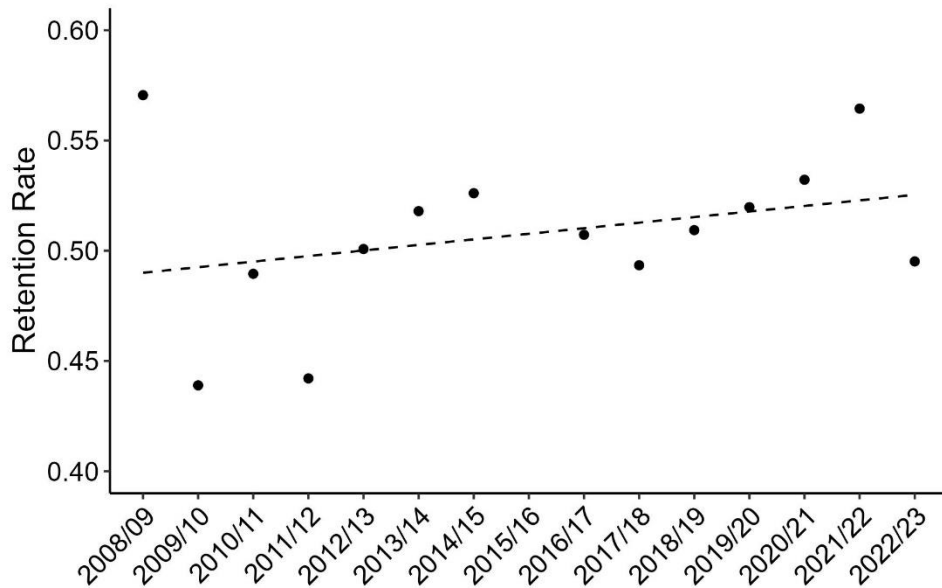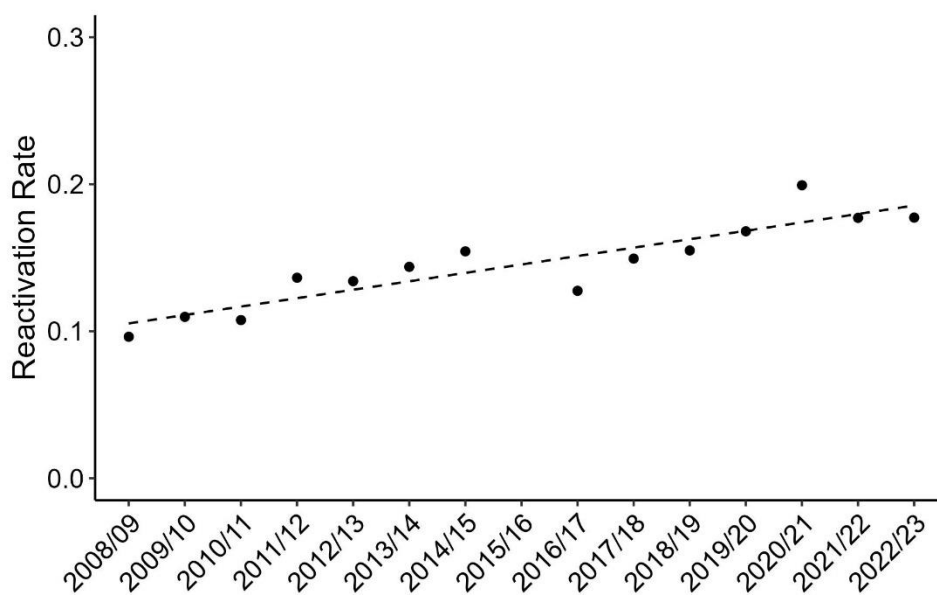

Figure 6. The recruitment rate for New Zealand Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons. The dashed line represents a simple linear regression on the recruitment rate over time.

There was no evident trend in retention rate over time between the 2008/09 and 2022/23 fishing seasons ($F_{1, 12}$ = 1.3, P = 0.28). The average retention rate was 50.8% of licenced anglers.
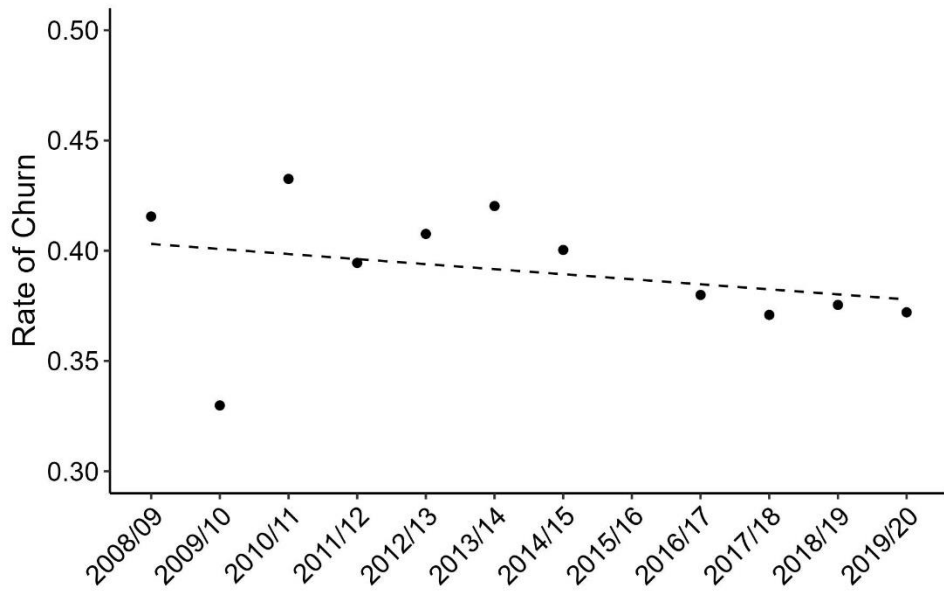

Figure 7. The retention rate for New Zealand Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons. The dashed line represents a simple linear regression on the retention rate over time.

The reactivation rate has increased since the 2008/09 season, at a rate of 0.6% per year ($F_{1, 12} = 52.7$, $P < 0.001$).

Figure 8. The reactivation rate for New Zealand 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 (±0.003) years. There was no significant trend in the number of licence holders "in churn" relative to the number of active licence holders ($F_{1, 9} = 0.86$, $P = 0.38$).

The rate of loss increased by an average of 1.4% annually between the 2006/07-2019/20 seasons ($F_{1, 11} = 24.2$, $P < 0.001$).

Figure 9. The rate of churn for New Zealand 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.
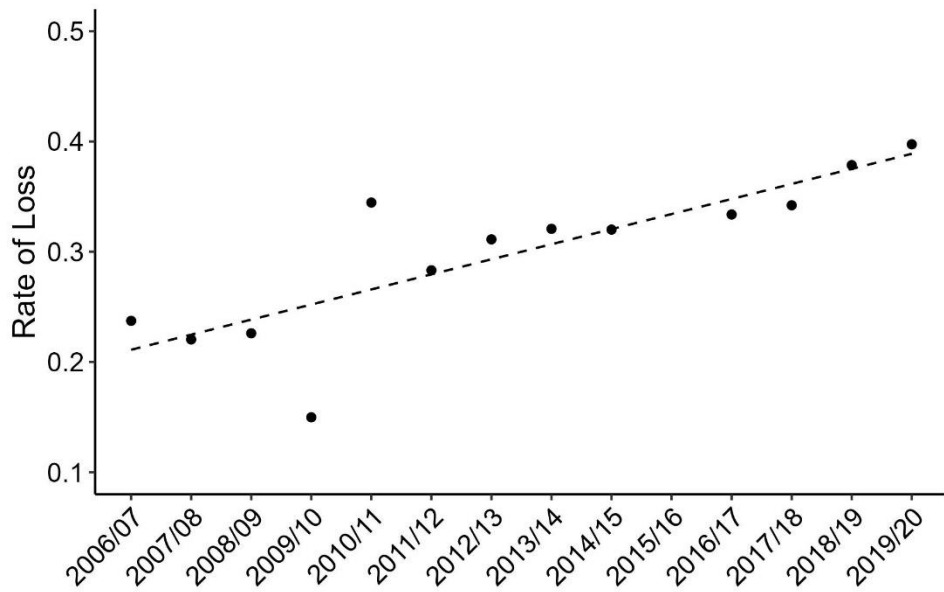

Figure 10. The rate of loss for New Zealand Fish & Game fishing licence holders from the 2006/07 through the 2019/20 fishing seasons. The dashed line represents a simple linear regression on the rate of loss over time.

Gender

Recruitment was higher for female anglers than male anglers, with an average annual recruitment rate of 62.3% relative to male's 32.0% ($F_{1, 24}$ = 191, P < 0.001). There was no evidence of any difference in trend between male and female recruitment rates over time ($F_{1, 24}$ = 2.52, P = 0.13).
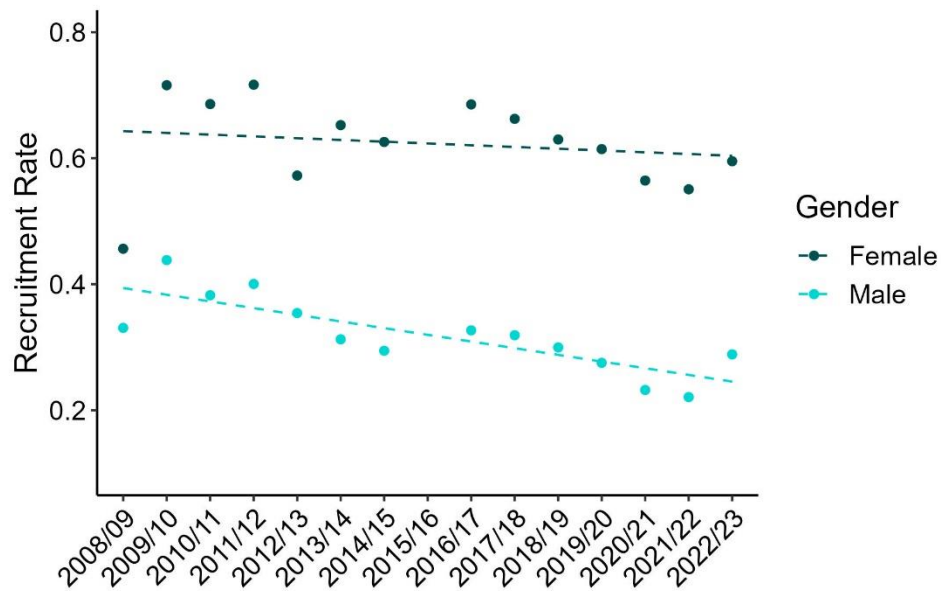

Figure 11. The recruitment rate for New Zealand Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons by gender. The dashed line represents a simple linear regression on the recruitment rate over time.

Retention was significantly lower for female anglers than male anglers, with an average annual retention rate of 27.6% relative to male's 53.2% ($F_{1, 24}$ = 170, P < 0.001). There was no evidence of any difference in trend between male and female retention rates over time ($F_{1, 24}$ = 3.1, P = 0.09).
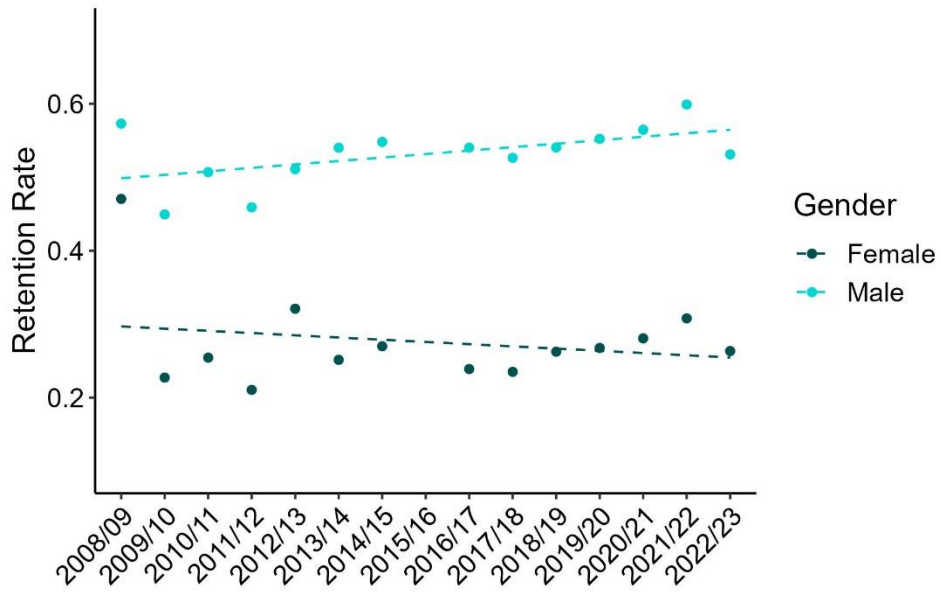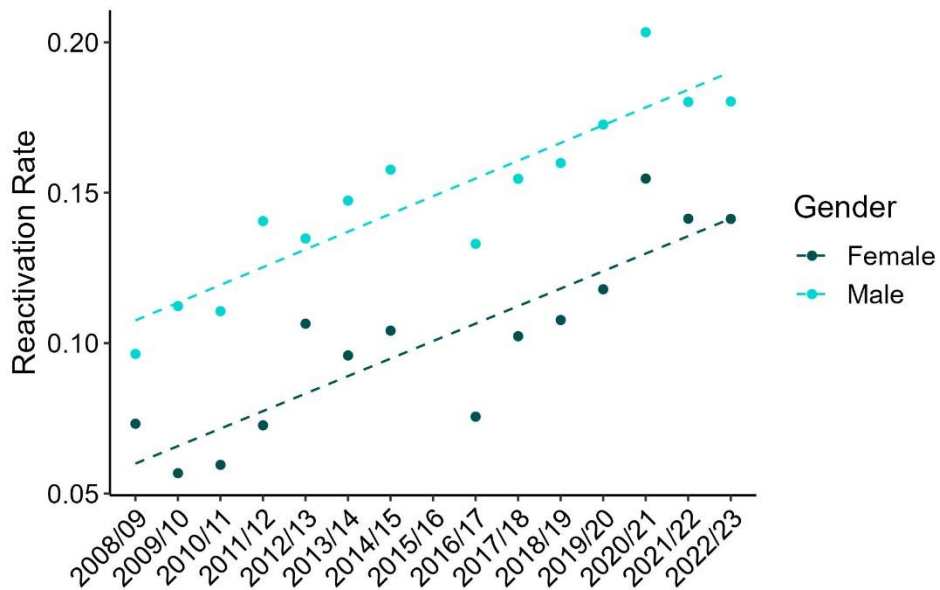
Figure 12. The retention rate for New Zealand Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons by gender. The dashed line represents a simple linear regression on the retention rate over time.

Reactivation was higher for male anglers than female anglers, with an average of 14.9% relative to female's 10.1% ($F_{1,24}$ = 77.6, P < 0.001). There was no evidence of any difference in trend between male and female reactivation rates over time ($F_{1, 24}$ = 0.005, P = 0.95).

Figure 13. The reactivation rate for New Zealand 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.

Churn was higher amongst male anglers than female anglers, with an average of 39.5% in-churn relative to female's 30.8% ($F_{1,18}$ = 17.3, P < 0.001). There was no evidence of any difference in trend between male and female rate of churn over time ($F_{1,18}$ = 0.76, P = 0.39). On average, male anglers spent slightly longer in-churn than female anglers, at 2.7 (± 0.003) years relative to female's 2.5 (± 0.01) years ($F_{1, 467,112}$ = 299, P < 0.001).
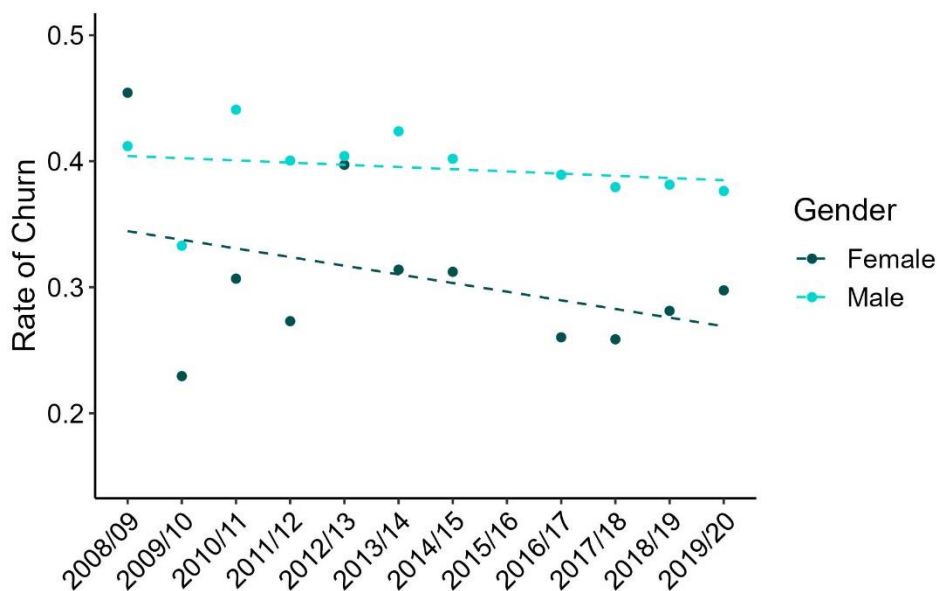

Figure 14. The rate of churn for New Zealand Fish & Game fishing licence holders from the 2008/09 through the 2019/20 fishing seasons by gender. The dashed line represents a simple linear regression on the rate of churn over time.

Loss was higher for female anglers than male anglers, with an average rate of loss of 43.5% amongst females relative to male's 28.4% ($F_{1, 22}$ = 16.7, P < 0.001). On average, the rate of loss for female anglers increased by 4.5% annually ($F_{1, 11}$ = 28.2, P < 0.001). On average, the rate of loss for male anglers increased by 1.0% annually ($F_{1, 11}$ = 13.3, P = 0.004).
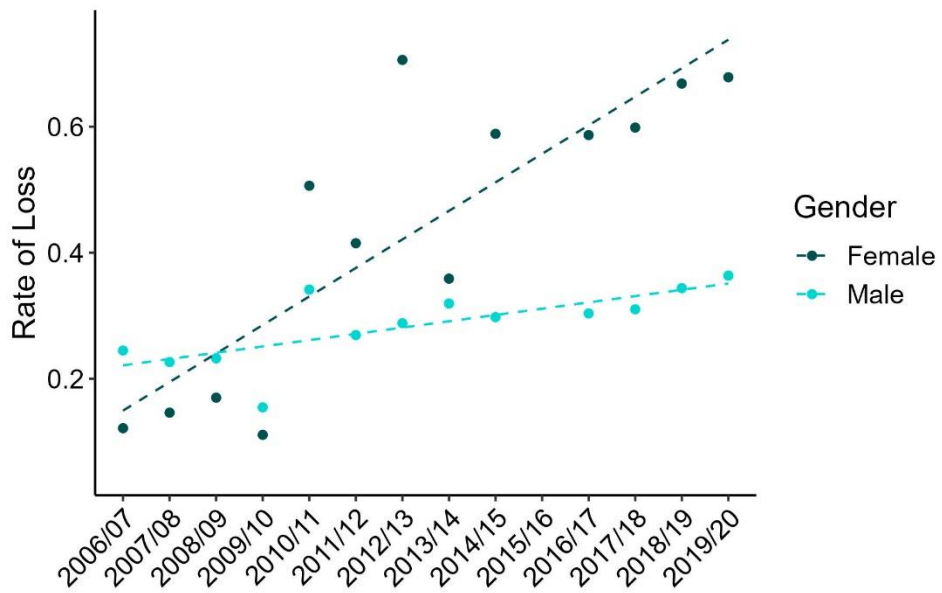

Figure 15. The rate of loss for New Zealand Fish & Game fishing licence holders from the 2006/07 through the 2022/23 fishing seasons by gender. The dashed line represents a simple linear regression on the rate of loss over time.

Age

Recruitment rates varied by age class ($F_{7, 96}$ = 324, P < 0.001) but the change in recruitment over time did not vary by age class ($F_{7, 96}$ = 1.3, P = 0.24). On average, recruitment was highest for the younger age classes and was lowest within the older age classes.
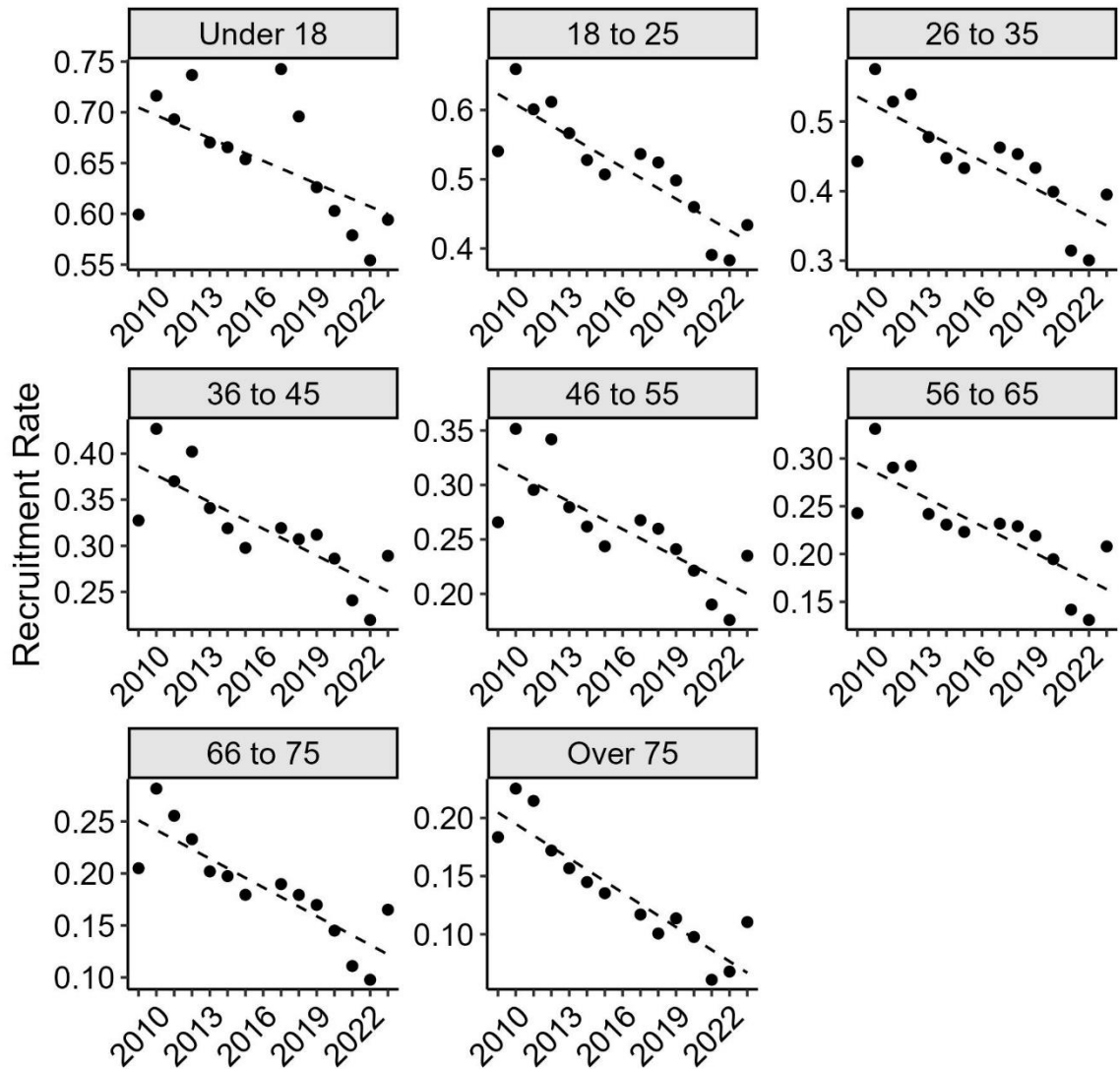
Figure 16. The recruitment rate for New Zealand Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons by age group. The dashed line represents a simple linear regression on the recruitment rate over time.

Retention rates varied by age class ($F_{7, 96}$ = 327, $P < 0.001$) but the change in retention over time did not vary by age class ($F_{7, 96}$ = 1.4, $P = 0.22$). On average, retention was highest within the older age classes and lowest within the younger age classes.
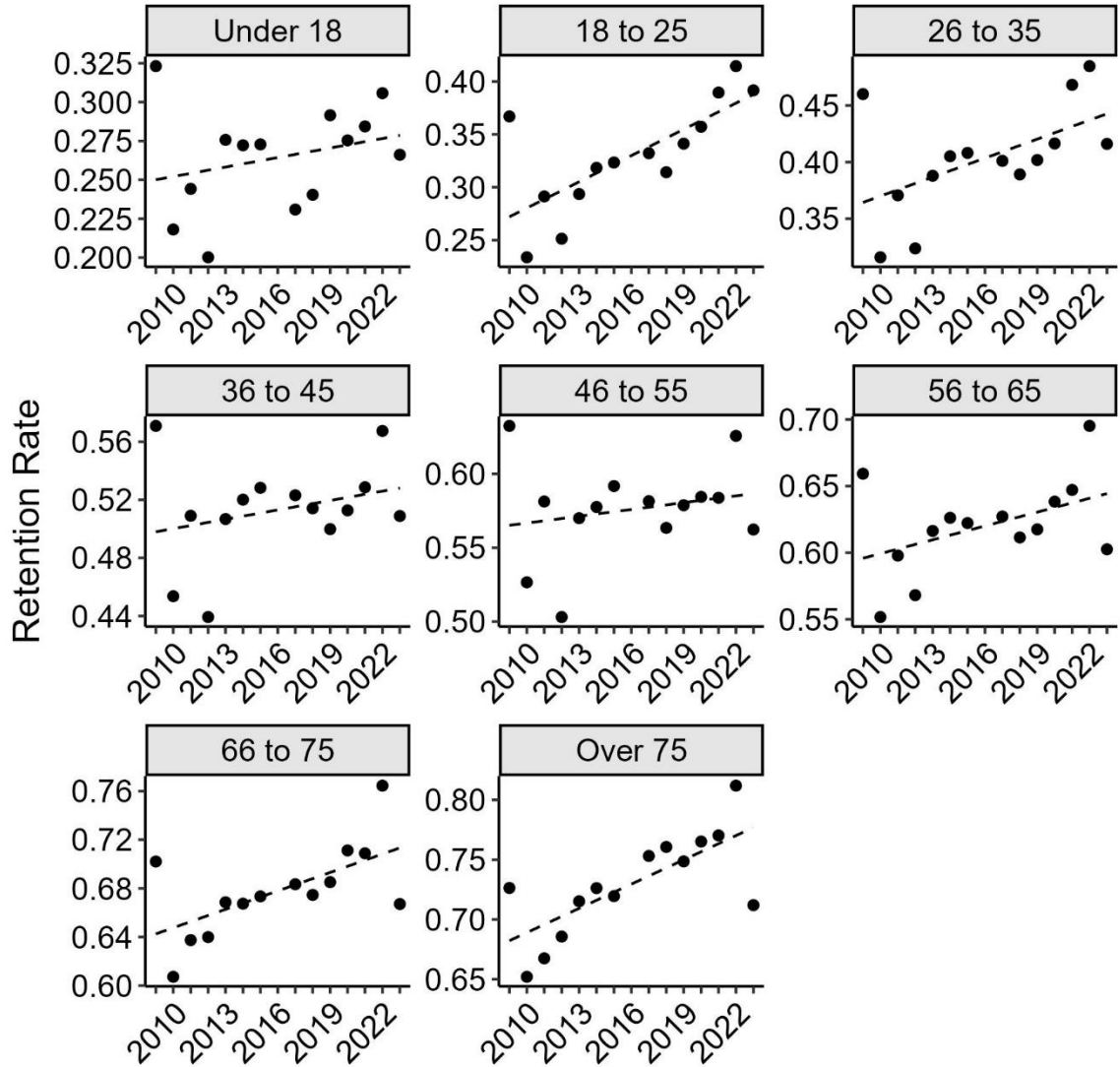

Figure 17. The retention rate for New Zealand Fish & Game licence holders from the 2008/09 through the 2022/23 fishing seasons by age group. The dashed line represents a simple linear regression on the retention rate over time.

Both reactivation rates and change in reactivation over time varied by age class ($F_{7,96} = 35.7$, $P < 0.001$; $F_{7,96} = 2.7$, $P = 0.014$). On average, reactivation was lowest within the under 18 age class. All age classes exhibited an increase in reactivation over time, but the increase was not as pronounced for age classes over 65.
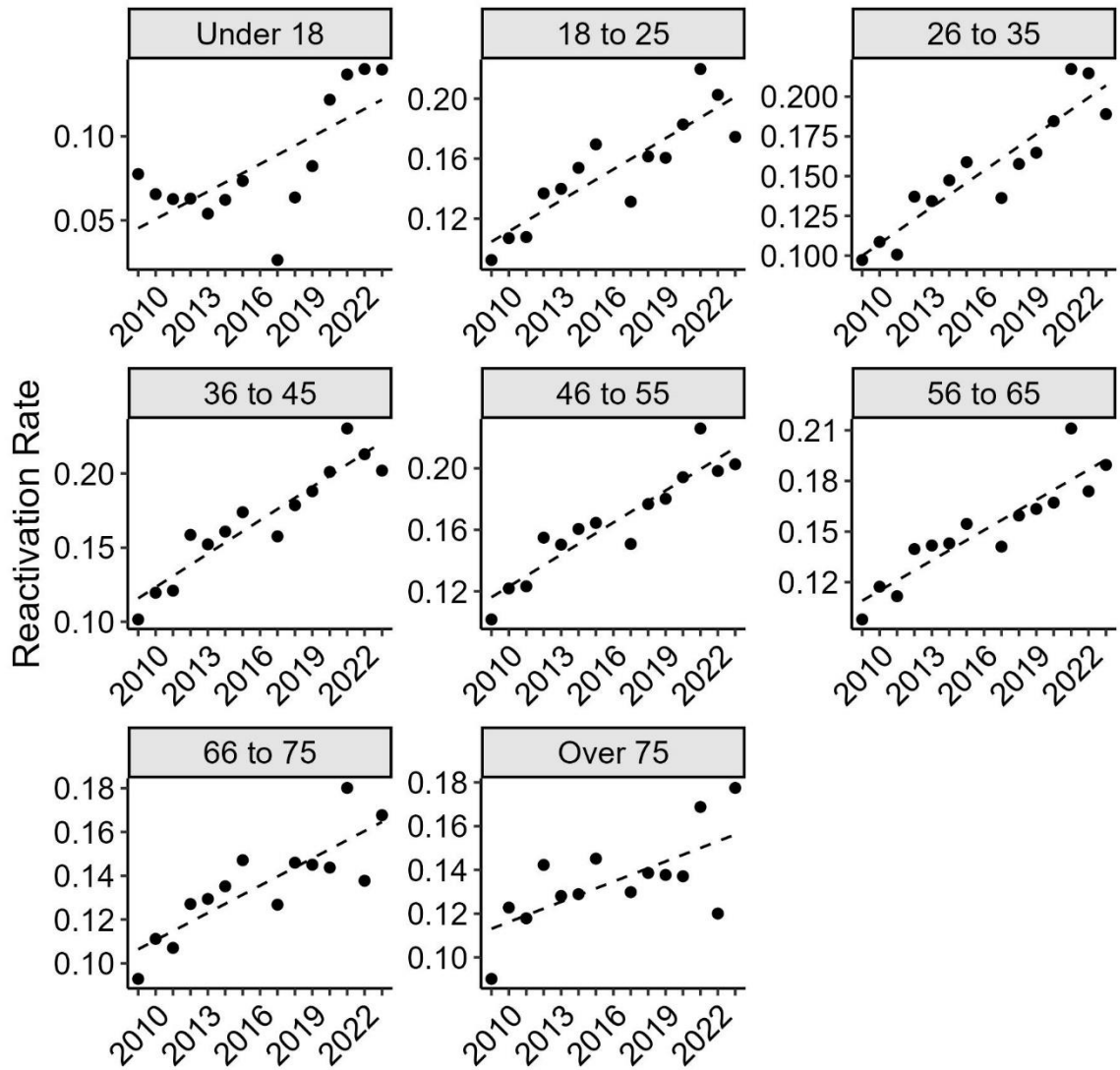

Figure 18. The reactivation rate for New Zealand Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons by age group. The dashed line represents a simple linear regression on the reactivation rate over time.

Both rate of churn and the change in rate of churn over time varied by age class ($F_{7, 72} = 67$, $P < 0.001$; $F_{7, 72} = 2.1$, $P = 0.049$). On average, rate of churn was highest within the 18-35 age range and lowest within the older age classes. The 18 to 25 age class exhibited a declining trend 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 ($F_{7, 493,515} = 982$, $P < 0.001$).
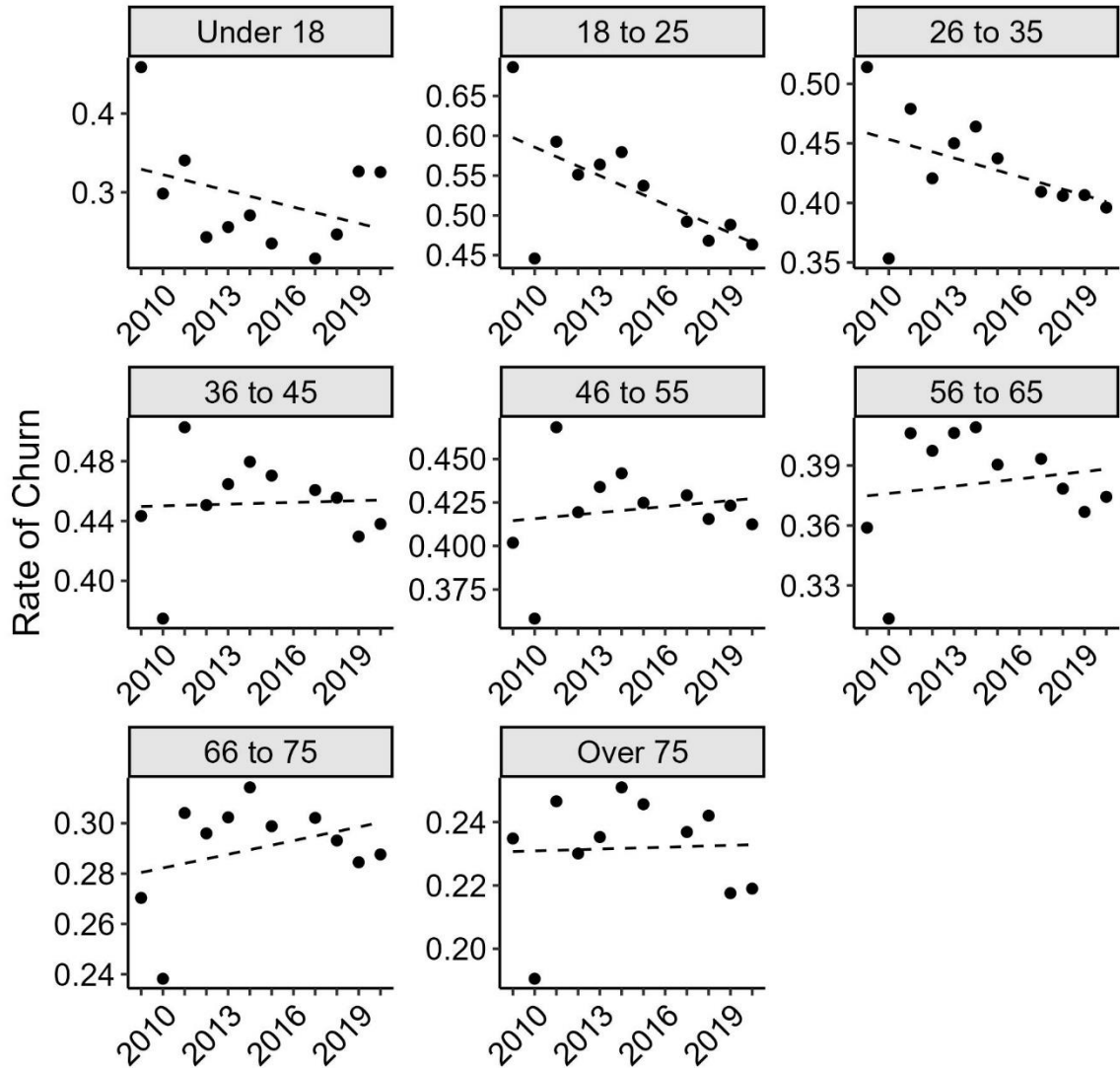

Figure 19. The rate of churn for New Zealand Fish & Game fishing licence holders from the 2009 through the 2020 fishing seasons by age group. The dashed line represents a simple linear regression on the rate of churn over time.

Table 2. The mean number of years spent in-churn and standard error by age group for New Zealand 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 ± 0.01
26 to 35	2.6 ± 0.01
36 to 45	2.7 ± 0.01
46 to 55	2.7 ± 0.01
56 to 65	2.8 ± 0.01
66 to 75	2.8 ± 0.01
Over 75	2.7 ± 0.02

Fish & Game

Both rate of loss and the change in rate of loss over time varied by age class ($F_{7, 88}$ = 42.8, P < 0.001; $F_{7, 88}$ = 4.7, P < 0.001). On average, rate of loss was highest within age classes 18-35. Age classes between 26-75 years old all exhibited increasing trends of loss over time, while the age classes under 18 and over 75 years old exhibited no evident trend.
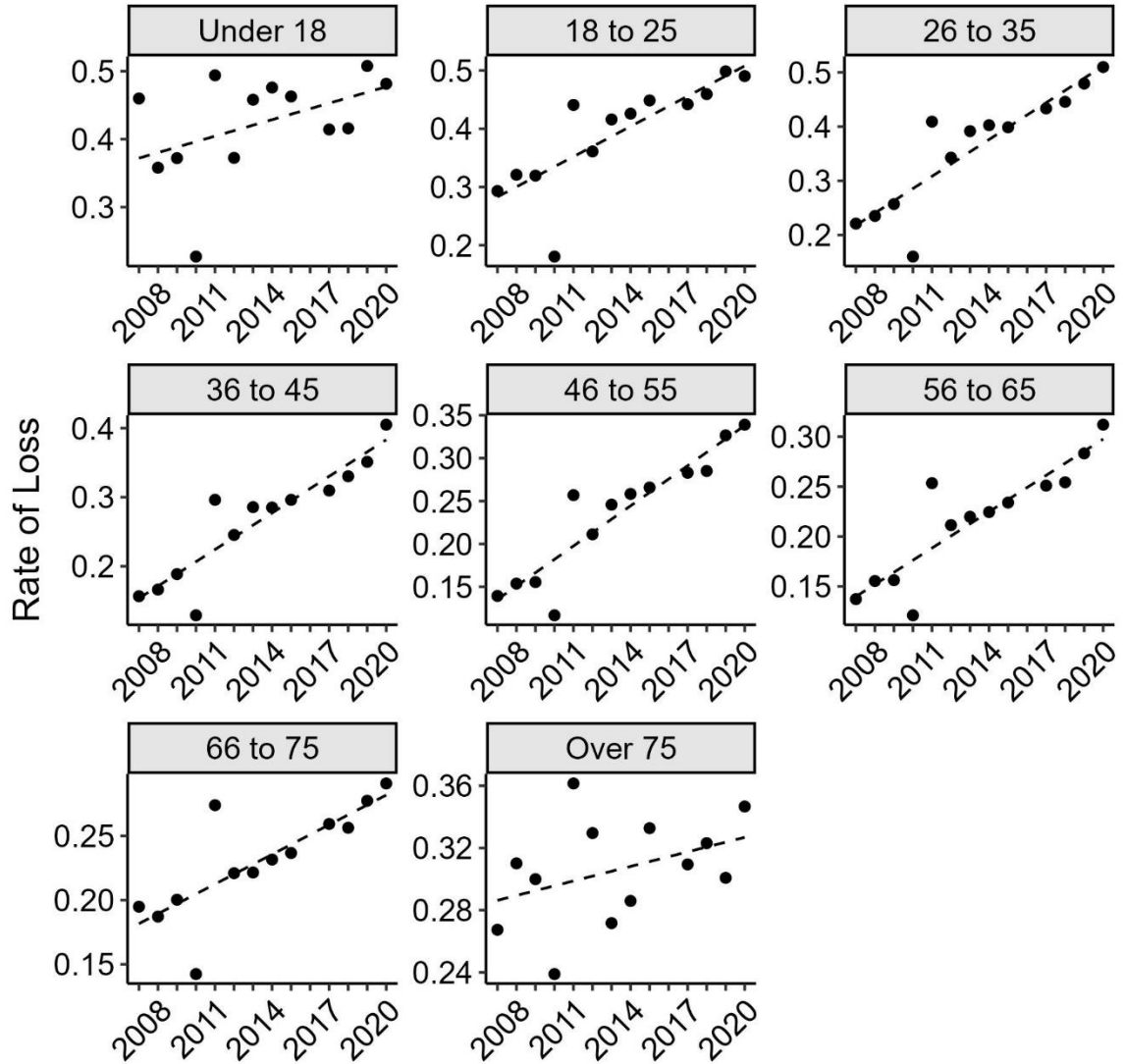

Figure 20. The rate of loss for New Zealand Fish & Game fishing licence holders from the 2006/07 through the 2019/20 fishing seasons by age group. The dashed line represents a simple linear regression on the rate of loss over time.

Non-Residents

Since the 2005/06 fishing season, non-residents from 144 countries have purchased fishing licences from New Zealand Fish & Game. On average, 43.0% (± 4.5%) of licences purchased by non-residents are day licences. The number of non-resident licence holders varied between 3,437 and 10,158 in the years prior to the COVID 19 pandemic. During the 2022/23 season, the number of fishing licences purchased by non-residents returned to the pre-pandemic norm, at 8,310 licence holders. During the 2022/23 fishing season, non-residents purchased 11,072 fishing licences, equating to a value of $1,201,772 NZD.

The majority of non-resident anglers have been from Australia (36.0%) followed by the United States (25.2%) and the UK (9.2%).
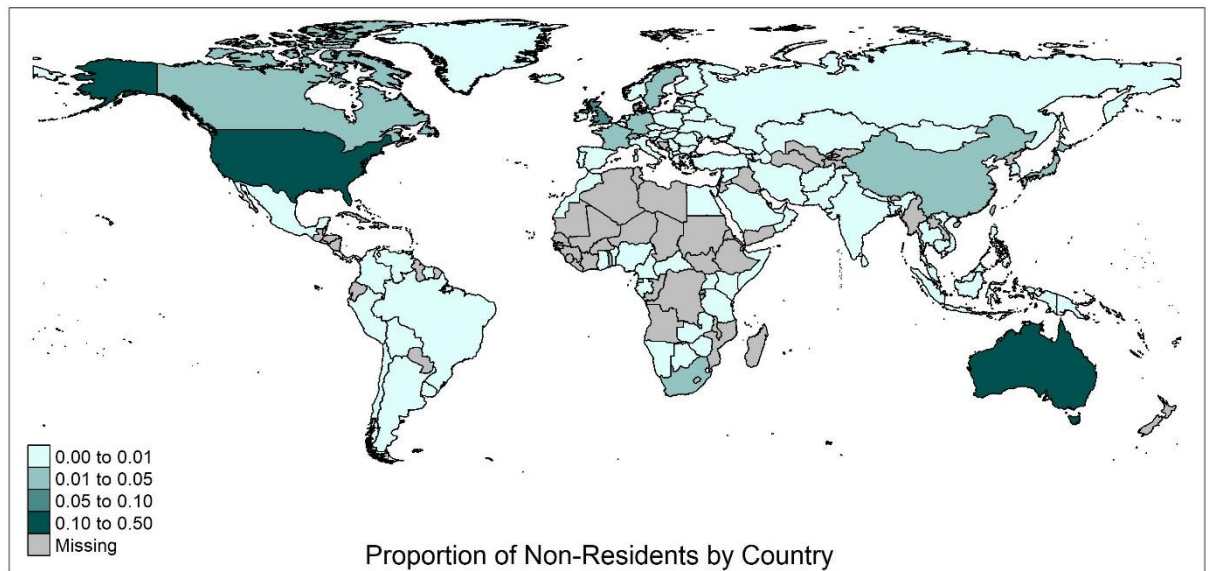

Figure 21. The proportion of New Zealand Fish & Game non-resident fishing licence holders from the 2005/06 through the 2022/23 fishing seasons by reported country of residence.

Game Bird Licences

The Average Licence Holder

Between the 2006 and 2023 game bird seasons, the average licence holder purchased licences during 4.8 (± 0.01) seasons.

Over the course of 2006 to 2023 game bird seasons, 83.5% of licences sold were associated with valid addresses. Of those licence holders which provided a valid address, an annual average of 21.7% lived within the Waikato Fish & Game region, followed by Southland (12.9%), Otago (12.4%), and Wellington (11.6%) Fish & Game regions. Proportion of licence holders by sales region is, overall, similar to the proportion of licence holders that reported residence within each region.
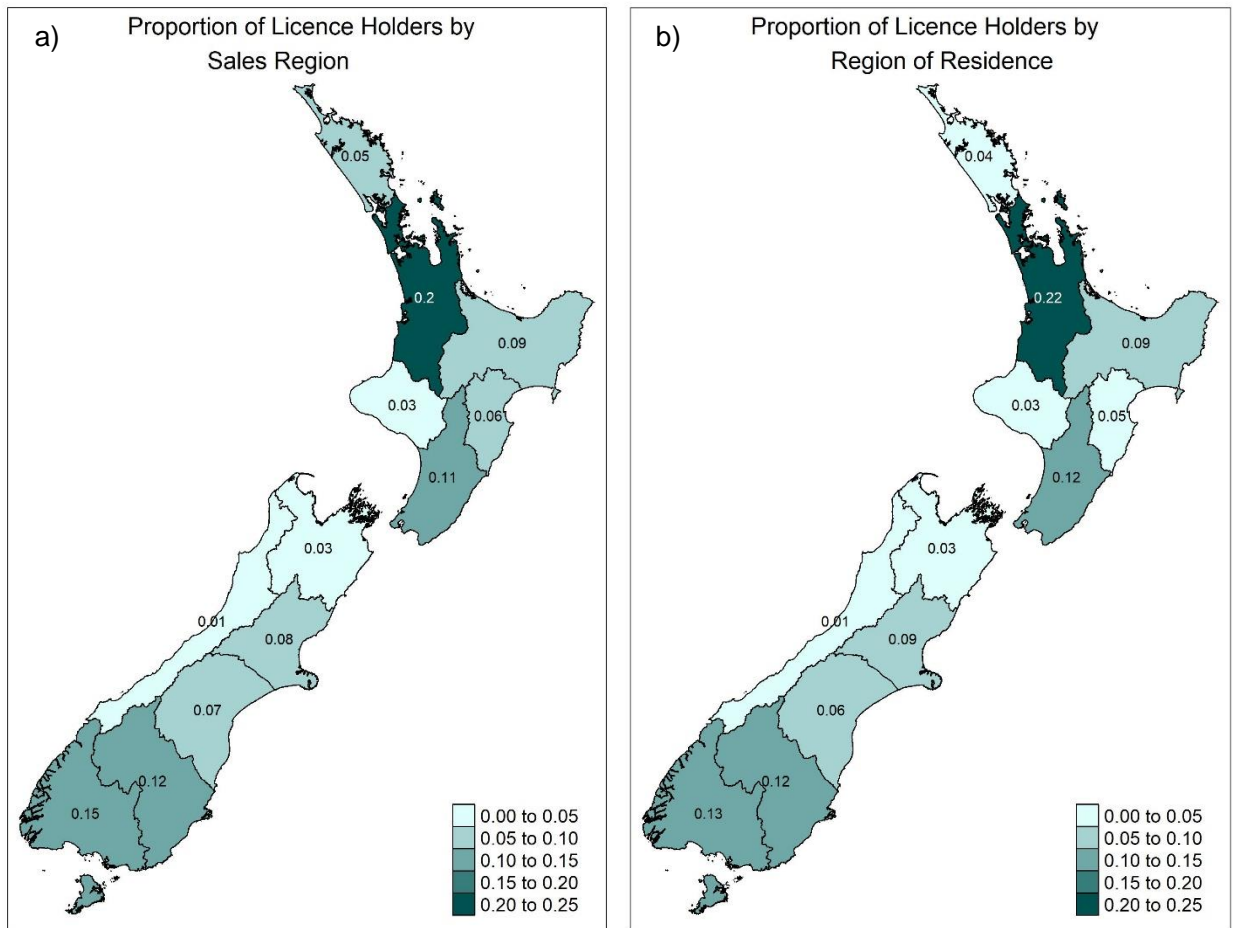

Figure 22. The proportion of New Zealand Fish & Game game bird licence holders by a) Fish & Game region of licence sale, and b) Fish & Game region of reported residence, between 2019 and 2023.

On average, 96.8% (±0.2%) of game bird licence holders self-identified as male while 3.1% (±0.2%) identified as female. There is an increasing trend in the proportion of licence holders that identify as female of, on average, 0.2% per year ($F_{1, 16} = 1,026$, $P < 0.001$). When it came to child's licences, an average of 84.7% (±0.9%) of licence holders identified as male, while 15.1% (±0.9%) identified as female.
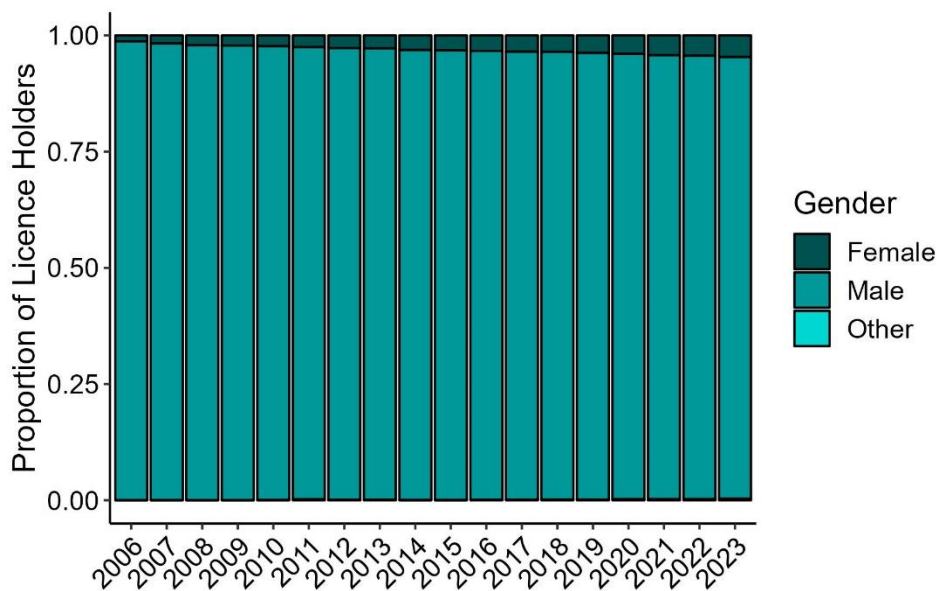
Figure 23. The proportion of licence holders who purchased game bird licences from New Zealand Fish & Game by gender from the 2006 through the 2023 hunting seasons.

The average number of licences purchased per licence holder did not differ by gender ($F_{2,\,51} = 0.68$, $P = 0.51$). However, male hunters on average spent more money on licences than female hunters did ($F_{2,\,51} = 18.2$, $P < 0.001$). A higher proportion of licences purchased by female hunters were day licences ($F_{2,\,33} = 7.6$, $P = 0.002$), 5.8% compared to 3.1% of licences purchased by male hunters. Additionally, a larger proportion of licences purchased by female hunters were child licences ($F_{2,\,47} = 43.35$, $P < 0.001$), 16.7% compared to 2.9% of licences purchased by male hunters.

The mean age of licence holders between 2006 and 2023 seasons was 41.7 (± 0.02) years. The mean age has increased by an average of 0.17 years per year ($F_{1,\,618,976} = 1,465$, $P < 0.001$). On average, female licence holders were 14 years younger than their male counterparts ($F_{2,\,618,975} = 6,455$, $P < 0.001$). Mean age varied by licence type, with the day licence holders younger than whole season licence holders by an average of 1.2 years ($F_{1,\,618,976} = 80.1$, $P < 0.001$).

Table 3. The mean age and standard error of New Zealand Fish & Game licence holders by licence type.

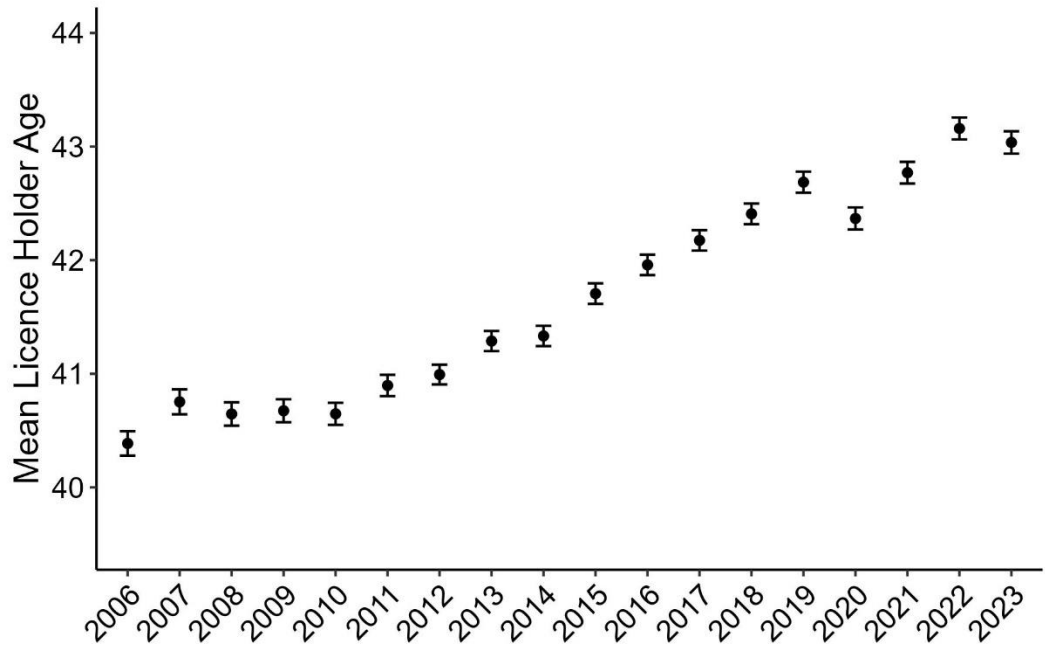| Licence Type	Mean Age	
Day	40.5	± 0.12
Whole Season	41.8	± 0.02

Figure 24. The mean age of licence holders who purchased game bird licences from New Zealand Fish & Game from the 2006 through the 2023 hunting seasons, with error bars representing standard error.
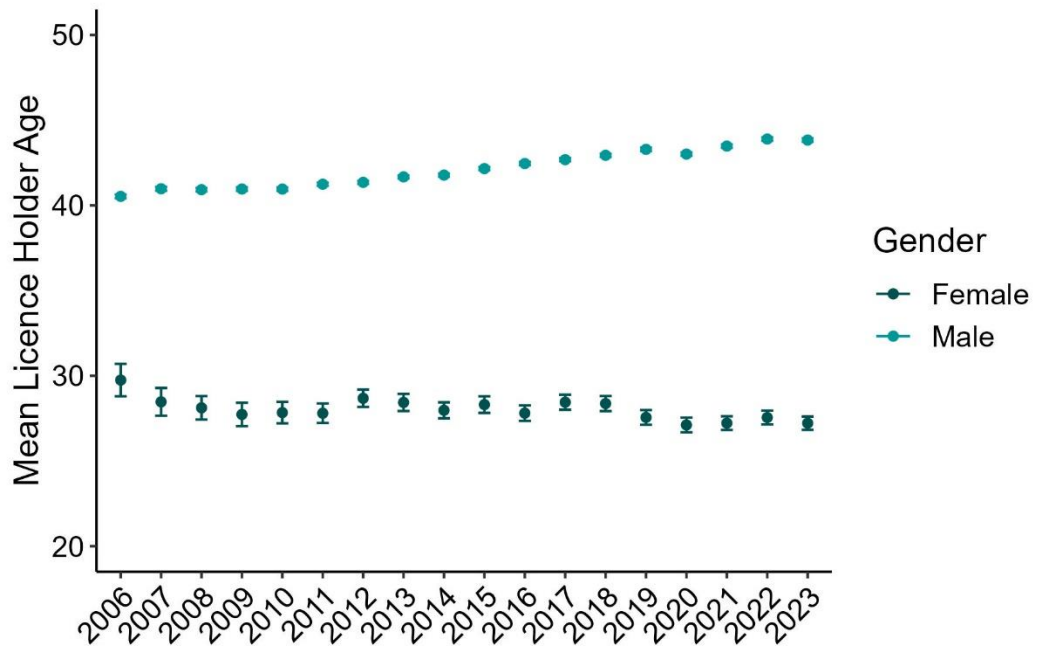

Figure 25. The mean age of licence holders who purchased game bird licences from New Zealand Fish & Game from the 2006 through the 2023 hunting seasons by gender, with error bars representing standard error.

Trends in R3

The relationship that best depicts the trend in the number of game licence holders over time is split between the 2012 and 2013 game seasons. Prior to the 2013 game season, a Poisson glm representing the number of licence holders over time indicates a rapid increase in the number of licence holders. After the 2012 game season, the relationship shifted and now indicates a small annual decline.
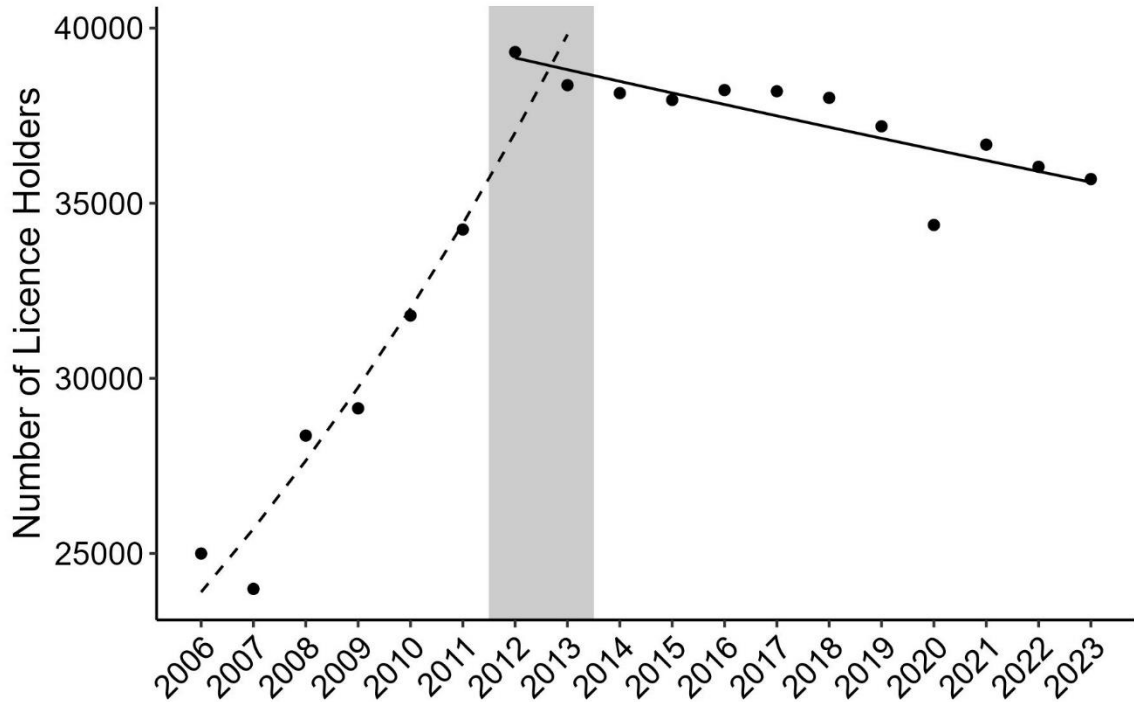

Figure 26. The number of licence holders who purchased game bird licences from New Zealand Fish & Game from the 2006 through the 2023 seasons. The dashed line represents a linear Poisson regression on the number of licence holders over time for the 2006-2013 seasons, while the solid line represents a regression for the 2012-2023 seasons.

Based on the 2012-2023 relationship, the estimated number of licence holders for the 2024 season is 35,293, an 1.1% decrease from the 2023 season. A 95% prediction interval on the estimated number of licence holders was 34,897-35,719. The estimated number of licence holders for the 2025 season is 34,989, with a prediction interval of 34,534-35,447.

The recruitment rate has declined since the 2009 season, at a rate of -1.0% per year ($F_{1, 12}$ = 36.1, P < 0.001).
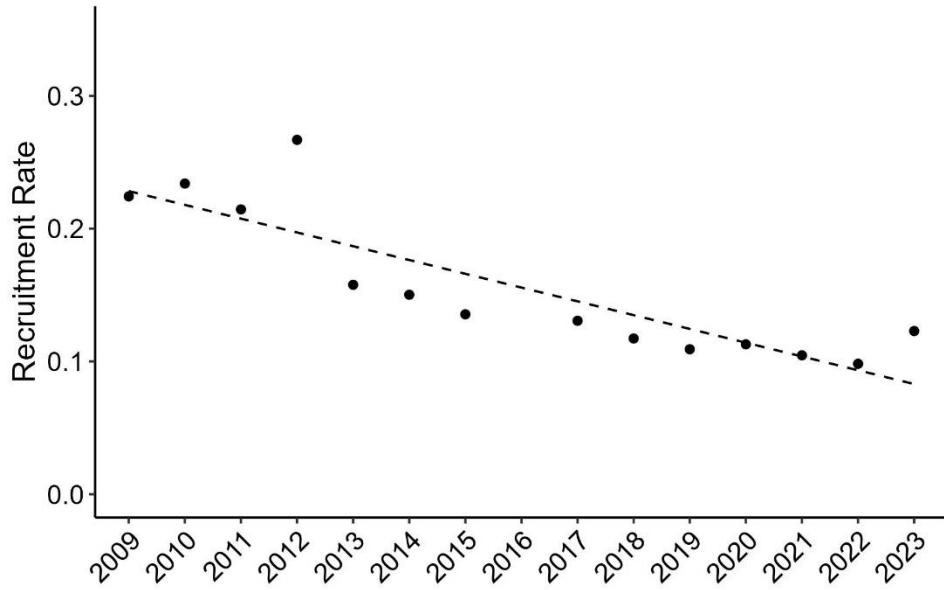

Figure 27. The recruitment rate for New Zealand Fish & Game game bird licence holders from the 2009 through the 2023 hunting seasons. The dashed line represents a simple linear regression on the recruitment rate over time.

The retention rate has increased since the 2009 season by an average of 0.8% per year ($F_{1, 12}$ = 16.2, P = 0.002). The average retention rate has been very high between 2009-2023 at 73.0%.
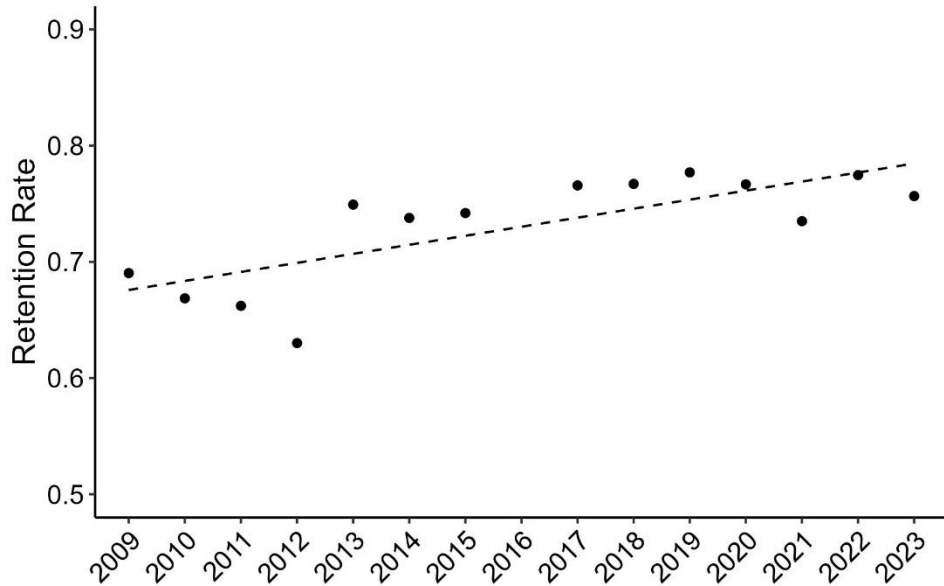

Figure 28. The retention rate for New Zealand Fish & Game game bird licence holders from the 2009 through the 2023 hunting seasons. The dashed line represents a simple linear regression on the retention rate over time.

The reactivation rate has increased since the 2009 season, at a rate of 0.3% per year ($F_{1, 12}$ = 9.3, P = 0.010). There was a small spike in reactivation during the 2021 season, likely a result of game bird hunters returning to the sport following the 2020 COVID restrictions.
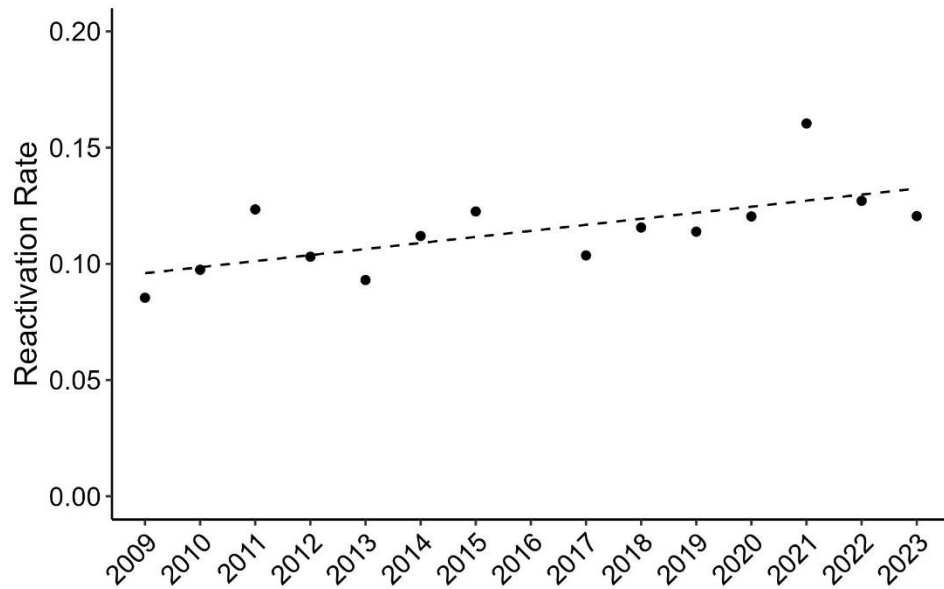

Figure 29. The reactivation rate for New Zealand Fish & Game game bird licence holders from the 2009 through the 2023 hunting seasons. The dashed line represents a simple linear regression on the reactivation rate over time.

The average number of years spent "in-churn" for hunters who purchased in multiple non-consecutive years since the 2009 season was 2.6 (±0.006) years. There was no significant trend in the number of licence holders "in churn" relative to the number of active licence holders ($F_{1, 9}$ = 1.2, P = 0.31).

There was no evident trend in the rate of loss over time between the 2007-2020 seasons ($F_{1, 11}$ = 0.12, P = 0.74).
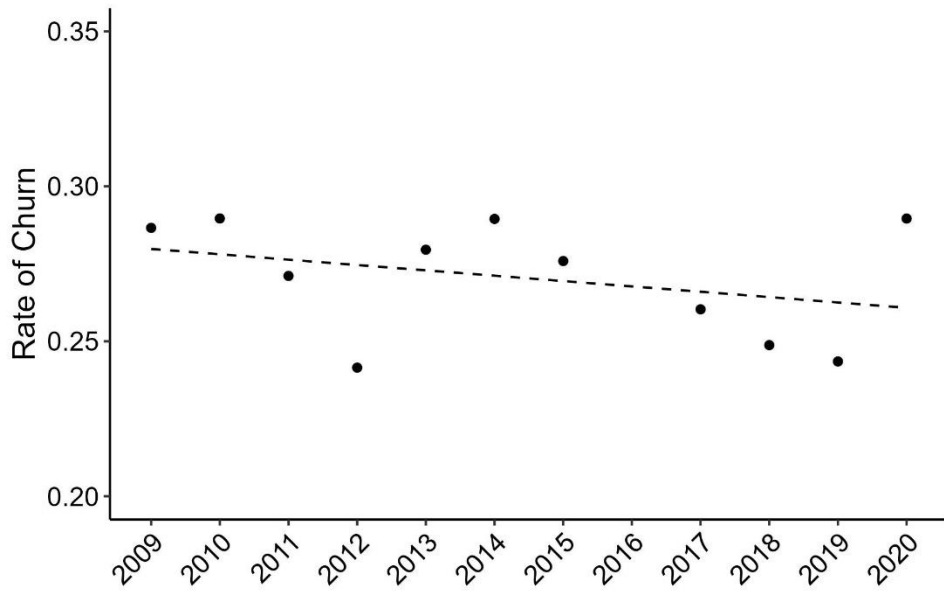
Figure 30. The rate of churn for New Zealand Fish & Game game bird licence holders from the 2009 through the 2020 hunting seasons. The dashed line represents a simple linear regression on the rate of churn over time.
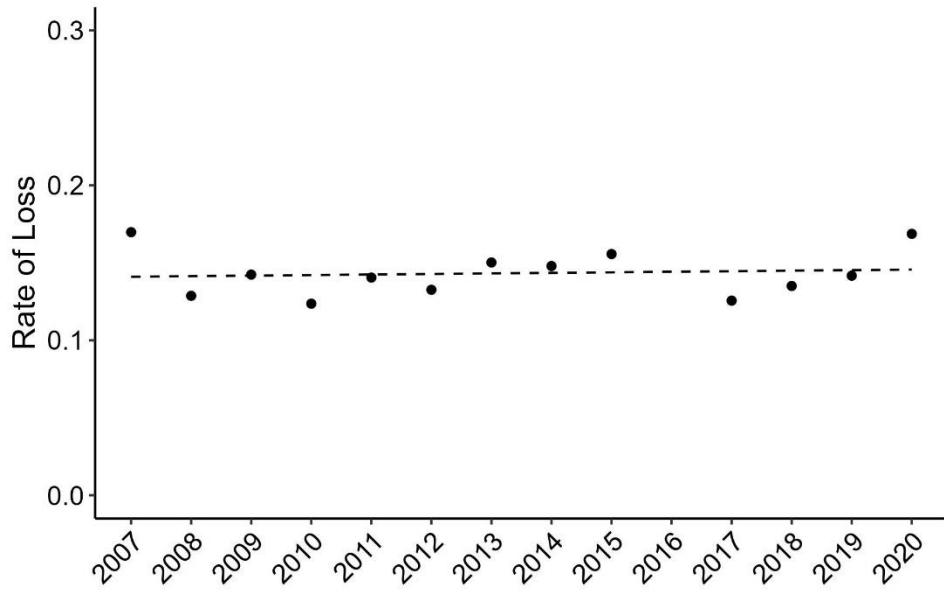

Figure 31. The rate of loss for New Zealand Fish & Game game bird licence holders from the 2007 through the 2020 hunting seasons. The dashed line represents a simple linear regression on the rate of loss over time.

Gender

Recruitment was higher for female hunters than male hunters, with an average annual recruitment rate of 35.0% relative to male's 15.0% ($F_{1, 24} = 271$, $P < 0.001$). There was no evidence of any difference in trend between male and female recruitment rates over time ($F_{1, 24} = 0.001$, $P = 0.98$).
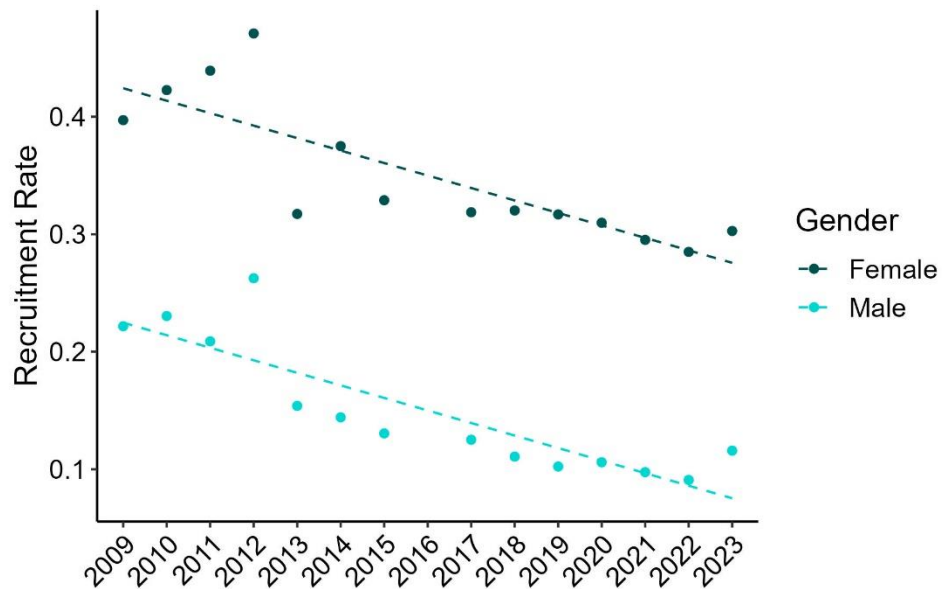

Figure 32. The recruitment rate for New Zealand Fish & Game game bird licence holders from the 2009 through the 2023 hunting seasons by gender. The dashed line represents a simple linear regression on the recruitment rate over time.

Retention was significantly lower for female hunters than male hunters, with an average annual retention rate of 54.8% relative to male's 73.6% ($F_{1, 24} = 193$, $P < 0.001$). There was no evidence of any difference in trend between male and female retention rates over time ($F_{1, 24} = 0.01$, $P = 0.95$).
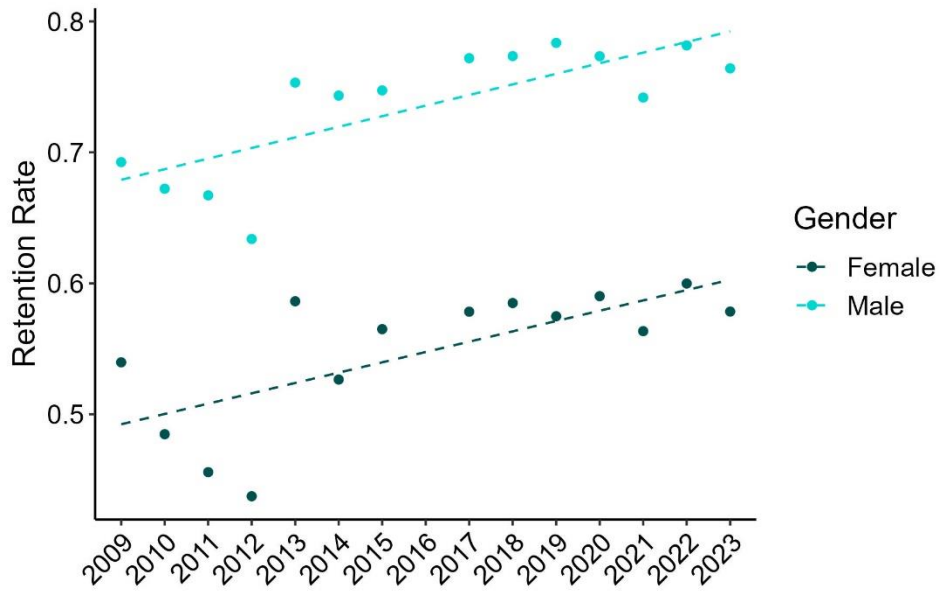
Figure 33. The retention rate for New Zealand Fish & Game game bird licence holders from the 2009 through the 2023 hunting seasons by gender. The dashed line represents a simple linear regression on the retention rate over time.

Reactivation was higher for male hunters than female hunters, with an average of 11.4% relative to female's 10.2% ($F_{1,24} = 5.5$, $P = 0.028$). There was no evidence of any difference in trend between male and female reactivation rates over time ($F_{1,24} = 0.018$, $P = 0.90$).
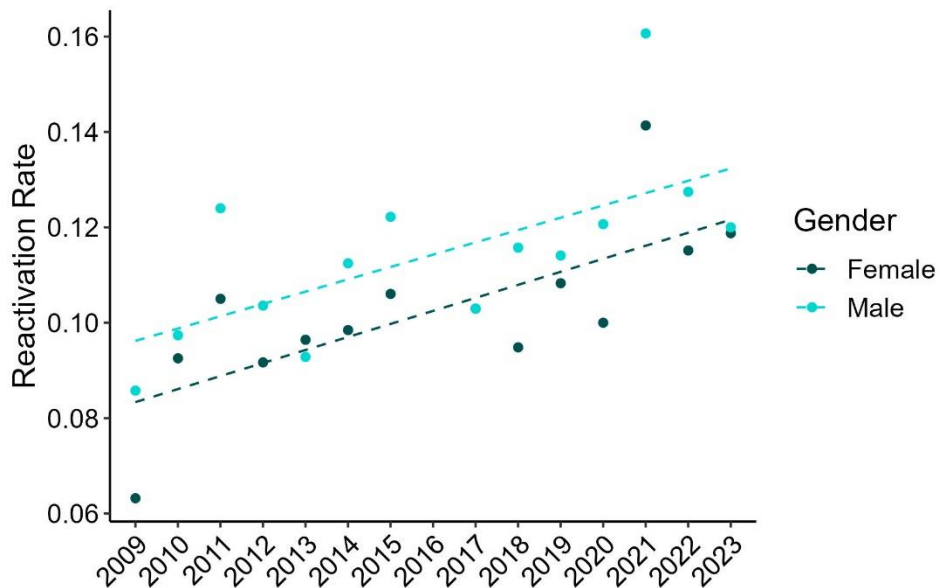

Figure 34. The reactivation rate for New Zealand Fish & Game game bird licence holders from the 2009 through the 2023 fishing seasons by gender. The dashed line represents a simple linear regression on the reactivation rate over time.

Churn was higher amongst male hunters than female hunters, with an average of 27.0% in-churn relative to female's 25.0% ($F_{1,18}$ = 6.0, P = 0.025). There was no evidence of any difference in trend between male and female rate of churn over time ($F_{1,18}$ = 0.085, P = 0.77). On average, male hunters spent slightly longer in-churn than female hunters, at 2.6 (± 0.01) years relative to female's 2.4 (± 0.03) years ($F_{1, 124,337}$ = 67.4, P < 0.001).
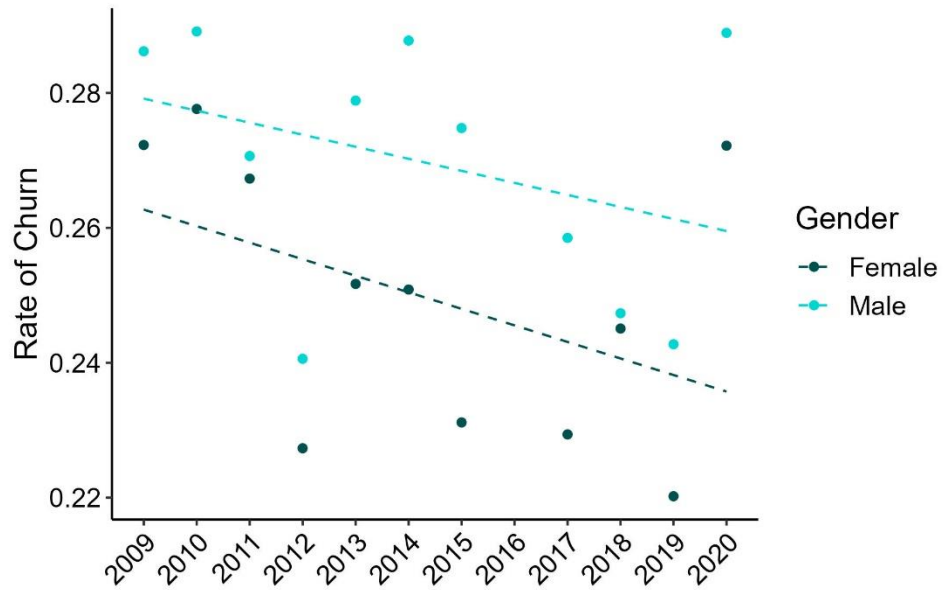

Figure 35. The rate of churn for New Zealand Fish & Game game bird licence holders from the 2009 through the 2020 hunting seasons by gender. The dashed line represents a simple linear regression on the rate of churn over time.

Loss was higher for female hunters than male hunters, with an average rate of loss of 24.9% amongst females relative to male's 14.1% ($F_{1, 22}$ = 48.2, P < 0.001). On average, the rate of loss for female hunters increased by 1.2% annually ($F_{1, 11}$ = 10.2, P = 0.008). For male hunters, there was no evident trend in rate of loss over time ($F_{1, 11}$ = 0.04, P = 0.84).
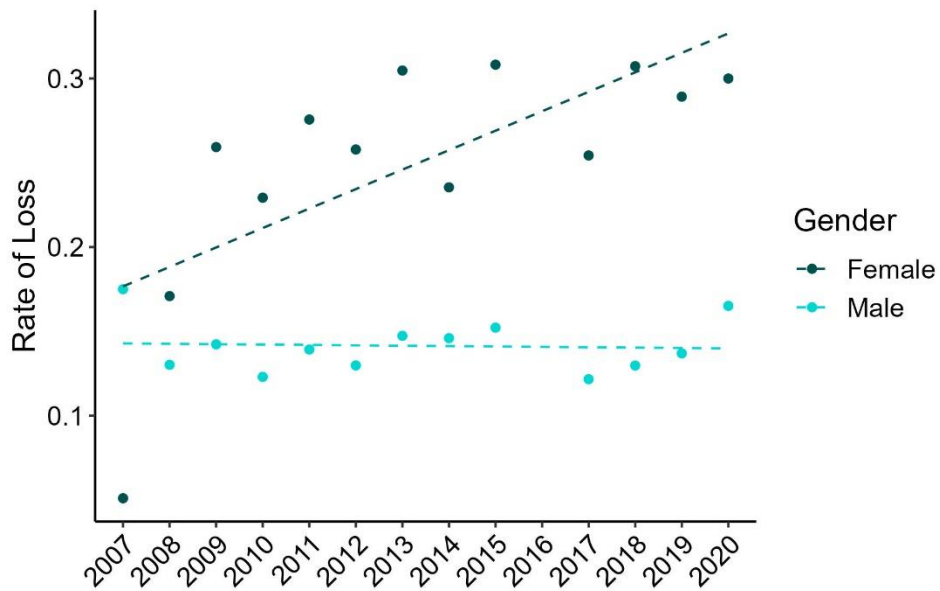

Figure 36. The rate of loss for New Zealand Fish & Game game bird licence holders from the 2007 through the 2023 hunting seasons by gender. The dashed line represents a simple linear regression on the rate of loss over time.

Age

Recruitment rates varied by age class ($F_{7, 96} = 166$, $P < 0.001$) but the change in recruitment over time did not ($F_{7, 96} = 1.1$, $P = 0.34$). On average, recruitment was highest for the younger age classes and was lowest within the older age classes.
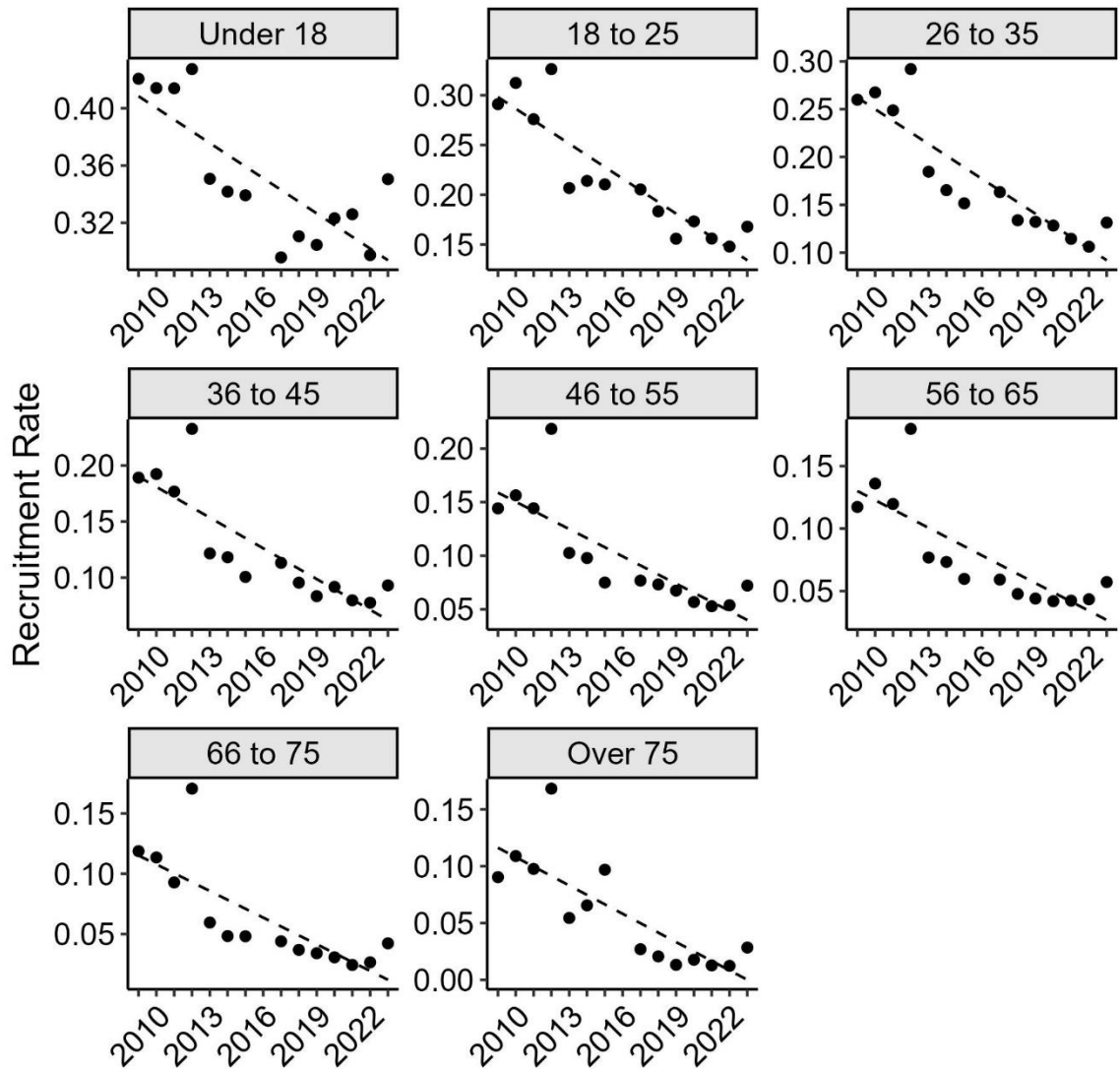

Figure 37. The recruitment rate for New Zealand Fish & Game game bird licence holders from the 2009 through the 2023 hunting seasons by age group. The dashed line represents a simple linear regression on the recruitment rate over time.

Retention rates varied by age class ($F_{7, 96}$ = 121, $P < 0.001$) but the change in retention over time did not ($F_{7, 96}$ = 0.42, $P = 0.89$). On average, retention was highest within the older age classes and lowest within the younger age classes.
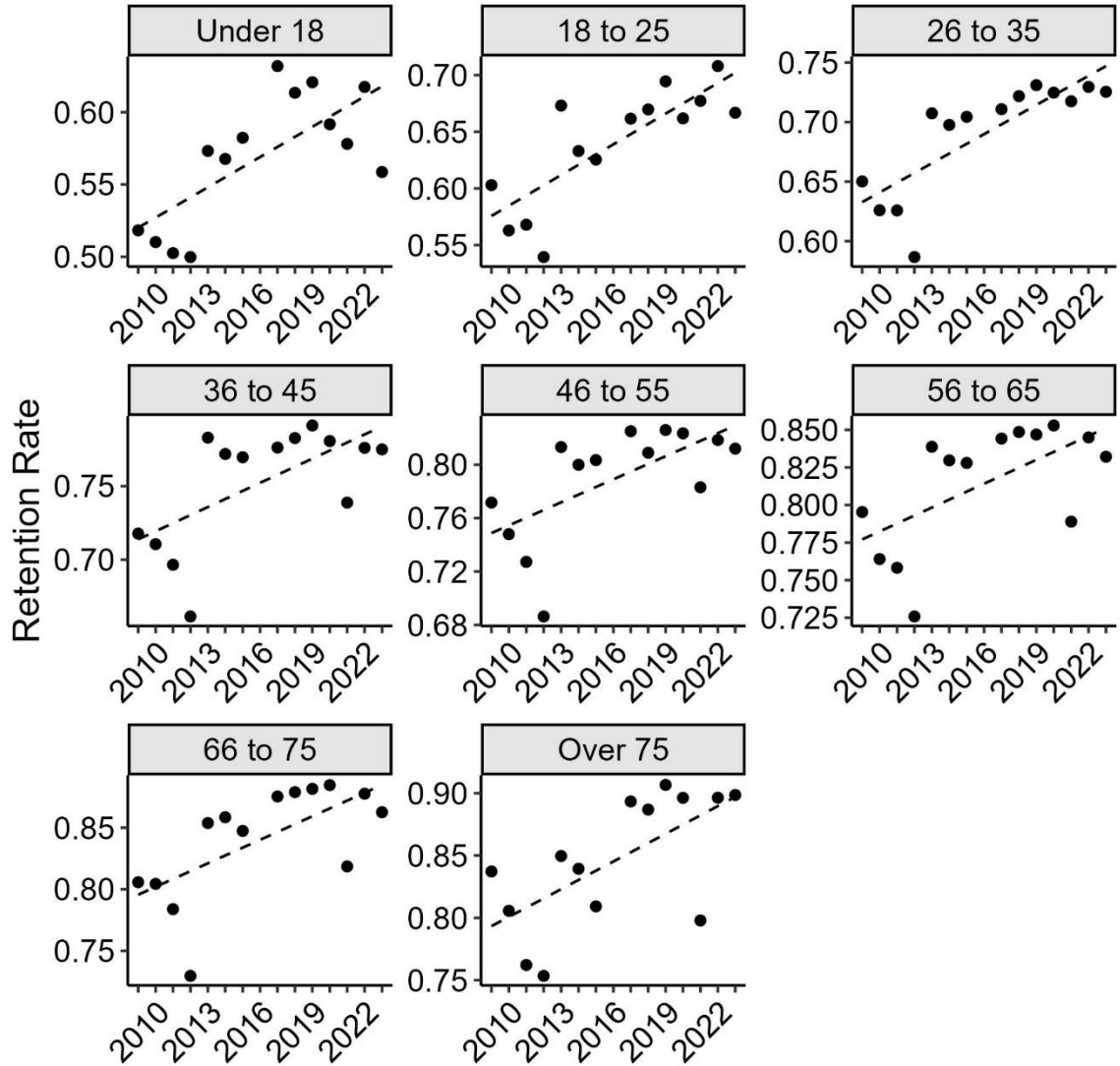

Figure 38. The retention rate for New Zealand Fish & Game licence holders from the 2009 through the 2023 hunting seasons by age group. The dashed line represents a simple linear regression on the retention rate over time.

Reactivation rates varied by age class ($F_{7,96}$ = 17.5, P < 0.001), but the change in reactivation over time did not ($F_{7,96}$ = 1.1, P = 0.37). On average, reactivation was highest within the 18-35 age groups and lowest within the under 18, 66-75, and over 75 age groups.
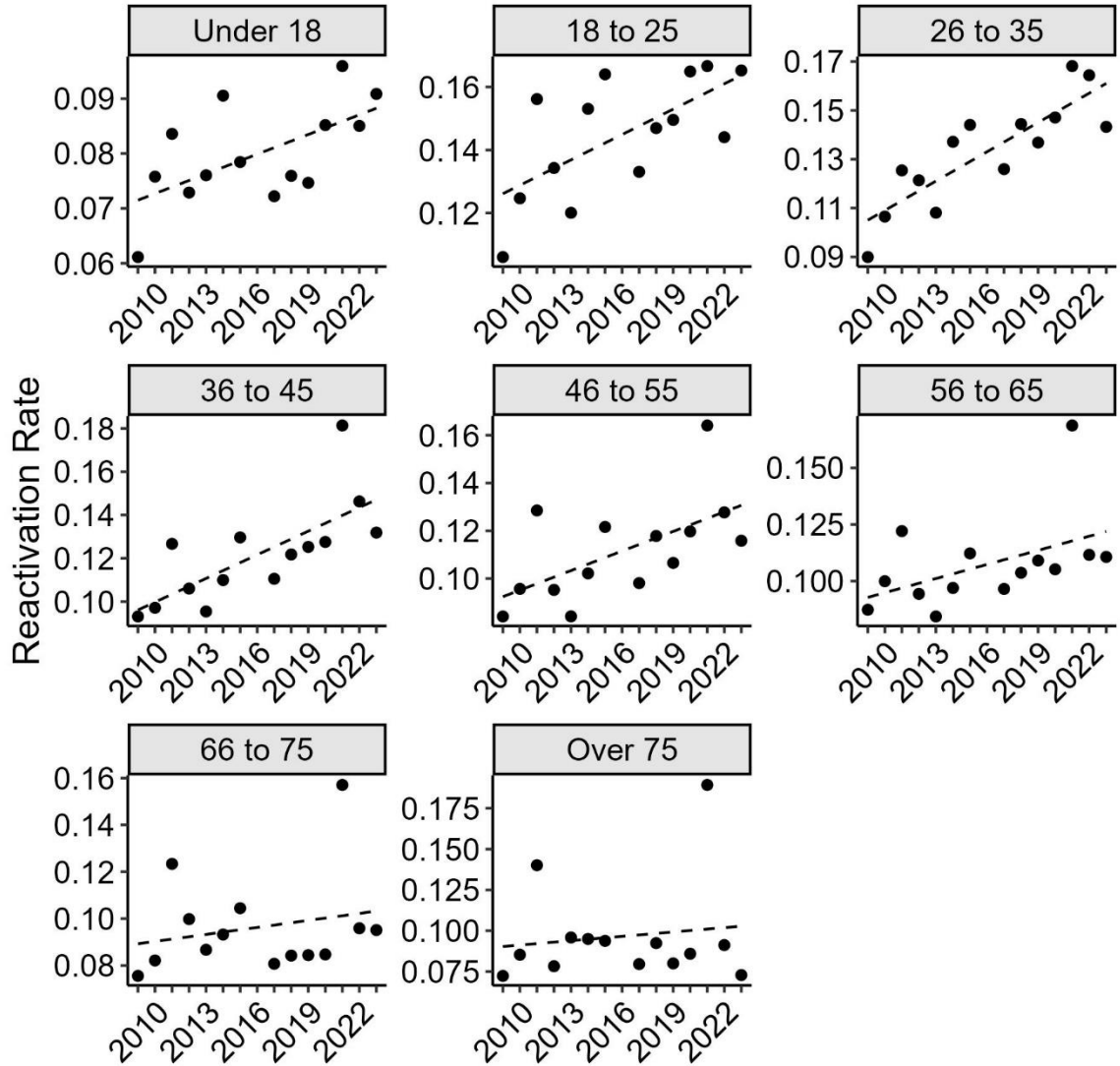

Figure 39. The reactivation rate for New Zealand Fish & Game game bird licence holders from the 2009 through the 2023 hunting seasons by age group. The dashed line represents a simple linear regression on the reactivation rate over time.

Both rate of churn and the change in rate of churn over time varied by age class ($F_{7, 72}$ = 110, P < 0.001; $F_{7, 72}$ = 3.6, P = 0.002). On average, rate of churn was highest within the 18-35 age range and lowest within the older age classes and the under 18 age class. The under 18 and 18 to 25 age classes had 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 ($F_{7, 130,668}$ = 195, P < 0.001).
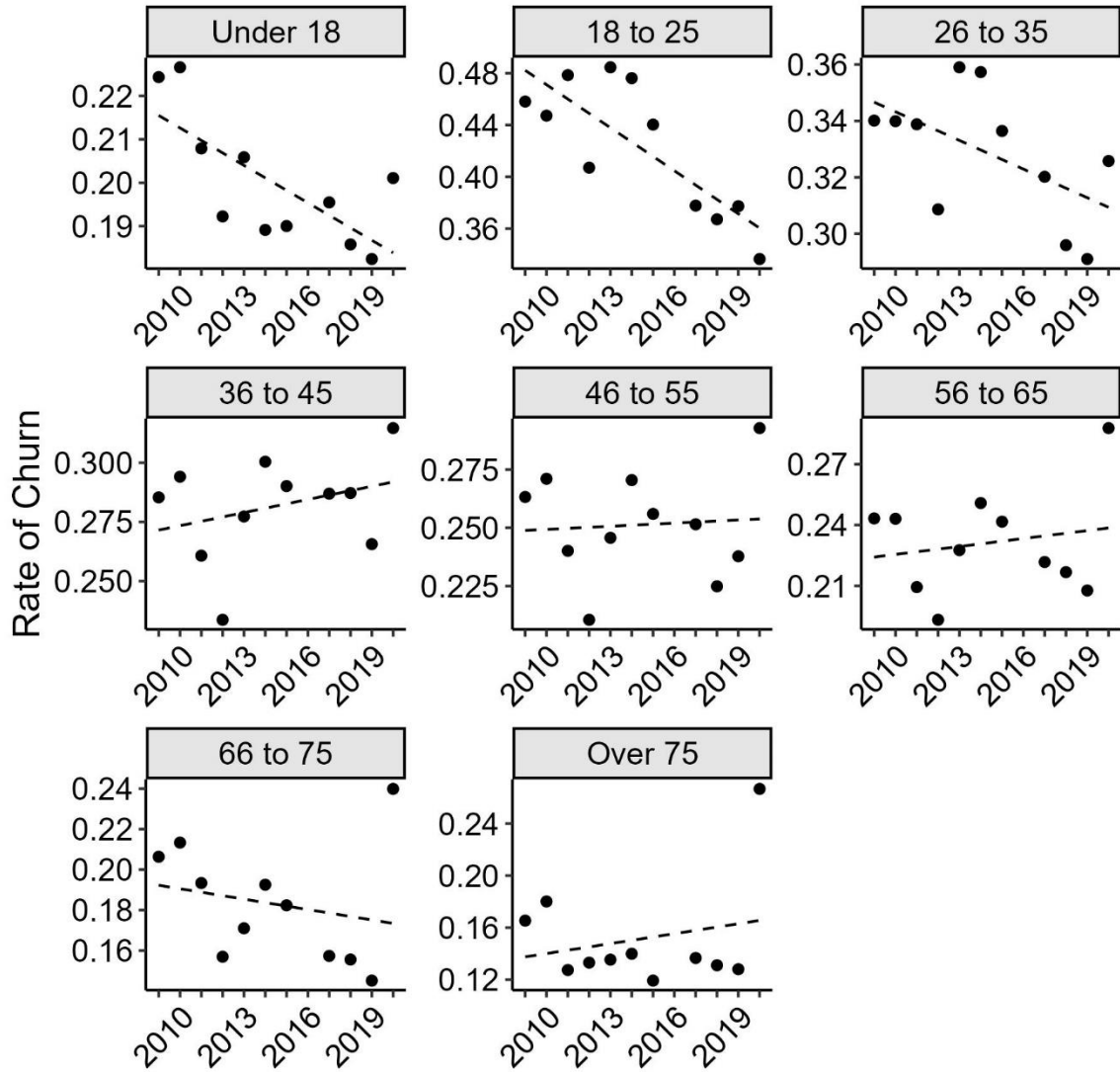

Figure 40. The rate of churn for New Zealand Fish & Game game bird licence holders from the 2009 through the 2020 hunting seasons by age group. The dashed line represents a simple linear regression on the rate of churn over time.

Table 4. The mean number of years spent in-churn and standard error by age group for New Zealand Fish & Game game bird licence holders from the 2009 through the 2023 hunting seasons.

Age Group	Years In-Churn
Under 18	1.9 ± 0.01
18 to 25	2.5 ± 0.01
26 to 35	2.7 ± 0.01
36 to 45	2.6 ± 0.01
46 to 55	2.6 ± 0.01
56 to 65	2.7 ± 0.02
66 to 75	2.6 ± 0.03
Over 75	2.5 ± 0.07

Both rate of loss and the change in rate of loss over time varied by age class ($F_{7,88} = 71.9$, $P < 0.001$; $F_{7,88} = 2.8$, $P = 0.011$). On average, rate of loss was highest within age classes up to 25 years old and over 75 years old. Age classes between 26-55 years old all exhibited increasing trends of loss over time, while the age classes under 18 and over 56 years old exhibited no evident trend.
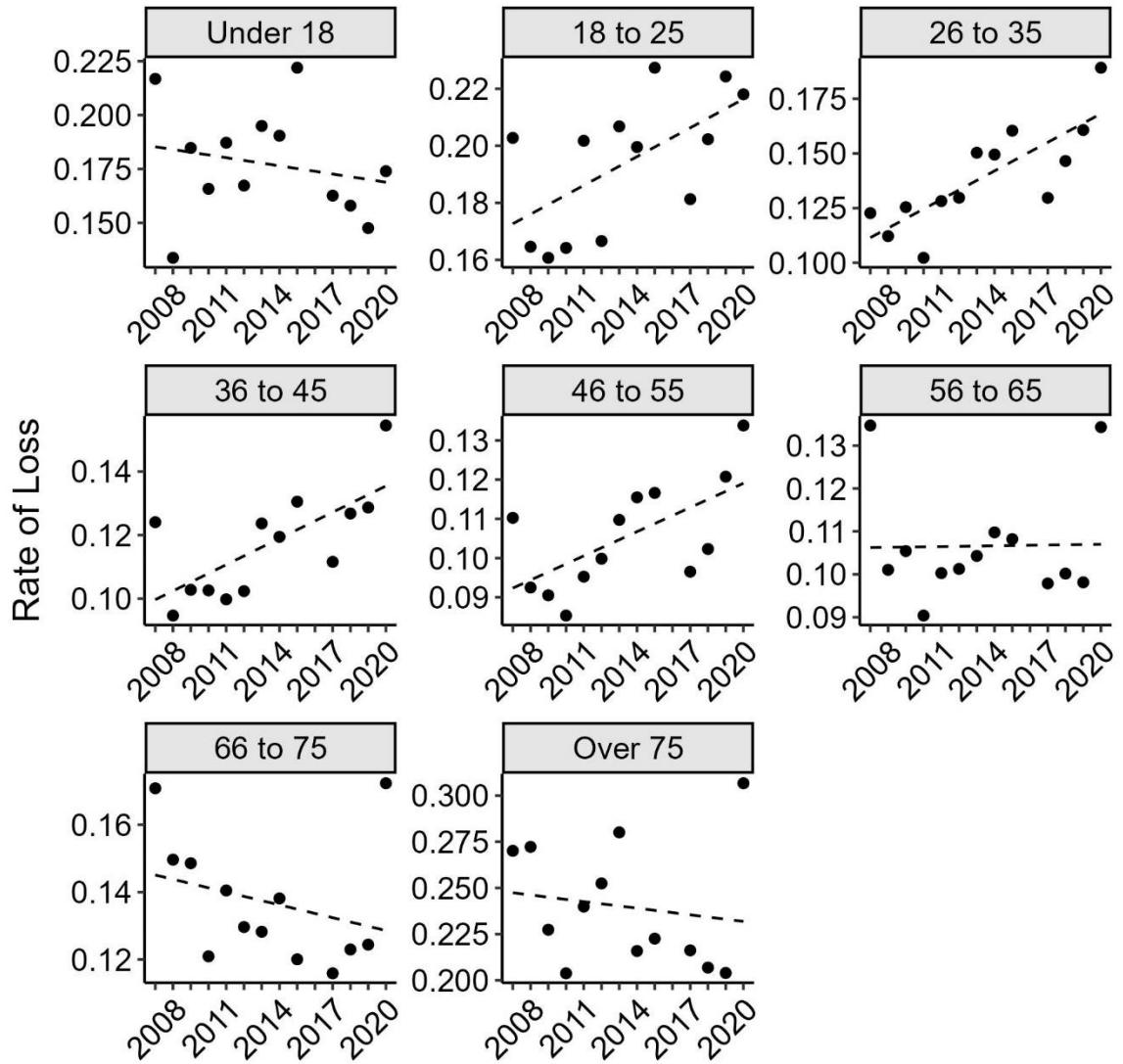

Figure 41. The rate of loss for New Zealand Fish & Game game bird licence holders from the 2007 through the 2020 hunting seasons by age group. The dashed line represents a simple linear regression on the rate of loss over time.

Non-Residents

Since the 2006 hunting season, non-residents from 46 countries have purchased game bird licences from New Zealand Fish & Game. On average, 14.8% (± 2.2%) of licences purchased by non-residents are day licences. The number of non-resident licence holders varied between 150 and 204 in the years prior to the COVID 19 pandemic. In 2023, the number of game bird licences purchased by non-residents returned to the pre-pandemic norm, peaking at 205 licence holders. In 2023, non-residents purchased 215 game bird licences, equating to a value of $18,172 NZD.

The majority of non-resident hunters have been from Australia (53.4%) followed by the United States (31.3%) and the UK (3.4%).
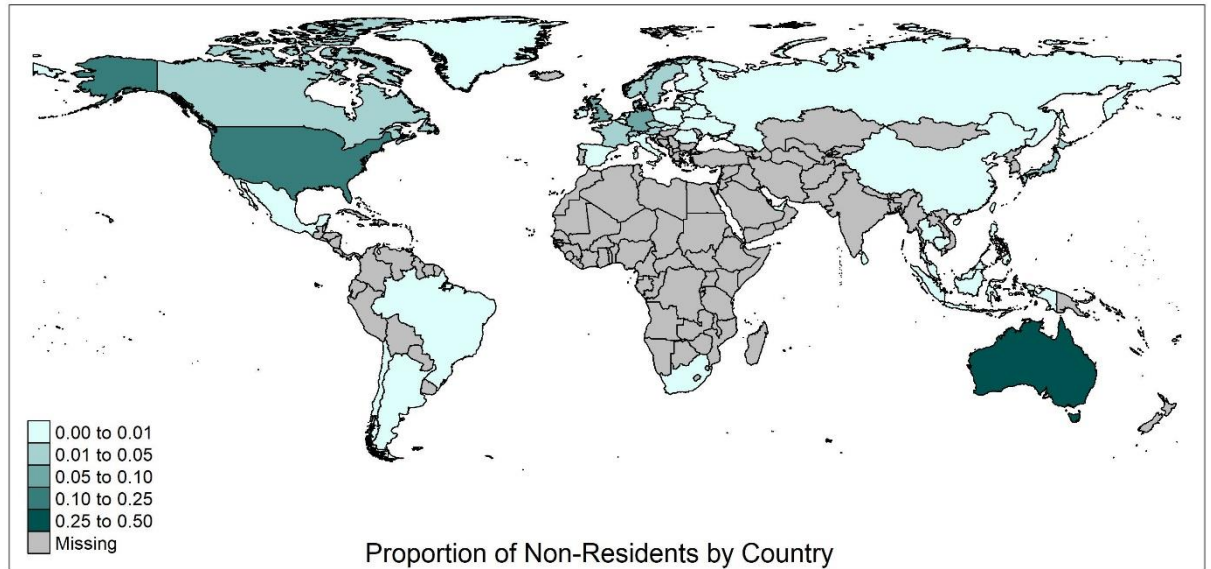

Figure 42. The proportion of New Zealand Fish & Game non-resident game bird licence holders from the 2006 through the 2023 hunting seasons by reported country of residence.