

Bag limits and Season Length.

The two primary options we have to reduce harvest are changing season length and bag limits. Both options have proven to be relatively blunt tools at regulating harvest in this region. Harvest is strongly correlated with hunter effort, but it is difficult to constrain effort using changes to harvest regulations as hunters can change their behaviour to shifting regulatory framework. Average hunter effort is generally decreasing over time in most regions throughout the country, even in regions where duck numbers are high and season regulations have remained fixed. There are likely to be competing interests and work requirements influencing overall participation in the sport. It is also likely that in years where population levels are low or hunters experience less success they will hunt less, (the law of diminishing returns) and vice versa.

Banding models indicate that hunter effort explains changes in survival better than any other competing factors in the Eastern Region, and changes in bag limits also receive high levels of support. But in the Auckland/Waikato Region neither bag limits, season length nor total harvest are highly ranked. Instead, summer rainfall receives the greatest support.

Historically, season regulations were liberalised to cope with the burgeoning mallard population. At that stage there was a real risk that mallards could have been made a pest bird due to their increase. It's fair to say that this would hardly be a relevant argument today. It was also accepted then that one of the desired outcomes of increasing the season would be to impact mallard productivity: *“When traditionally the season closed on Queens Birthday weekend, every bird that survived almost certainly took part in the subsequent breeding process. Each of these birds is a fit strong bird and all those shot will reduce the breeding population. So in some areas where there is concern about the Mallard population it is eminently sensible to extend the hunting season and so give hunters the opportunity to continue to shoot while at the same time carry out the only reasonable strategy we have available to us to contain or even reduce the population”* (Caithness 1982). Today we are once again faced with concern about the mallard population but unfortunately not in the same context as above.

Managing Expectations

We need to acknowledge that there are limitations when using season length and bag limits to manage harvest in New Zealand. We have localised populations which has advantages, however it also means much of our harvest is constrained to the start of the hunting season. This is different from managing

a migratory flock with a fresh supply of new birds into different hunting areas and a more even harvest spread throughout a season. Changing regulations may also have counterintuitive consequences. For example, hunters may hunt more prolifically during shorter seasons and therefore effort and harvest are not necessarily constrained.

We must recognise these limitations that challenge traditional belief systems when setting harvest regulations which have been identified as a principle causes as to why this approach has failed to meet some waterfowl manager's expectations. These traditional beliefs can be categorised as myths of control, learning and goal setting.

Myths of control include the belief that there are tight linkages between hunting regulations, hunter behaviour, harvest and waterfowl population responses. It is important to recognise that a manager's ability to control harvest and population size through the manipulation of hunting regulations is limited, especially when compared with the influence of environmental factors beyond our control. A related myth involves the misconception that harvest strategies can account for all sources of variability in waterfowl demographics.

Myths of learning includes the belief that strong inference is possible in the absence of experimental controls, replication or randomization and the unquestioned assumption that systems of interest are stable enough to permit learning. Ecological systems are constantly changing and there are serious questions about our collective ability to learn quickly enough for knowledge to be applicable to new or unexpected system behaviours.

The myth of goal setting includes the belief that broad qualitative statements about desirable management outcomes are sufficient to define a unique management strategy. For example, there are many management strategies that could achieve the overarching goal of sustainable harvest, yet could also differ in ways which affect how they are perceived and accepted by various stakeholders. A key difficulty that remains is the disagreement and uncertainty about how harvest regulation change affects the behaviour and satisfaction of hunters.

There has often been a lack of attention to the social components of harvest management when assessing management decisions. Managers do not control harvest directly, but rather must rely on the manipulation of regulations to achieve their intended objectives. It seems obvious that understanding the relationship between hunting regulations and harvest is a critical link in this relationship.

The factors that motivate hunters and hence drive harvest vary widely and it may be impossible to predict how changes in harvest regulations will affect hunter behaviour. This does not mean that

regulations should not be changed, rather, managers must realise that long held beliefs regarding the effects of making certain changes may not necessarily hold true.

Hunter Success

There are several ways we can define hunter success, and the definition of success can vary dramatically on an individual and regional level. Perceived duck numbers and numbers of ducks bagged, consistently rank highly as an important contributing factor defining success; however, it is not always the highest-ranking variable.

In a comparative analysis, a perceived high number of ducks was given as a driving factor for Wellington hunter measures of success, whilst companionship and hunting enjoyment were given the highest-ranking variables in the Taranaki Region. In the Auckland/Waikato Region, seeing lots of game birds and spending time with family and friends scored much higher than any other variables. Perhaps somewhat surprisingly shooting lots of game birds scored near the bottom, just in front of pulling the trigger.

A number of supplementary questions have been asked in relation to harvest regulation changes during harvest survey to gauge hunter's opinions. Hunters surveys provide a completely randomised and therefore unbiased perspective of hunter opinions. Most hunters (53.8%) supported the reduction in bag limits from 10 to 6, however, the main reasons given for such is that the individual never reached the limit; hence it was not an issue for them.

Hunters have also been asked whether they would prefer a reduction in bag limit or a reduction in season length, if restrictive conditions were deemed necessary. A specific example of a 6 bird, 8 week season was given in comparison with 10 bird, 5 week season. The results were relatively even with just over 50% preferring a reduction in season length whilst 41% preferred a reduction in bag limits. These results closely mirror those found in the Eastern region where 52% of hunters preferred the season reduction alternative and 42% favouring a reduction in bag limits.

In 2012, the Auckland/Waikato Region reduced the season length for the first time since 1985. Hunters were canvassed to ascertain their relative support of the reduction to 4 weeks. The majority either supported the regulation change or did not care (73%). As with bag limits, it is likely that hunters who do not go out often during the season simply felt that they were unaffected by the change. Many felt that the decision was justified due to the low duck numbers witnessed throughout most of the region. When hunters were asked a completely open-ended question about season length duration the majority felt that 4-8 weeks was sufficient with a 6-week season getting the highest level of support.

Dabbling Duck Season Length

Mallards are generally sedentary in New Zealand which means that there is no large influx of 'fresh' birds into a region during a season like there is in their natal countries where the birds tend to be migratory. For this and other social reasons there has always been a large emphasis on opening weekend of the game bird season. In the Auckland/Waikato Region On average 38% of the total season harvest occurs on opening weekend with 66% occurring in the first fortnight (Figure 1).

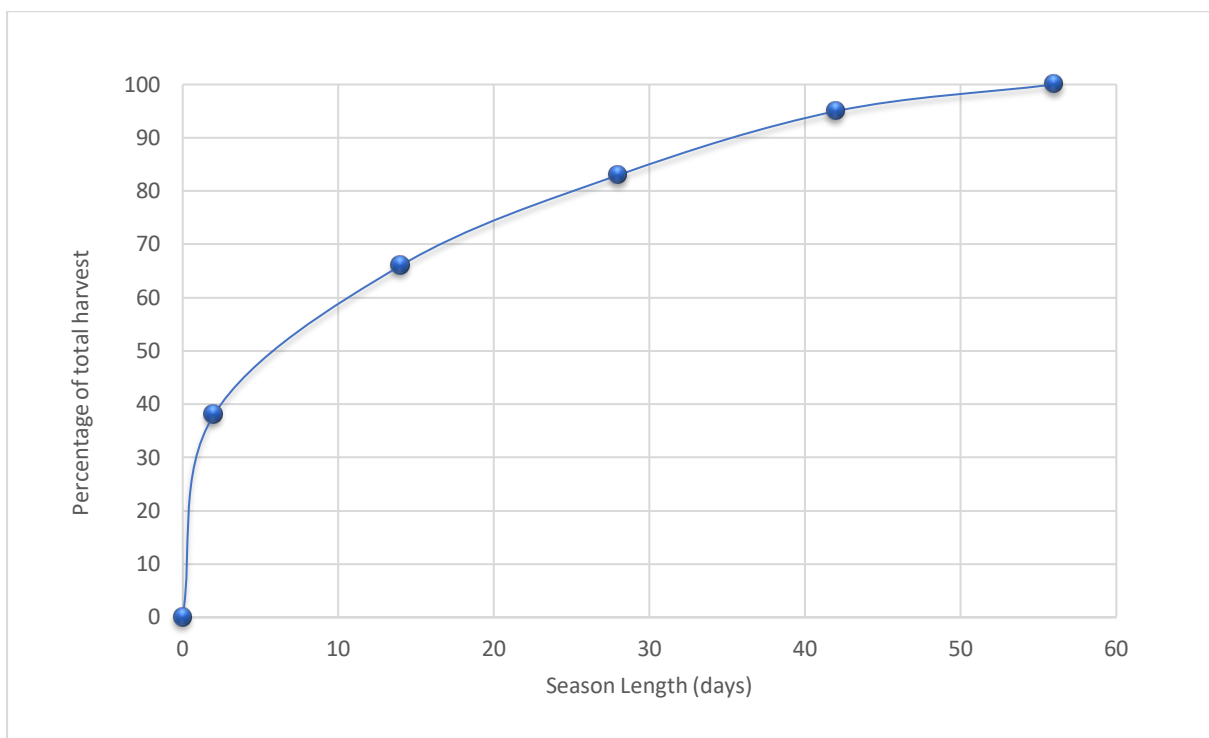


Figure 1: Average cumulative harvest in the Auckland Waikato Region in an 8 week season.

When season length was first liberalised, it was assumed that there was a strong and predictable linear relationship by which a 5% increase in harvest could be attributed to every extra week of season length. We now know that changing harvest regulations has a less predictable impact on hunter behaviour and therefore this assumption does not hold true. For example, when a 4-week season was first trialled in the Eastern Region, it resulted in a higher harvest than both the previous and subsequent 8-week seasons. In that instance many hunters were unaware of the regulation change and 14% of the harvest occurred after the season had officially closed. The strong linear relationship previously reported was likely due to the bias associated with the harvest surveys of the time, where statistics were based on a non-random selection of hunters. If we canvassed only

dedicated hunters like those used for the earlier analysis it is likely that the same relationship would still be evident today. For this reason, we now use a minimum of 120 randomly selected hunters for each survey period to obtain an accurate estimate of the entire licence holder pool.

Since the inception of reduced season lengths in the Waikato in 2012 the number of hours hunted has reduced from an average of 30 hours per hunter to 22, with a statistically significant relationship between the two variables ($p < 0.05$ $R^2 = 0.58$). Season length may therefore be having some impact on hunter effort, although there is also a general reduction in hours hunted across the country over the same period. Even some regions with high populations and consistently liberal limits and season length have witnessed a similar proportionate decline in average hours hunted.

The mallard telemetry study confirmed that longer seasons, encroaching to the end of June, are extending into the start of the breeding season. This can impact pair bond formation, breeding site selection and may prevent birds from putting on adequate condition prior to nesting through constant disturbance. Therefore, season length is more likely to influence productivity than bag limits, although the level of any effect is difficult to measure.

When hunters have been surveyed for their opinion in the game bird harvest survey, feedback was mixed with a shorter season length being favoured by a small majority over a reduction in bag limits when only given these two options. Before the season was reduced from 8 weeks, a reduction in season length was favoured over all other regulation changes closely followed by restricting magazine capacity and separate drake and hen limits.

It is acknowledged that having more birds to shoot is not necessarily what drives some hunters and therefore the hunter opportunity that a longer season enables does play a role in improving hunter satisfaction. Most submissions asking for a longer season length, seek a trade off with a slight reduction in bag limits, mostly after opening weekend. As discussed in that section, a small reduction in bag limits will not reduce harvest as few hunters achieve higher bags, especially after opening weekend.

Bag Limits for Mallards/Greys

To be effective tool for reducing harvest, bag limits would have to be low. On average only around 12% of hunters report shooting more than 6 birds on any given hunt day, whilst 74% shoot 2 birds or

less. Council has not set any policies as to what it considers liberal, intermediate or restrictive limits. Table 1 outlines the potential reductions in harvest that could be realised by reducing the limit. Much like with season length these predictions may be oversimplified. For example, if bag limits are reduced significantly and hunters finish for the day, harvest could be redistributed to others in the area. This is particularly relevant to opening weekend where hunters are often located in close proximity to one another, especially on public land. There is also evidence that compliance is poor when daily bag limits are very low. With a high portion of the harvest skewed towards the first two weekends of the season, especially opening weekend, it will be difficult to ensure compliance over the entire region with current ranger effort to ensure adherence with extremely low limits.

Table 1: Potential percentage reduction in total harvest by setting various bag limits in the Auckland/Waikato Region.

Bag limit	10	8	6	4	2	0
Harvest Reduction Potential	0%	4%	12%	28%	54%	100%

Hunters often believe that a small reduction in bag limits will compensate for an increase in season length, e.g. reduce limit to 8 and increase season length back to 8 weeks. As shown in table 1, small changes to daily limits (e.g. 8 or 6) are ineffectual at reducing the number of birds shot. One valid point regarding bag limits is the social component, i.e., why set bag limits that only few hunters will ever achieve? If bag limits are seen as a goal to aspire to, and the overriding aim is to set limits accordingly, so hunters can say “I got my limit” then a reduction may be warranted. A reduction in limit would also signal to hunters that the population is currently low.

Differential hen and drake limits are common in several overseas countries and they could have some merit here. Our trap samples show a disproportionately larger number of juvenile drakes compared to juvenile hens which is uncommon for banding programmes overseas. In most studies a close to 50:50 split is expected in the primary (juvenile) population. We also know that juvenile females have a lower average survival rate than their male counterparts due to sex specific mortality and therefore the sex imbalance will become greater as that particular cohort ages. The mallard tracking study also indicated that mallard hen survival is the second most influential factor governing population change behind duckling survival. Decreasing hunting mortality of hens is one way by which hen survival could be increased.

Currently we do not have a consistent trend in harvest rates for drakes and hens and the proportion of both sexes shot in any given year is often similar. It appears that the voluntary 'go for green approach' has failed to shift to drive hunters to target drakes. Internationally, research has indicated that 'surplus' drakes can be harvested without any detrimental effect on the population. Once again, the main issue with any change to bag limits, whether conventional or sex-based, is they are likely to be ineffective unless restrictive; i.e. even with an 8 drake 2 hen split, we would only expect a circa 10% reduction in female harvest. This may be a worthwhile initiative given the very low juvenile female survival rates in this region; however, there are several potential issues, particularly with enforcement. It is impossible to accurately sex grey ducks on the wing and therefore these would need to be exempted from any sex-based limit. When sex-based limits were trialled in the Eastern Region, staff there quickly became aware that these limits would be difficult to enforce given the large amount of genetic introgression between these species. It was also felt that prosecuting someone would be fraught with difficulty given that we refer to grey and mallard ducks as grallards and accept that the two species have shared genetics. The sex-based limits were deemed to be ineffective at regulating female harvest despite being relatively restrictive with a bag limit of 7 and a 5:2 drake: hen split. A 6:1 split was deemed to be too restrictive. Other issues involve mallards in eclipse plumage especially at the start of the hunting season, hunter's ability to differentiate between drakes and hens in low light conditions and the potential for high grading of harvested birds in order to avoid reaching a limit are other potential problems. Given that an educational and voluntary approach has failed to result in any meaningful change in harvest dynamics it may be worthwhile setting sex-based limits so at the very least hunters begin to learn to differentiate between drakes and hens on the wing.