

# The use of non-toxic shot for hunting wild duck over wetlands in Tasmania.

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and  
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Tasmania

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## Introduction

This booklet has been prepared by the Game Management Liaison Committee and the Game Management Services Unit to assist in the transition to the use of non-toxic shot for hunting wild duck over wetlands in Tasmania.

The change to non-toxic shot has been coming for some time. There is now almost universal acceptance by interstate and overseas hunters that the dangers to wild duck and other waterfowl posed by spent lead pellets cannot be defended on either environmental or ethical grounds. Tasmanian hunters can benefit from the decades of research and development of alternatives to lead shot which are already in widespread use elsewhere, providing non-toxic shot that is safe, effective and comparable in cost to lead shot.

The Game Management Liaison Committee and the Game Management Services Unit are committed to ensuring that you have access to current and accurate information about the alternative shot types, their ballistic performance and any adjustments that you could consider making to your shooting techniques and firearms.

The transition away from lead shot will be phased in over the next two hunting seasons, allowing you ample time to decide your best non-toxic options. Beginning in 2005 the use of lead shot to hunt wild ducks over

public wetlands will be banned, and from the 2006 wild duck season the use of lead shot will be banned over all wetlands.

This phase-out is fully supported by the Tasmanian Field and Game Association, Field and Game Australia and the Tasmanian government which share a vision to continue to adopt world's best practice in all aspects of sustainable game management. We ask hunters to accept this reform as an important and necessary step along the path to securing our hunting heritage.

*Judy Jackson*

*Minister for Environment and Planning*

## **Why lead shot is being phased out**

It has been known for many years that heavy metals pose serious environmental and health dangers. This is why metals such as mercury, cadmium and lead are rapidly being phased out of use worldwide. Exposure to lead in the environment – either in our homes, in air or in places that we hunt – can cause the accumulation of the metal in the body. In turn this accumulation can cause serious problems to people's health.

In Australia, unleaded petrol is mandatory in most types of modern vehicles. Lead has not been present in paints for several years, and the use of lead in the plumbing industry has been minimised.

The ingestion of spent lead shot has been recognised worldwide for the past 70 years as a cause of poisoning of waterfowl, and Australia is no exception. Lead affected waterfowl have been found in many hunting wetlands on the mainland and in Tasmania.

The Tasmanian government has resolved to accept the recommendation of the Game Management Liaison Committee and the Australian and the national agreement reached in 1996 to phase out the use of lead shot for wild duck hunting. This has already occurred in South Australia, Northern Territory, Victoria and New South Wales, and will be implemented shortly in Queensland.

The *Wildlife Regulations* 1999 will be amended prior to the 2005 wild duck season to address the issue of using lead shot for the purpose of taking waterfowl. Rangers will be undertaking compliance inspections to ensure that waterfowl hunters do not use or possess ammunition containing lead from 2005 onwards.

## **Is lead really that bad?**

Research on the short and long-term effects of lead shot on waterfowl have been undertaken overseas since the 1930s.

When lead shot is fired from a gun it doesn't disappear. Because lead is dense and chemically stable it doesn't react quickly with air or water. Rather, it can remain in the wetlands for years – particularly hard-bottomed wetlands.

Some of the lead shot remains at a height in the sediments where it can be ingested by waterfowl, while they dabble for grit and feed. Birds ingest grit to aid in the grinding and digestion of food in the gizzard. If lead pellets are ingested along with the grit, then the lead is also ground down in the gizzard, and then enters the bird's bloodstream. The amount of lead absorbed will determine whether the bird becomes sick or dies. Even if the bird does not die immediately, sick birds become more vulnerable to predators, weather extremes, or

disease. So even small amounts of lead can contribute indirectly to waterfowl deaths.

The simple reason that we don't often see poisoned waterfowl is simple – sick birds seek shelter where they die, and scavengers quickly locate and dispose of the carcass.

When poisoned birds die, the lead then enters the wider food chain and can pass to scavenging species such as hawks and eagles and quolls, which may also sicken and die from secondary poisoning.

Research coordinated by the Tasmanian Firearm Owners Association during 2000 showed that lead levels in black ducks taken from throughout Tasmania had reached the threshold levels adopted internationally for change.

## **Alternatives to lead**

Alternatives to lead shot are effective, and all are less harmful to the environment. Your hunting experience will not be affected – and you will be giving waterfowl a boost to survive and breed, and contributing to the sustainable future of your hunting heritage.

So, what are the alternatives? Three alternatives lead a diverse pack:

- Steel
- Bismuth
- Tungsten polymer

There are other alternatives such as tungsten, tin and zinc and ammunition manufacturers are constantly trying to improve alloys, coatings and other enhancements.

There has been extensive testing in North America and Europe over the past 50 years on alternatives to lead for shotgun shells. Non-toxic shot is the norm in the USA, much of Europe and South Australia, Northern Territory, Victoria and New South Wales.

Here is a summary of the strengths of the three most popular alternatives to lead shot. Which one suits you will depend on personal preference, your guns and your budget.

## **Steel shot**

Steel shot is actually soft iron, rather than steel.

The strengths of steel are:

- Readily available.
- Environmentally friendly, in that it does not cause toxicity in waterfowl.
- More predictable in delivering tighter, more reliable patterns that hit harder at effective shooting distances.
- Tried and tested since the 1950s and fired safely in many thousands of guns.



## **Bismuth shot**

Bismuth is chemically very similar to lead, thus giving a comparable performance.

The strengths of bismuth are:

- Similar performance to lead shot.
- Similar malleability to lead, so allows ‘give’ as the shot moves along the gun barrel.
- Does not harm the environment.
- Extensively tested in the field.
- The best alternative in older guns.

## **Tungsten polymer**

Tungsten polymer, or tungsten matrix, is a polymer plastic with tungsten particles inserted into it. It produces pellets with a density that is comparable to lead. It delivers the same pattern, shot stringing and down range hitting power as lead.

In other parts of the world tin, zinc, sintex and other non-toxic shot are being used. Ammunition companies are now conducting research and development to create the best and most cost-effective new shot materials. It is anticipated that some of these new products will eventually make their way onto the Australian markets.

**If you have any doubts about the effects of non-toxic shot on your gun, please seek the professional advice of your local gunsmith or the manufacturer.**

## **Do you need to change the way you shoot?**

Irrespective of the type of shot you use, the objective is the same – that is, to reliably deliver a spread of shot at sufficient velocity and with adequate energy to cleanly harvest a bird.

We are all familiar with the ‘lead’ needed to achieve this objective. That is, aiming ahead of the target to compensate for its speed and the time taken for the shot to reach the target. So is the ‘lead’ different with the various forms of non-toxic shot?

If we shoot with bismuth or tungsten polymer, then the answer is ‘no’ because they both behave similar to lead. But they also cost more.

If we shoot with steel, then the answer is ‘yes’. You will need to change to a larger shot size.

## **What are the differences between lead and steel?**

Steel shot is significantly harder than lead, so it doesn’t alter in shape as it travels along the gun barrel and in flight. Steel patterns more tightly and travels in a shorter shot-string.

In contrast some lead shot becomes deformed and loses its aerodynamic qualities both in the barrel and in flight. The end result in less predictable shot spread and a longer shot-string. The energy pattern of lead is also spread in a less predictable way. So lead delivers a lesser concentration of pellets and energy on the target.

## **Lead-to-steel rules**

### *# 1 Pellet size*

To achieve the same effect as lead, it is recommended that you increase your pellet size by two. For example, if you are currently using # 4 lead shot you will need to use # 2 steel shot to achieve the same result.

### *# 2 Ricochet*

An important safety aspect is steel's ability to ricochet off hard surfaces. Clearly this is an issue when dispatching wounded birds on the water, and hunters must ensure that no-one is near to the line of fire.

### *# 3 Re-loading*

Whilst bismuth can be re-loaded using current lead shot components and re-loaders, steel shot needs different wads and powders. The shot charge bar will need to be adjusted, replaced or have another bush inserted for steel shot. Always consult your reloading manual and never deviate from its listings. Consult your gun smith or ammunition supplier if you are not sure.

### *# 4 Choke effects*

The harder steel pellet and its predictable shot-string and pattern performance suggest that you can relax your choke without compromising energy-on-target performance. On interchangeable chokes, open it by

one quarter to obtain a similar pattern with steel. For guns with fixed chokes, either have the choke modified, or have a set of interchangeable chokes fitted by a qualified gunsmith.

If you use steel shot in a fully choked gun there is an increased risk of ‘ring bulging’ at the choke. Most integral-choked full choke barrels may suffer ring bulge immediately behind the choke, particularly guns manufactured before 1990. **The risks are best assessed on a case by case basis by your experienced gunsmith who will analyse the proof marks on the gun.**

## **Myths about non-toxic shot**

### *# 1 Switching shot types will cost money.*

Almost all open choked guns, or those with interchangeable choke-tubes, can handle steel shot. Very old guns will require modification to handle steel shot. In some cases the more expensive bismuth may need to be used on older guns.

### *# 2 Steel shot doesn't hit as hard or effectively as lead.*

Steel arrives at the target in a tighter pattern, in a shorter shot-string, and thus delivers more energy. Once you have your eye in, steel will deliver more reliable hits – as long as you use steel shot that is two sizes larger than your current lead shot.

*# 3 If I use larger pellets there will be less in the shell and therefore less to hit the target.*

Not so – steel pellets just take up slightly more room within the individual shell, and there is almost the same number of pellets in steel or lead shells. For example, a 32-gram load of # 4 lead has an average of 154 pellets. A # 2 steel load has an average of 140 pellets – a difference of only 14 pellets. This is compensated by the steel patterns having tighter and shorter shot-strings which will deliver more pellets, and more energy, to the target.

*# 4 I have to shorten my lead because steel is faster.*

Not true – some hunters think that because steel is lighter and leaves the muzzle faster than lead, they need to adjust the lead at short range to allow for a faster arrival at the target. At 20 metres steel moves faster than lead by 18/10,000 of a second, and at 40 metres lead is faster than steel by 3/10,000 of a second!

Accordingly, the lead differences required between steel and lead are so insignificant that if a hunter becomes preoccupied by lead it may cause him to over-compensate and become erratic in his shooting technique. If a hunter has gone up 2 pellet sizes and opened his choke by a quarter, all he needs to do is shoot as always.

### # 5 *Steel shot wounds more birds*

No – actually when it's on target, steel is more effective than lead at delivering more energy to the target. However, a close miss can be deceptive because a closely-bunched steel shot-string creates a shock wave as it passes the target which may cause the bird to baulk in the air, giving the impression of being wounded. Most of these incidents involve the bird just being surprised and evading the shot-string, rather than being wounded.

## **Practice Makes Perfect**

Today's steel shot performs on a par with lead shot. Even if you decide that you don't like steel, you have other proven alternatives in bismuth and tungsten polymer to choose from and other metals and alloys are being developed all the time.

The secret of success with non-toxic shot is familiarisation. You will need to 'get your eye in' and re-familiarise yourself with your gun and the leads that you need to adopt – but this should be standard pre-season preparation in any event.

## **Non-toxic shot - a Summary**

- Worldwide, lead is being withdrawn from commercial use.
- Steel shot has been used safely and effectively in the USA and Canada for 30 years.
- The main alternatives are steel, tungsten polymer and bismuth.
- Tungsten polymer and bismuth behave ballistically the same as lead. But they cost more than lead.
- You can achieve the same performance with steel if:
  - You increase your pellet size by 2 sizes.
  - You open the choke by one-quarter.

**It cannot be stressed strongly enough that the best person to assist with information and practical advice in the transition to non-toxic shot is your gunsmith or firearm's manufacturer.**

**If you have any doubts or concerns about your gun's ability to handle the new shot types, speak to manufacturers or gunsmiths, before making a final decision.**