

The Killing Nation

New Zealand's State-Sponsored
Addiction To Poison 1080



Reihana Robinson

RURAL REVOLT: IN DEFENCE OF COROMANDEL'S WILD KINGDOM

When you see poison raining from the sky do you feel that this is right? When you read, "this is the only affordable way" do you feel clean? When you hear "there is no alternative" does your heart believe it? Do you think that a public relations campaign will make it right? Listen to the voice within you.

Fred Look, Coromandel Town Crier 2007

The Ngāti Huarere ki Whangapoua Trust endorses the Coromandel-Colville Community Board's opposition to the use of residual poisons on the Coromandel peninsula. In the Trust's view the use of such poison is not consistent with katiakitanga and the Trust holds concerns about the long-term consequences of such poisons. The Trust supports the use of hunting, trapping and cyanide only.

Ngāti Huarere ki Whangapoua Trust
Environmental Management Team

Te Uringahu o Ngāti Maru supports the Coromandel/Colville wards resolution regarding the issues of community concern. We are a Hapu that has interests all over the Coromandel Peninsula and we do not support the use of 1080 poisons on any of the Tribal or Forest Parks throughout the Coromandel we have interest in.

Craig Solomon,
representative for Te Uringahu o Ngāti Maru

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To Poison 1080***

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by Reihana Robinson

THE KILLING NATION: New Zealand's State-Sponsored Addiction To Poison 1080 is preceded by *First They Came for the Goats, Don't Fence Us In* and *Save Our Wild Pigs*, and *Poison Peninsula* comprising the full set of five parts of *Rural Revolt in Defence of Coromandel's Wild Kingdom*.

COVER PHOTO SUPPLIED BY Wendy Pond, Secretary Manu Waiaata Restoration & Protection Society Moehau, June 2013. Local residents drove to Stony Bay to witness the aerial dispersal of 1080 poison over Te Moehau o Tamatekapua mountain, and to express their opposition to the operation.

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Dedication

Dedicated to Ngahere Koa, who in 2006 at age six handed in the first submission against the use of toxin 1080 to the Environmental Risk Management Authority (ERMA) in Wellington. And to all our mokopuna.

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Part 1

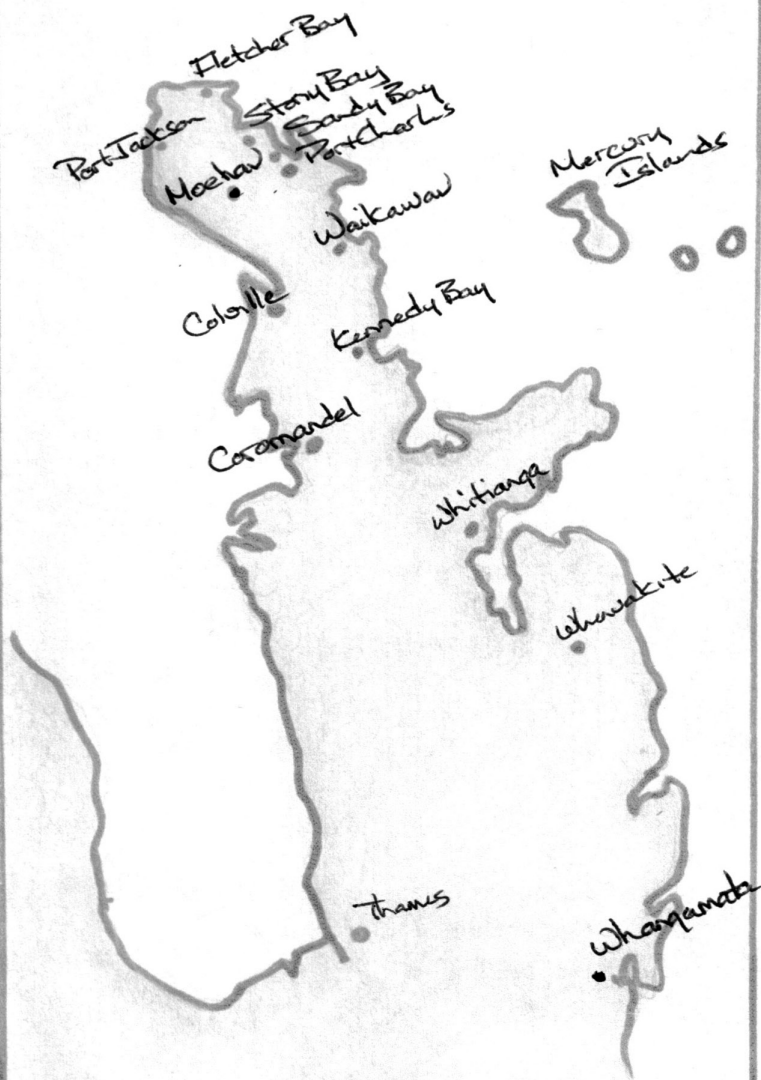
Poison Rain—New Zealand: Small Country, Big Poison

*The greatness of a nation and its moral progress can be
judged by the way its animals are treated*

Mohandas Gandhi



Coromandel Peninsula



Introduction

Prize or pest? Varmint or valued resource? Invasive species or intrinsic to the cultural and economic fabric of rural communities?

For centuries, Aotearoa New Zealand has struggled with both the vast potential and the various pitfalls resulting from introduction of exotic mammal species—whether for food, sport or industry—into its unique and stunning landscape.

Browse of native bush by red deer dates back to 1861, when decades of introductions from England and Scotland first met the desires of big game trophy hunters. By 1932 with expanding herds, deer were officially declared pests.

Between 1837 and 1858, optimistic businessmen brought the Australian brushtail possum to Southland in an attempt to establish a sustainable fur industry. But the possum established itself throughout the country and, today, is considered by some New Zealand's number one environmental public enemy.

Explorers James Cook and the French de Surville offloaded pigs as gifts to local Māori, starting in 1769. As they had done elsewhere in the Pacific, voyagers also hoped to establish a food resource for castaways and future settlers. A few years later goats were landed by Cook in the Marlborough Sounds. Both pigs and goats thrived and established wild populations from north to south—valuable food resources for many, noxious interlopers to others.

But first out of the kete, or off the plank, or down the anchor line was the rat. The Polynesian rat, or kiore, is thought to have arrived as early as the thirteenth century with the first canoes. The more aggressive Norway rat disembarked with Europeans in the late 1700s, and the ship rat got established a few decades later. As in the rest of the world, rats have made a good living in the bush country and in cities and towns, ever since.

How official New Zealand has responded through the years to these headline exotic species is as much about politics and attitudinal shifts as it is about environmental or ecosystem science. Sportsmen, farmers, fur and meat producers, exporters, and rural Māori and Pākehā communities have held disparate positions

on wild animal control, and each is an important constituency at election time. So too are adherents of the new ecological “nativism” and their allied pest control industry. The desirability, let alone any realistic possibility, of eradicating pest species is hotly debated.

While natural population dynamics and hunting pressure on game species tend to keep numbers in check under many conditions, some further intervention has been largely accepted given the range of adverse environmental impacts that have been observed historically. From government sponsored culling of deer herds in the 1930s to hunting and trapping of goats and possums in the new millennium, guns and steel have always played a central role—meeting conservation goals while stirring controversy.

But arguably no environmental issue has galvanised rural communities, threatened traditional cultural values, divided conservationists, mobilised farming families, and uncovered deep splits in the scientific community more than the expanding use of chemicals for wild animal control—most notably, the use of residual poisons and, in particular, the use of toxin 1080.

Poison 1080 was initially promoted as “just one tool in the toolbox” and “a necessary evil” in the fight against bovine tuberculosis and excessive browse of the New Zealand bush by brushtail possums. Aerial application of the poison was advanced specifically for use only in remote and inaccessible areas and in the most difficult terrain, since much of the country, including prodigious tracts of the conservation estate, had been tracked and trapped over many years for possums and mustelid predators with documented success in both forest canopy enhancement and bird population recovery.

Fast forward to 2017. New Zealand’s singular use of the poison has dramatically increased, with aerial operations now covering tens of thousands of hectares of accessible, previously trapped, flat and rolling land annually, just metres from dairy and dry stock fence lines, and directly into the drinking water catchments of small communities—even, accidentally, onto trampers and campers.

The environmental and economic threats from the brushtail possum may have diminished in recent decades. But with an official strategic shift in focus away from the possum to that most resourceful and successful mammal species of all—the rat—the financial future of New Zealand’s aerial toxin industry looks brighter than ever.

A 100 million-dollar 1080 poison industry boasts the ironclad backing of government policy and is now more deeply entrenched than ever. Until only recently the tool of last resort for pest control, poison 1080 has come to every corner of New Zealand and affects communities from North Cape to Stewart Island.

But rather than receding, opposition and controversy surrounding the supertoxin have only grown, as communities feel the adverse effects and become more aware of the risks—to human health, non-target native species, exporters and tourism, as well as the country's dubious clean image overseas.

This synthetic chemical compound, enlisted with promise for a greener and healthier future, has proven a frightening failure. The science is clear. The numbers tell the story.

With certainty, the destructive toxic blanketing of the New Zealand bush, dealing of inhumane death, and tainting of our food, water and collective wellbeing will cease. The only question is when?

Geoffrey Robinson

Port Charles, September 2017

What is Poison 1080?

Man's endeavours to control nature by his powers to alter and to destroy would inevitably evolve into a war against himself, a war he would lose unless he came to terms with nature. [We are] challenged as mankind has never been challenged before to prove our maturity and our mastery, not of nature, but of ourselves.

Rachel Carson

All substances are potential poisons. It is the dose that counts. So wrote Renaissance physician and alchemist Paracelsus, born Theophrastus von Hohenheim and renowned as the founder of the discipline of toxicology.¹

The word *toxin* (derived from the Ancient Greek) is used to describe the poisonous liquid into which arrowheads were dipped prior to battle. To be perfectly accurate, the word *toxin* refers to poisonous substances from living organisms. But with the rise of chemical pollutants and the manufacturing of tens of thousands of synthetic poisons for use in war, agriculture or medicine, the terms *toxin* and *poison* are commonly used interchangeably.

In 1896, Belgian scientist, F. Swarts created a synthetic new poison—sodium monofluoroacetate—commonly referred to as Compound 1080 (“ten-eighty”). The name was simply the batch number, subsequently adopted as its trade name. Synthetic 1080, a white powder, is designed to disrupt the biological energy cycle (Krebs cycle) of all oxygen-breathing creatures. It can lead to extremely painful, lingering deaths through its assault on the central nervous system, leading to cardiac or respiratory failure. 1080 is manufactured by treating either methyl or sodium chloroacetate with sodium or potassium fluoride, “or by the reaction of hydrogen fluoride with carbon monoxide and formaldehyde at high pressure then neutralised with sodium hydroxide.”²

Registered in the United Kingdom during the 1920s as a contact and systemic insecticide, 1080 poison was subsequently banned due to its devastating effect on invertebrates. It was eventually patented in the late 1930s as a rodenticide in the United States,

after its use as an insecticide was not approved because of its high toxicity and persistence in nature.³

Potassium fluoroacetate exists naturally in some plants in Western Australia as a defence against browsing animals. Some animals native to Western Australia have evolved degrees of tolerance. But this adaptation or co-evolution did not occur in the herbivorous Eastern Brushtail Possum (*Trichosurus vulpecula*) that was translocated to New Zealand/Aotearoa in the nineteenth century.⁴

In the South Pacific islands of New Zealand, the manufactured poison was first imported for rabbit control in 1954. However, it was not registered as a pesticide until 1964, so had ten years of unregulated use. It is now registered for use in various formulations to kill rabbits, rodents, possums, goats, wasps, cats, deer and wallabies. Since the 1990 EPA deregistration of 1080 poison as a rodenticide in the USA, New Zealand's annual consumption has been up to 90% of total world production—2000 kilos of pure toxin. (See Appendix I)

The poison is banned in several countries, including Brazil, Belize, Cuba, Laos, Slovenia and Thailand. Minute amounts of the pure toxin are exported from the USA to Israel, Mexico, South Africa and Australia.⁵ Its use in the USA is strictly controlled, and it may only be used in chemical livestock protection collars on domestic herbivores in several western states. According to the California Environmental Protection Agency, sodium monofluoroacetate (1080) is a male reproductive toxin.⁶

In New Zealand, pure 1080 poison is imported from its only production source in the world—Oxford, Alabama USA. It arrives by container load and is transported from Ports of Auckland, over public motorways and secondary roads to its destination at the government poison manufacturing facility in Wanganui—Animal Control Products (ACP), recently rebranded under the name ORILLION.

But toxin 1080 is not an ordinary household or agricultural pesticide. In New Zealand, the Department of Conservation (DOC) and regional councils employ helicopter contractors to spin poison 1080-coated or infused bait out in a wide circle onto great swathes of the public conservation estate—tonnes of poison-laced carrot or cereal baits dropped indiscriminately over hundreds of thousands of hectares each year. To DOC, poison 1080 is a panacea, necessary

to save native flora and fauna from certain extinction. Hundreds of millions of dollars have been spent just in the last two decades, yet DOC is failing to stop the decline of threatened species.

Meanwhile, the private/public Animal Health Board (AHB), having convinced dairy and deer farmers to support toxin 1080 drops on private land, has continued its own aerial toxin campaign throughout the country. AHB, in conjunction with regional councils nationwide, has promoted poison 1080 as its main weapon against the brushtail possum, identified as a vector of bovine Tuberculosis (bTb). The acronym, AHB became defunct in 2013. The phoenix arising from the ashes is now promoted as TBfree, managed by OSPRI.

Regional Councils have routinely granted the official resource consents to drop the toxin onto land and into waterways, including into drinking water catchments. Public health officials sign off on all aerial poisonings.⁷

So we enter the Orwellian world of New Zealand, where “conservation” means poison the wilderness and “Animal Health” means excruciating, lingering deaths for wild animals.⁸

The World Health Organisation (WHO) rates 1080 poison as an A1 hazardous toxic substance, their highest hazard classification. WHO data sheets state categorically it is “very toxic to birds, toxic to bees, very toxic to wildlife generally”. They state the general public “should be excluded from all access to premises while baits are exposed, baits should be laid in containers clearly marked *Poison*,” and “a specific permit for each operation should be required to avoid any danger of contamination of water sources.”⁹

There is no antidote to toxin 1080. As for the environment, left exposed, the poison does not break down quickly at low temperatures. In water, the poison is merely leached and diluted or absorbed by leaf and root tissue, algae and other bacteria and plant particles.¹⁰ The poison persists in corpses of possums, rats, birds and invertebrates, and remains deadly for months, ready to kill again. (See Appendix II)

The Spectacular Failure of 1080

One must therefore conclude that the end result, after hundreds of millions of dollars spent on broadcasting some 2,300kg each year of 1080, and some 23 tonnes of the stuff in ten years over tens of thousands of hectares of forest, is failure to reduce possum numbers overall, simply keeping the population stable and healthy. This constitutes a type of possum farming under the guise of conservation.

Bill Axbey

That New Zealand's unique and decades-long use of the powerful toxin 1080 has proven an expensive failure in safely and efficiently meeting conservation goals is increasingly clear. A risky environmental experiment to begin, the programme of poisoning the environment to a state of health has simultaneously, but unsurprisingly, spawned a range of unanticipated problems and unintended adverse impacts.

In assessing the results of New Zealand's 50-year toxin campaign, one fact stands out among all the rest—there has been no sound scientific research whatsoever that conclusively demonstrates ecosystem improvement as a result of aerial 1080 operations.

Anecdotes abound, and studies by industry-associated professionals are common. But scientific research that meets internationally recognised standards does not exist to show that poison use has either improved overall ecosystem health or directly resulted in long-term population benefits to any individual native species.

In respect of its main target, the poison has failed to eliminate, or even significantly reduce, the country's brushtail possum problem. Possum numbers were estimated in the tens of millions when 1080 poisoning began. After more than a half-century of toxin use, population estimates still range from 30 to 50 million individuals. And with repeated spreading of the toxin, bait shyness in possums has developed and is now generally recognised.

Lethal effects on non-target native species are documented—from tomtits and robins, to frogs, bats and eels, to kea, kaka and

morepork, to insects and other invertebrates. In some cases, impact on local populations has been devastating.

Populations of rats, known predators of a wide range of indigenous species, have been found to dramatically increase within 24 months following aerial applications of the toxin. And even more troubling, increasing resistance in rats to 1080 toxin is now suspected.

Unsurprisingly, helicopter application of poison 1080 has proven accident-prone and unsafe. Reliance on high-tech application from the sky has resulted in numerous recorded accidental deaths of stock and pets, off-target drops directly onto trampers and campers, and off-boundary errors.

Contamination of product by 1080 has limited or damaged export industries including timber, livestock, dairy, garment, and specialty items. Most recently, critical international reaction to widespread aerial use of the toxin has emerged as a threat to New Zealand's primary export industry—tourism.

And then there is the problem of cost. Per-hectare costs of aerially applied 1080 regularly exceed \$50. Hunters and trappers, when they have been contracted, can bring costs down to half of that, while achieving the same or better pest number results. Aerial 1080 has failed to achieve cost savings.

But most obvious of all indications of the failure of 1080 is the word of the government and poison industry themselves... New Zealand's environment is under increasing pressure from predators, they say, and decades of toxin has not solved the problem. More toxin is needed, in more places more often. Doing the same thing, over and over, and expecting different results...

After decades of 1080 use over hundreds of thousands of hectares of native bush and farmlands with no long-term success toward stated goals and with well documented adverse impacts, the question is often posed...Why does New Zealand continue to use toxin 1080 as it does?

As always, the answer can be found, in part, by following the money. For the Animal Health Board, an ongoing programme of aerial 1080 operations, ostensibly in an effort to combat the threat from bovine tuberculosis, has provided a critical rationale for annually levying millions of dollars in farmer fees. While nominally representing industry, the AHB was for years a lucrative business itself, replete with a \$400,000 CEO pay packet. Ongoing

involvement with aerial 1080 poison also brought the AHB millions of dollars in direct regional council support each year.

For the government, poisoning operations nationwide (and direct poison manufacture) have represented well over \$100 million in direct economic activity annually, and much more indirectly. The environmental toxin industry represents a growth export sector as well. Like any other industry sector, toxins contribute their share of gross domestic product and tax potential, to be protected and grown like any other sector.

Why does New Zealand continue to spread 1080? Besides the money, there are other reasons.

One of the most attractive features of aerial 1080 is ease of use. As Department of Conservation management has learned over the years, contracting out the job of wild animal control to a single helicopter company for a three-day or six-day job is infinitely simpler than hiring staff or contract hunters and trappers. Gone with a single cheque are the headaches of managing people. Gone are the individual contracts and personnel problems. Gone is the need to monitor, evaluate, and direct staff in the field, month in and month out, year after year. Pest control becomes a single project, complicated to be sure, but one that need only be repeated every three or four years no different to long-term plans or other discreet projects. DOC management can focus instead on tourism development and infrastructure projects, as Government would have it.

Of course, if 1080 toxin were to be found fundamentally ineffective in achieving ecosystem improvement, or to cause damage to non-target species, or to be inefficient or inhumane, or to present long-term risks to human health, its use would surely be reduced and eventually abandoned. But the toxin has never been subjected to rigorous scrutiny and evaluation. As the 2007 Environmental Risk Management Authority (ERMA) "reassessment" demonstrated, there has been little to no appetite for a look at downsides and risks.

More insidious has been the willingness of DOC and other industry-linked entities to actively sabotage the research and careers of scientists investigating adverse effects of the toxin as it has been used. What passes as "research" in New Zealand is often biased and industry tainted. Researchers who question efficacy have learned they do so at the peril of their careers.

To honestly evaluate any programme or process, a hard look is required at both risks and benefits. Instead, the commitment by DOC, AHB, regional councils and other supporters to a constant public relations effort has assured that public opinion, largely molded through conventional media, has remained steady and supportive.

At the end of the day, for use to continue year after year, aerially applied 1080 has had to remain the “best option” in the eyes of officialdom and the public. This has been achieved in several ways.

Obvious alternatives to 1080, such as contract hunting and trapping and the use of the more humane poison cyanide have not been supported. DOC and regional councils have simply dismissed these options as being inefficient or more costly. Toxin 1080 has survived its failed tenure in part because the alternatives have been purposely abandoned.

Other options have been actively opposed. Councils and DOC have actively opposed nationwide and regional bounty systems for the control of brushtail possums. This obvious, simple, and low-cost option, which has worked historically to achieve a range of conservation pest control goals, has been categorically dismissed, most likely because it represents an easy and risk-free alternative to aerial 1080.

As it has been increasingly used closer to towns and settlements, in drinking water catchments, on paddocks and in accessible rolling bush over recent years, aerial 1080 has caused mounting public concern and controversy. Regional and district councils have been under pressure to protect resident and ratepayer interests. So the one last and best defense for government policy that runs afoul of public opinion is...to change the law. Legislation passed in 2017 effectively strips representative local government of their regulatory powers as they apply to 1080.

The 1080 strategy continues to fail. For the time being, however, a big industry, with the support of its enablers in government, rolls on.

New Zealand — “The Killing Nation”

Conservation is all about killing things.

NZ conservation volunteer

The stated conservation goal of the 1080 poison industry is to efficiently kill non-native mammals, in a further effort to protect native plants, trees and birds, including the dorkily iconic, flightless kiwi. In DOC's original pest portrait gallery, one animal subject was painted with utter contempt. The Australian brushtail possum was conjured as public enemy number one. Mission creep now finds the canvas coloured with multiple target species.

Purangi conservationist Bill Axbey highlights the classic error of DOC's shifting poison targets — “The system of lumping possums, stoats, rats, pigs, and even deer together with kiwi preservation is not satisfactory. Possums do not eat kiwi, nor do rats. But rats do eat eggs and chicks of smaller birds. Stoats and cats eat rats and mice as a primary food. They turn to kiwi chicks and other birds when the main food source is cut off, by a poison sowing.

“Cats, like any predator, take the easiest and most readily available food supply after a poisoning. Rats and mice are only available for a very short period as secondary poison bait, and the surviving cats turn to other prey. This would indicate that bulk poisoning is detrimental to kiwi populations, as it often takes place when the majority of kiwi chicks are about.

“Fixed bait and trap stations keep rats under control, without the drastic reduction of a food source for predators. Possums, on the other hand, have only minimal direct effect on birds and should be treated as a separate problem to stoats in kiwi recovery areas.”¹¹

Possums are predominantly foliavores. Only very rarely have traces of fledglings or eggs been identified in possum stomach contents. *Notornis* the journal of the Ornithological Society of New Zealand published *Evidence that possums prey on and scavenge birds' eggs, birds and mammals* in 1993 by Brown et al. A page-turner of conjecture, unscientific hypotheses and anecdotes—the experiments were conducted under starvation conditions. What possums eat under starvation conditions is absolutely meaningless

as far as determining their diet under normal circumstances. Under similar circumstances human beings have resorted to eating grass and other human beings. What possums eat under starvation circumstances is whatever is put in front of them... totally preposterous conclusions.

Robertson H. et al. in a Northland study looking at kiwi survival after anticoagulant poisoning, confirmed Axbey's thesis—"We had no evidence from our study to show that either rats or possums were killing kiwi chicks." But more importantly, the study showed they "still do not know the long-term effect to kiwi of the sustained application of brodifacoum. We have shown that kiwi chicks are ingesting the toxin [and] we are not yet confident that they (kiwi) are not slowly accumulating the toxin which may have fatal consequences at a later date. We also do not know whether, or how fast kiwi eliminate brodifacoum from their bodies."¹²

In his role as Southern Lakes conservator of wildlife for the Department of Internal Affairs in the 1960s Axbey witnessed first-hand, poison 1080 killing non-target species in large numbers. He observed its use against rabbits in Central Otago, where huge populations of quail and chukor were decimated along with ground birds, hawks, moreporks and falcons that were attracted to the baits, the dead rabbits and the secondary kill of rats and insects. He felt at that stage no one seemed concerned about the collateral casualties. He believed there was a possibility that remnant kākāpō populations were exterminated.

After multiple massive 1080 drops near the Coromandel's main tourist hotspot, Cathedral Cove, DOC staff could not locate sufficient kiwi to pilfer from the poisoned Whenuakite Kiwi Sanctuary for a potential translocation project. But no poison advocates want to join the dots.

Incidents of confirmed collateral damage to endangered species continue unabated. An entire population of 26 monitored, insectivorous, rock wrens vanished after DOC's 1080 poisoning of Kahurangi National Park in 2014. Wrens were living alongside rats and stoats prior to the aerial drop, but were not to be found after the drop.

"Killed by DOC" is definitely not good public relations. So DOC immediately invents an alibi—heavy snowfall is publicised as the cause for wren loss— a fanciful speculation, given the wren's successful adaptation to alpine wilderness. But much later, and

only recorded on a Federated Farmers/Forest & Bird website, is the news that DOC will halt aerial 1080 poison drops in rock wren inhabited alpine regions.

Longer lists of so-called pests litter each regional council's long-term strategy, supported by multimillion-dollar fiefdoms. Ungulates and marsupials, hedgehogs, rodents, mustelids, feral cats, rabbits and hares are just the tip of the target iceberg. But it is a zealous reader of these pest plans who will find the word *kill* or any mention of aerial 1080, or any of the other appallingly inhumane toxins such as brodifacoum, pindone, cholicalciferol or diphacinone. The wholesale killing of wild animals by aerial poison drops is usually referred to as an *operation* or *control*.

Campaigns to "save the birds" do employ the language of war, but the cruel killing of wild animals is only ever referred to euphemistically. DOC does not like to publicise how 1080 poison causes grossly inhumane deaths, leaving wild animals suffering over hours, even days. Real death and dying are kept far from the public gaze.

The poison industry's message machine works to diminish the reality of killing by never actually using the verb *to kill*. In any advertisement to alert the public to a coming poison drop, the words *1080 operation* or *1080 treatment* imbue the action with a clinical patina, deceptively disguising the reality of their shockingly inhumane business.

James Frankham, editorialising in the *NZ Geographic* magazine (April 2012) records "a two-day thought experiment behind closed doors [where] there were no minutes." Nineteen select individuals from Forest & Bird, Animal Health Board, DOC, Landcare Research and a few academics were ensconced on Mt Ruapehu.

Within a couple of years the conservation minister, Nick Smith, has an easy-to-sell, shiny new plan worthy of any ad agency. He announces *Battle for our Birds* that adds a further 500,000 hectares to the "treatment" zones in pursuit of the now "famous three" – possums, rats and stoats (mice are too pesky). The "battle" is only an introductory skirmish in a massive new multi-billion dollar industry government joint venture project ambitiously labelled *Predator Free NZ 2050* (PFNZ).

Predator Free is the poison industry's dream-come-true. The unrealistic initial goal is to kill off possums, rats and stoats entirely. What other predators will ultimately find their way into the

Predator Free dragnet? Dogs? Cats? Predatory, non-native birds? Only time will tell. The death row roster is likely to alter over time. According to DOC research, it is often the humble canine that causes most havoc among kiwi birds. Wild dogs, for some reason, are not on the DOC kill list, yet.

To achieve buy-in from business, Predator Free's secondary sales pitch is enhancement of "economic return from agriculture and forestry." And really grovelling for the regional and local ratepayer dollar, they aim to "create new opportunities for regional development." Not mentioned is the death knell Predator Free will sound for such local industries as wild pet food, merino mink, possum fur and leather. Not mentioned is the likely cost, estimated to be in the vicinity of \$32 billion.

But what animals, what birds, what insects and what plants are actually under threat in New Zealand? Scientists working for the National Institute of Water and Atmospheric Research (NIWA) regularly list the ten most endangered species in New Zealand. Not kiwi, not robin, not kōkako. Only one bird is on the list—the fairy tern, whose habitat destruction by humans is the root cause for its imperilment. *Homo sapiens* are streaks ahead of all other habitat wreckers and arguably the greatest predator.

Apart from the photogenic Maui dolphin, no other endangered species has purchase within the media. A skink, a weevil, a stag beetle, a small shrub, eyelash seaweed, coastal peppergrass, limestone cress, and a primitive aquatic fern round out the ten.

But saving endangered species by poisoning a few predators has wide and unintended effects. In one study published in 2014, Cawthron Institute toxicology research showed that even trout could be contaminated with 1080 poison, allowing the poison into the food chain. And the supertoxin 1080 is routinely air dropped into hundreds of kilometers of trout streams annually. The uptake in trout was found to be in excess of National Food Safety Guidelines.

Fish and Game NZ and the New Zealand Federation of Freshwater Anglers advise catch and release where toxin 1080 is dropped. Freshwater crayfish/koura and eels are also off the wild-caught menu in a poison zone.¹³ Although human mortality is highly unlikely from eating poisoned fish, very little is known about the effects of sub-lethal 1080 doses in humans. Detrimental

effects in skeletal muscle tissue of birds, however, have been shown, after exposure to sub-lethal doses of the poison.¹⁴

Lethal effects on non-target wildlife have been thoroughly documented, including by independent Otago researcher Jo Pollard—"Birds reported killed by 1080 poisoned cereal baits include morepork, weka, tomtits and grey warbler, and animals known to eat cereal bait include kea, kaka, little spotted kiwi, kōkako, saddleback, kakariki, pukeko, insects, koura and lizards".

Dr. Pollard states bluntly, "DOC's reporting on bird deaths cannot be relied upon." She quotes the New Zealand Environmental Risk Management Authority that says the five-minute bird count methodology favoured by DOC is "not reliable for assessing population impacts after 1080 operations, unless high mortality occurs and not reliable for rarer species".^{14a} Meanwhile accidentally poisoned domestic animals, including dogs, horses, cows and sheep, suffer horrific deaths.

Even with safety controls in place at every poison drop, accidents continue to plague the industry. Trampers on the Nydia Bay Track in the South Island in 2013, observed bucket-loads of toxin 1080 flying over the track. Without warning, poison baits were dropped onto both the track and the trampers. This type of dangerous accident was repeated in Reefton on the West Coast of the South Island (September 2014) with serious health consequences for the affected women.¹⁵

As a killing nation New Zealand stands alone. In neighbouring Tasmania, by contrast, the use of 1080 to control native browsing animals has met strong, grassroots public opposition. There the government listened, and 1080 poison is banned from use on all public lands.¹⁶

One might imagine, given the non-stop 1080 industry promotion over decades, that citizens of New Zealand would support this arbitrary and inhumane killing of wildlife. But research shows quite the reverse. Recent attitudinal studies found the majority of New Zealanders surveyed, oppose inhumane killing of wild animals—including by aerial 1080 poison. Almost 100% oppose poisoning of large mammals. Even the wily possum should be treated humanely, according to approximately 75% of respondents.¹⁷ Online and paper petitions continue to evidence this trend.

Government aerial poison policy is not only condoned, but is fully embraced by National, Labour and the Greens. NZ First, Mana, and the Ban 1080 Party advocate an end to the policy.

How did the Department of Conservation develop into a poison advocacy business?

Bill Axbey, who had joined the Wildlife Service in 1946, offered some background. "In 1987 DOC took over from the Wildlife Service and was flooded with 3,000 unwanted Forestry staff and 1,800 Lands and Survey staff. With them came the addiction and the easy option of control by poison...The dangers and concerns that were obvious even then, were minimised...irrespective of the huge volume of published adverse findings from overseas experts resulting in almost world-wide bans. In-house reports and so-called scientific findings by those with vested interests increased the justification until the original theoretical use in areas too rough for any other system was expanded to general use over huge areas."

All nations kill. In New Zealand the brutality of the policy is concealed behind polite propaganda espousing lofty conservation goals. Conservation Minister Maggie Barry recently boasted her party's Predator Free intentions to a cynical U.K. Foreign Secretary Boris Johnson on July 25, 2017.

Johnson ripostes, "I congratulate you on your campaign of slaughter...I'm sure you are doing it in an entirely humane and dignified way... They die with a smile on their face". One could imagine he is taking the Mickey, but with Johnson it is hard to say.

Barry then offers to send DOC to deal with any problems the UK may have with grey squirrels. Johnson asks, "And you'll come and do a programme of painless extermination?" Barry replies, "Yes, painless eradication, that's us."

How We Inhabit the Land

We fill our gardens with roses and hollyhocks brought into Europe from the holy land, and dine on venison and pork, but in Aotearoa we wont allow wildlife to enrich its diet or live peacefully in our forests. Nature is hounded. Wildlife is starving.

Wendy Pond

The beautiful Coromandel Peninsula showered in poison? It's not the usual tourist image.

Longtime farmers and fishers, retirees, creative communities, holidaymakers, and bach owners sparsely inhabit the land, sharing a remarkable coastline, farmland and bush that teems with wildlife. Moviemakers have made the Coromandel their backdrop as far back as Sam Pillsbury's *Quiet Earth* and as recently as *The Lion, The Witch and The Wardrobe*. Musicians, both national and international, have performed and filmed here. Tourists from around the globe fly in for wedding shots.

Those who love Mother Nature/Papatūānuku live here. Some campaign for multinationals to quit gold mining. Others work in mines. Some fight exotic forestry. Others work in pine plantations. There is a continual struggle to balance between how we *use* nature and how *we care for*, or *kaitiaki* nature. How to survive without destroying what sustains us is a constant challenge.

Destruction of Mother Earth/Papatūānuku by *homo sapiens* began as soon as the first humans paddled ashore. When east Polynesian people first arrived, they depended on fish from rivers, seals and fish from the sea, birds hunted or snared, wild plants, and cultivated gardens of taro and kumara. They brought dogs and the eastern Pacific rat/kiore (*Rattus exulans*). The rat proceeded to decimate populations of native lizards, frogs, eggs and the little reptile, the tuatara. Purpose-lit fires catastrophically reduced indigenous bush by approximately a quarter of the land area. At least 45 species of birds, including 11 species of the flightless moa, had disappeared.¹⁸

According to Australian zoologist and outspoken mammalogist, palaeontologist and environmentalist Tim Flannery, New Zealand suffered from overexploitation by its first people. Even the sea was not immune. Three-tonne elephant seals and half-tonne sea lions were wiped out. Food sources dwindled.

By the 15th century, dogs, rats and even humans were on the menu. The practically inedible bracken root became a staple. The huia bird was close to extinction by the time of European settlement, and the once routinely abundant kākāpō was hunted down to the remaining few in Fiordland. The takahē also was consumed, leaving only a handful of survivors at the remote end of the South Island.

About 23 plant species may well have evolved divarication at juvenile stage as a response to heavy browse by moa and some believe that present-day exotic mammal browse by deer, goats and possums replaces that of moa, providing a degree of replication of an earlier bush pattern. As a result of introduced rat/kiore predation, one weta species developed a new habit of forming tiny burrows to prevent rat entry.¹⁹

Petrels disappeared from the Chathams, 14 species of seabirds were eaten down to two. Eleven species of terrestrial birds and the Haast's eagle were gone by the time of early European sealing and whaling. With new tools, devastation was wrought at unimaginable speed. Over the past 200 years, an additional eight full species and seven subspecies have become extinct.²⁰

Whales, trees, kauri gum, gold—all were exploited. Rivers and land were left poisoned with mercury and arsenic from the early gold digging days. Giant kauri trees were painstakingly sawn for harvest. The countryside of Aotearoa has endured.

European colonisation got fully underway in the late 1800s bringing with it, eventually, hundred of introduced plants and animals. Environmental advocates Graham and Ann Sperry note that, "Cattle, sheep, rabbits, deer, goats, fruit trees, plantation forest trees, plus trout and salmon were introduced...deer and rabbits were released into the wild for use as food, skins, fur and sport. Pheasants, quail and various ducks were brought in for the same reasons, along with the Australian Brushtail possum."²¹

A literature review notes "Early concerns that they [possums] had become a nuisance led to an assessment of their impact by Kirk (1920) who concluded that they were not causing serious

damage to native forests, but were causing problems in orchards. The advantages of establishing a fur industry were deemed to outweigh any minor problems that possums might be causing: 'At any rate, if it is proved eventually, which is unlikely, that possums are a menace to the forests, their skins are so valuable that at any time the animals can be reduced in numbers to the extent desired without any cost' (Cockayne 1928)."²²

The Sperrys pick up the narrative—"During the mid to late 1900s, bovine tuberculosis was identified in farmed cattle, causing extreme concern. New Zealand's primary industries at the time were farming and forestry. Government agencies, primarily the Forest Service, identified the possum as a possible carrier and host of bovine Tb."²¹

In a span of less than a thousand years New Zealand/Aotearoa had gone from a group of isolated and pristine South Pacific islands to a new country replete with countless new species and even new diseases. For an isolated nation exporting meat to the world, disease in cattle posed a dire threat.

One response was the choice to use the supertoxin 1080 as a strategy to kill possums, a suspected vector of bovine Tb. By May 2005 the World Organisation for Animal Health (OIE) declared bTb was no longer a trade barrier to New Zealand's overseas markets but the aerial spreading of toxin 1080 over hundreds of thousands of hectares each year continues unabated to this day.

Aerial 1080 poisoning has knock-on economic effects. It has devastated New Zealand's wild venison industry and severely hampered an emerging skin, fibre and meat industry. As South Island farmer Shirley Hudson says, "It is only a matter of time before sanctions will be imposed by our trading partners as a result of our dangerous and foolhardy 1080 practice."²³

As the Sperrys observe, "Today, the world is discovering the serious hazards to humans and animals alike presented by the use of chemicals such as 1080, even in minute dosage levels."²⁴

There are alternatives.

How We Poison the Land

It's the most non-specific of pesticides I know. Even DDT is more specific than 1080. I am very worried about the non-specific effects of it among animals, and I would very much rather New Zealand didn't use it.

Ian Shaw

(Professor of Toxicology, University of Canterbury)

The Hazardous Substances and New Organisms (HSNO) Act 1996 states the Environmental Risk Management Authority's role is to "protect the environment and the health and safety of people and communities, by preventing the adverse effects of hazardous substances and new organisms." In spite of these intentions, approximately 3.5 million tonnes of pesticides are spread in New Zealand each year. According to Ministry for the Environment researchers, comprehensive and reliable data is difficult to obtain.

The statistics that are available are stupefying. In the five years from 1999 to 2003, the estimated volume of pesticides (tonnes of product), as reported by Statistics New Zealand from Customs documentation, suggests that total pesticide imports increased by 17%. Herbicides increased by 42%, fungicides by 10%. Total active ingredient pesticide sales increased in that time by 27% along with a 19% increase in organophosphate insecticides and 35% of glyphosate herbicide.²⁵

Freshwater ecologist Mike Joy, based at Massey University, said that New Zealand has the highest rate in the developed world for four water-borne diseases. "Over the past two decades, we have had the highest rate of increase in fertilizer use in the OECD and have doubled the number of dairy cows (the South Island a seven-fold increase)" with the result being heavy metal contamination. Our children's intake now exceeds "the European standards for the weekly intake of cadmium."^{25a}

Awareness worldwide of how rapidly the natural environment was being poisoned took a leap with the publication of Rachel Carson's *Silent Spring* in 1962. Carson reminded readers of the sudden rise of synthetic chemicals. These compounds, she said,

"differ sharply from the simpler insecticides of prewar days [that] were derived from naturally occurring minerals and plant products." It was her coherent critique of post-war insecticides and pesticides that eventually led to a complete review of US pesticide policy and the eventual banning of DDT by President Richard Nixon.

Carson wrote of a "reckless and irresponsible poisoning of the world that man shares with all other creatures." At the time, she was ridiculed and vilified. Despite being hailed as one of the century's greatest environmental advocates, her work continues to be mocked and derided.

After half a century of increasing awareness, pesticides continue to find their way into the food chain throughout the world.

In New Zealand, industrial dairy giant Fonterra still allows milking cows on land where soil tests show up to a specified percentage presence of DDT. The organochlorine was used extensively on pastureland between 1950 and 1970 and not fully banned in New Zealand until 1989.

According to a Fonterra spokesperson in August 2017, "New farms are required to have soil DDT levels <0.7mg/kg soil to ensure that when you supply milk at the start of the season the farm milk DDE levels are <0.3mg/kg milkfat. All new farms are informed of these requirements, along with any existing Fonterra farmer."

In 1993, the allowable limits in New Zealand drinking water of yet another systemic herbicide—2,4-D were lowered from 100ppb in 1984 to 30. Still a scary number when compared with the USA (3ppb) or Europe where the allowable limit was just 0.1ppb. Dr. Meriel Watts, a scientist specializing in the adverse impacts of pesticides, records these concerning figures in *The Poisoning of New Zealand* (1994) and explains "The European levels, set at a time when 0.1 was believed to be the limit of detection, are based on the attitude that no residues at all are acceptable in drinking water." And she points out the "USA figures are based on what is accepted as good agricultural practice, not health risk."

Of equal concern is the 2016 decision by MPI not to test for glyphosate in food, even though Physicians and Scientists for Global Responsibility called on the New Zealand government to ban glyphosate-based herbicides. Potential health effects of low levels of consumption over extended periods of time are unknown.

MPI's *Animal Products Notice Contaminant specifications* of July 2016 states New Zealanders can eat animal fat containing up to 5mg/kg maximum permissible level of the sum of DDT, DDE and DDD. The latter two are both breakdown products of DDT. The consequences for New Zealanders' health are unknown.

Equally disturbing are the amounts of rodenticide anticoagulants and 1080 poison allowed in farmed cattle, sheep, goats and wild and farmed deer listed by the Ministry for Primary Industries (MPI) in its *Contaminants Monitoring Surveillance Animal Products Notice* (29 June 2017). In meat, fat and offal of any animal, a permissible level of sodium monofluoroacetate (1080) is 0.001 mg/kg.

It is now known that anticoagulant resistant rats are causing major problems in the USA, UK, Europe and parts of Asia.^{25b} Research in New Zealand remains sparse, however Landcare researchers Cowan and others, confirm resistance in rat populations exposed repeatedly to the anticoagulant warfarin. Their research found resistance is now "extended to most other first generation anticoagulants (e.g. diphacinone), and there are occasional reports of rats resistant to second generation anticoagulants (e.g. brodifacoum).

"New Zealand makes extensive use of anticoagulants for pest management, not only for control of rodents in urban areas and on farms as in other parts of the world, but also for broadscale control of rabbits (e.g. pindone) and possums (e.g. brodifacoum) and rodents in native habitats (e.g. diphacinone). Because anticoagulants for possum control are regularly used in bait stations, rats are often exposed to them as well. The scale and nature of anticoagulant use is unique to New Zealand."^{25c}

New inhumane poisons such as cholecalciferol continue to enter the market with heavy uptake in rural areas. In the case of cholecalciferol rats usually take two to six days to die, showing signs of severe discomfort, with symptoms ranging from vomiting, gastrointestinal and pulmonary haemorrhages, kidney failure to blindness. Depending on dosage, brushtail possums can take over two weeks to die a similarly excruciating death.

Much of the increased use of poisons is by private sector environmental groups associated with DOC such as the Coromandel based, Moehau Environment Group whose budget and purchasing power is supported by tax and ratepayer funds.

While claiming neutrality on the contentious poison 1080 issue, their position essentially supports the status quo policy.

DOC's proxy is taking the money and continuing to poison against community decisions. In 2009, after petitions of more than 1500 and hundreds participating in a town demonstration, the local Coromandel-Colville Community Board (CCCB) resolved to—

- 1. Invite the Minister of Conservation and the local Coromandel Member of Parliament to attend a meeting in Coromandel to discuss the use of 1080 and other residual poisons on the Coromandel Peninsula with a view to seeking a Policy review*
- 2. Advocate on behalf of the Coromandel-Colville community that all animal pest control be undertaken by trapping, hunting and non-residual poisons*
- 3. Advocate that the Coromandel-Colville Ward be used as an example of how effective animal pest control can be using hunting, trapping and non-residual poisons.*

The community board vote, although non-binding, carries some political weight and put the Coromandel ward in step with the Taupo, Marlborough, Westland, Kaikoura and Dunedin councils. The Thames-Coromandel District Council (TCDC) adopts a similar stance at the end of 2009—“Council advocate to the Minister of Conservation that where possible animal pest control in the Thames-Coromandel District be undertaken by trapping, hunting and non-residual poisons.

- Resolves that council further advocate to the Minister of Conservation the potential for economic development in the growth of our possum fur exports.
- Resolves that council further advocate to the Minister of Economic Development the potential for economic development in the growth of our possum fur exports and the benefit of the job opportunities that are provided by the expanding market of possum fibre.
- Resolves to ask the Hauraki Coromandel Development Group to pursue feasibility funding from NZ Trade and Enterprise to develop the possum fibre market.” While TCDC has no power in the decision-making process their undertaking is another step away from poisoning and forward to safe and sensible wild animal control.

The winter of 2017 finds MEG “volunteers” hand distributing poison 1080 with full government backing.

But tinkering with the animal kingdom produces unintended consequences. In 2003 Auckland University researcher Rachel Fewster sought funding for a study *A stochastic modelling framework for metapopulation dynamics with conservation applications* to produce tools to somehow connect the dots. She writes of what has become recognised as a fundamental concept in conservation—the metapopulation, a term used to describe the interactions, through immigration and emigration, of localized wildlife populations.

“Population dynamics at the metapopulation scale can have important impacts at the local scale,” she observes. “For example, local control of pest populations might produce a local sink, causing immigrants to flow in from overcrowded neighbouring subpopulations and nullifying the effects of the control scheme. Interactions between subpopulations must be taken into account for conservation management to be effective.” Fewster states despite the importance of the metapopulation effect it “is still largely ignored in conservation planning.”

Whether animals are poisoned cruelly or killed humanely, tinkering with nature alters nature’s dynamics. Use of inhumane and residual pesticides in the environment has been widely opposed. There are alternatives. On the upper Coromandel peninsula residents prefer to trap, hunt and cyanide wild animals, as reaffirmed in 2012 by the area’s Community Board.

Whether widespread use of animal poisons is advisable or necessary is being questioned more and more by the New Zealand scientific community. The war on predators is considered by some a faulty strategy based on the delusion we can turn back the ecological clock.

Environmental scientist Jamie Steer argues for a conciliatory approach to introduced species that would provide for more diversity, evolution, nature and compassion. “For me change is not the end of the world. I think we can learn to accept a broader range of species, we don’t need to restore our environment to pre-human times.”²⁶

George Gibbs, entomologist and (retired) associate professor of zoology at Victoria University, observes that those who strive for forests to be returned to a pre-human state are the ones setting goals for New Zealand conservation, leaving no room for exotic

species.²⁷ Gibbs believes invertebrates are bearing the brunt of conservation policies.

"Believe it or not, sanctuaries which receive heavy doses of 'conservation management' are the places where species are being lost...The irony is that they are selected for the express purpose of saving species from extinction...Our preoccupation with vertebrates, however, can lead to disaster for insects."²⁸

For a country steeped in poisoning its way to a pristine past, the emerging views of scientists like Steer and Gibbs should give government and the industry conservation establishment reason for pause...to take a look at the alternatives.

Bounties—an Alternative to Poisoning

A falcon is the perfect hunter.

Jean Craighead George

Before bovine Tb was recognised as a potential threat to meat exports, the brushtail possum was emerging as a new pest species in the wild after years of protection. Increasing numbers were seen to have an adverse impact on native forests and grassland.

In response, a possum bounty system was introduced by the government for trappers and hunters in 1953...but halted in 1961. More than eight million payments were made to bush workers for the two ears and a strip of skin. Why was the scheme halted?

Officially, the government's possum bounty system was discontinued because trappers were blamed for "farming" possums as they culled the so-called "easy" possums from fence lines and farm roads. Yet every possum killed is a reduction in overall numbers. And as possums are reduced in easy to trap areas, possums would re-enter from difficult terrain. The bounty system was indisputably working. Possum numbers were being sharply reduced.

Former Wildlife Service conservator Bill Axbey, writing in *NZ Outdoor Hunting*, believed possum control finances were jealously guarded, leading to the undermining of bounties. Funds were redirected to poisons and administration. "The inescapable fact is that a bounty will kill hundreds of thousands more possums for the same money," Axbey wrote.

In the context of New Zealand's response to bovine Tb, Axbey had more to say about the bounty system. "Quite frankly, our clean green image is in greater danger from 1080 poison than it will ever be from bTb, that after all, comes from cows and is found worldwide.

"Official objections to a bounty on possums list the excuse that possums would be farmed—the very thing the present system is doing. What would be wrong with a bonus for every kilo of possum fur or a tax exemption for trappers selling fur? In China, Russia and many continental countries, the armies use fur-bearing

animals to supply them, while we have 70 million we are trying to get rid of that are classified as pests.

"I'd bet that no approach has ever been made at a government level to sound out the market, and it is a certainty that no finance is available to sponsor and publicise the availability of high grade furs from a pest animal for use as a trade commodity."

In contrast to possums hunted for bounties, those killed by 1080 poison cannot be used for any purpose—not fur, not meat, not skins.

Axbey continues, "As long as so-called pest control remains in the hands of a couple of government departments, we will be faced with increased costs on what amounts to an in-house bounty system and a regular poison-oriented control system that is nothing more than a type of farming."

The bounty system continues to be resisted throughout the country by the Department of Conservation and regional councils. On the Coromandel, DOC intransigence was recorded as far back as 1992, when a local manager rattled off unsubstantiated figures disputing any positive role played by bounties.

"Money spent on bounties", he said, "would be better spent on planned control as this gives higher returns on investment. Bounties had been introduced in the past for hedgehogs, ferrets, rabbits, pigs, deer, goats and even some introduced bird species, but none had succeeded. Pest control to protect native species with high conservation values has to be totally effective."

Totally effective? Exactly what has the decades-long policy of farming possums using aerial 1080 poison accomplished? Possum population estimates still range in the tens of millions, with a steady profit stream to a thoroughly entrenched poison industry.

Never mentioned by stubborn opponents of a possum bounty system are its collateral benefits and the avoidance adverse impacts of poison 1080. When ten million possums are removed by a bounty system, there is no unintended destruction of a range of native and exotic animal and bird species, as there is with poison. When possums are removed by bounty, there are no risks to human health, no tainting of water supplies, no accidental deaths of pets and farm animals, and no risks to export products.

When possums are removed by bounty, there are local jobs and economic benefits to a range of industries. As many argue, a

possum bounty system is the real clean green alternative for wild animal control.

There is one stark experiment that showed bounties work only too well. Towards the latter end of the nineteenth century, kea (now an endangered native bird) were causing distress to sheep farmers. Starved of habitat and food, kea attacked live animals.

In the 1920s, the Department of Agriculture shelled out five shillings per bird, with county councils and run holders each contributing half a crown. It is thought that over 150,000 kea were slaughtered in one hundred years from 1868. The bounty was removed in 1970.

Writing in the December 1994 *New Zealand Geographic*, Philip Temple notes, "This is one of the worst cases of avicide in history. That the kea survived this massive slaughter, and the continuing pressures on its environment, seems little short of a miracle."

Fast-forward to 2014, and kea face a new crisis—poison 1080. Rather than halting aerial 1080 poison drops in kea territory, DOC's choice was to test repellents. The poisoning continues.

It is obviously a great deal easier for DOC managers to hire one helicopter contractor to drop toxin 1080 than it is to pay numerous idiosyncratic trappers and hunters in a bounty system. But the benefits of bounties are hard to dispute. There is no shortage of people willing to do the physically hard work in the bush, setting traps and hunting.

And in regions like the Coromandel, interest in a bounty system remains high. According to fur industry leaders, Steve and Sue Boot, "Commercial harvesting of possums has legitimacy as a viable method for possum management."

Possum bounties are an obvious alternative.

Rigorous Research?

Chinese believe that science, morality and spirituality must go together—that science without ethical and spiritual considerations is not a whole science, but a form of madness.

Benjamin Hoff

Alone among nations in its massive use of toxins to control wild animals in its forests, its conservation estate, and production farms, official New Zealand still struggles to explain or justify its outlier poison policies, and for good reason.

The objectives of wild animal control, and rationale for increasing use of poisons, have shifted from decade to decade and species to species, as political priorities have changed. Dramatic increases in use of the highly controversial supertoxin 1080 are a case in point.

First used post-WWII by farmers against the economic plague of rabbits, the toxin was soon recognised as a potential tool to reduce burgeoning brushtail possum numbers and, thereby, protect browsed forest species. Enter the cattle and farmed deer industries, and 1080 poison is enlisted as a dubious tool to prevent a bovine disease and to protect export revenues.

When forests appear to thrive with more conventional pest control methods, use of the toxin is promoted to save endangered native bird populations from possum predation. When the possum's predation role is questioned, a new target species for 1080 is selected—the rat.

And all the while, a massive toxin industry warns New Zealand of widespread “forest canopy collapse”, and with it, loss of the country's clean outdoor brand and unique tourism allure. With no supporting evidence, longtime 1080 researcher John Innes and associate Gary Barker “suggest that the ecological consequences of using toxins may be much less than the consequences of not using them.” Based on such unsubstantiated hunches (in this instance from Innes and Barker's 1999 *Ecological consequences of toxin use for mammalian pest control in New Zealand—an overview*) the toxin

industry continues to explode. Yet even Innes and Barker go on to say their “suggestion deserves exploration; it may not be true when persistent toxins such as brodifacoum are used repeatedly.”

Missing, as the alarm bells continue to sound, has been the independent science to justify current policy. Ignored, is the mounting hard evidence of failure to meet conservation goals. Given the repetitive use of poison 1080 over the same territory, this would surely indicate “exploration” is urgently required, along with a moratorium on aerial 1080.

Even in the early 1990s, scientists who knew the bush were aware most tree and shrub species regenerate in the presence of invasive species. At the government-sponsored *Workshop on Possums as Conservation Pests* in 1994 conservationist John Parkes declared, “Most plant species regenerate irrespective of their palatability to possums in the presence of uncontrolled possums.”

Parkes went on to pinpoint how species are manoeuvred into the funded crosshairs of conservation bureaucrats... “New bête noire are fingered by managers and lobbyists—magpies and mynas are the latest candidates nominated by the Forest & Bird Society.”

G.J. Hickling, now associate professor at the Center for Wildlife Health at the University of Tennessee, presented a paper at the same workshop entitled, *Action Thresholds and Target Densities for Possum Pest Management* in which he stated, “Despite decades of research demonstrating the negative effects of possums on our ecosystems, there is as yet almost no published data that assists us in investigating the relationship between control intensity and vegetation protection.” The startling lack of knowledge cited means practically zero information has been recorded to assist with defining action thresholds and target pest densities. No one knows what is required to conserve ecological diversity.

Hickling proposed, “The ecological interactions involved are probably so complex that such thresholds will have to be set by trial and error. Even this will not be possible if we do not begin to monitor ecosystem responses to possum control using reliable methods over a wide range of control situations.” He offered a sobering conclusion—“Until more data can be gathered to demonstrate the link between possum control and ecosystem protection, regional conservation staff will be in an invidious position in trying to justify their possum management strategies

to the anti-1080 lobby, commercial possum hunters, cost-cutting accountants and politicians, and a sceptical public.”

Phil Cowan and Chris Pugsley in their 1995 study *Monitoring the Cost Effectiveness of Aerial 1080 and Ground Hunting for Possum Control* found “Even with intensive monitoring, however, accurate calculation of target densities is fraught with difficulty because of factors such as immigration, lack of precision and accuracy in monitoring, and changes in rates of reproduction and survival in response to reduced densities.”

One could imagine conservation department researchers would have seen the 1994 conference as a wake-up call. But 15 years later, scientists found “limited outcome monitoring severely constrains the ability of regional and local authorities to provide robust justification for their pest management activities and expenditures.”²⁹

And more than two decades after Hickling’s eye opening warning, researcher Andrea Byrom and others, again make the same astonishing observation in their *Review of biodiversity outcomes from possum-focussed pest control in New Zealand*—“few studies have taken advantage of decades of extensive pest control in New Zealand to monitor ecosystem-level outcomes.”

These scientists repeat Hickling’s warning a full 22 years later and conclude, “Future studies would benefit from a standardised set of biodiversity indicators from a range of taxonomic and functional groupings, and from standardising experimental designs so individual studies can contribute to future meta-analyses, to strengthen the evidence base for the impacts of invasive pests on native biota in New Zealand and worldwide.”

Ecosystem outcome research is missing, as is investigation into sub-lethal exposure to toxin 1080. Waikato paediatric specialist Peter Scanlon remarked in 2006, “It is astounding that no one has done any research on the effects of sub-lethal doses of 1080 episodic exposures on developing human and non-human brains, given the fact that 1080 is a known brain or central nervous system toxin. And the brain function is intimately connected with immune and endocrine function.” Scanlon was one of the few medical specialists to raise his voice against the indiscriminate use of poison 1080.

Millions of taxpayer dollars are wasted on industry-biased reports that support the ongoing use of toxin 1080. Few are peer reviewed by international researchers. Even the bland and

inoffensive *NZ Listener* headlines a story of January 2014—*Scientific studies should always be taken with a grain of salt* that states, “The gold standard is the double-blind randomised controlled study... it needs to be published in the peer-reviewed literature. Even then, there is an enormous range of quality of journals, and the peer-review process is somewhat fraught, so some things get through when they are flawed. But by and large, it’s still the best screen.” As an extreme and recent example, independent scientist Dr. Jo Pollard quotes a DOC researcher saying his own study lacked “replication, random assignment of the treatments, and observers blind to treatments.” (May 2017 *Loss of science quality in NZ is having dire consequences*).

Nothing has changed since 1995. In the report *Possums and possum control; effects on lowland forest ecosystems A Literature Review with specific reference to the use of 1080*, Atkinson et al. state, “Although the impact of a 1080 poisoning operation on a few major groups of organisms in the forest (e.g. possums, rats and birds) has been documented, the impact on other forest organisms is unknown.”

The authors warn, “This applies to an even greater extent if 1080 is applied repeatedly. Some native species that are affected might not be able to recover to their previous numbers before the next poisoning, and so gradually decline in numbers, much as yellowheads appear to do under predation during the intermittent stoat plagues in beech forest.

“Long life-cycle invertebrates such as cicadas could be affected by repeat poisonings, reducing the population in a series of steps.” The authors also discuss the likely uptake of 1080 in plants, leading to the poisoning of native scales, pseudococcidae and aphids, one scale insect species being an important food of kōkako.

Devastating impacts on native species are, in fact, known. What has remained unchanged for decades is how such knowledge is buried or massaged by the public relations spin machine or just swept under the carpet. (See Appendix III)

Tufts University biophysicist Alexis Mari Pietak conducted a comprehensive literature search for “peer-reviewed scientific investigations into the effects of aerial poison operations on non-target fauna” and compared “the costs and benefits to native species poison operations versus unchecked possum populations at their peak density”. Her research indicated aerial poisoning

has “twice as many costs to native species as benefits, and that aerial poison operations were twice as costly to native species as unmanaged possum populations at their peak density.” This potential for widespread poisoning of insectivorous, omnivorous and carnivorous endemic and endangered or threatened bird species she believes is “a serious issue worthy of international and immediate action.” Namely, to immediately halt aerial poison operations.

Dr Pietak notes the few bird species that have actually been the subject of “proper radio-transmitter, colour banding, and mark-recapture analysis before and after poison operations” are the nectar, fruit and foliage eating birds such as hihi, kereru, kōkako and kaka and are indeed most likely to benefit from possum removal. Missing from thorough research are those birds identified as being high risk of primary or secondary poisoning. They number 24 indigenous bird species. She references work by Armstrong 2001 that “notes that data derived from bird or call counts cannot be analysed to separate changes in abundance from changes in detection, due to the fact that bird behaviour is affected by the presence of a human observer. Detection rates can vary depending on the weather, human observer, and unknown bird behavioural patterns.” She states the “science seems to have been selectively interpreted, ignored, and moreover left grossly incomplete in its scope, presumably in the name of non-environmental economical interests.”^{32a}

Like a growing number of researchers Dr Pietak notes the potential for bias given the large number of studies funded by AHB or DOC. Of the 28 studies retrieved she finds 19 of 28, (nearly 70%), were conducted by employees of either AHB or DOC with only three being published internationally.

More recently, Shaun Hendy, director of New Zealand Centre of Research Excellence and a professor of physics at Auckland University, produced the critical volume, *Silencing Science*. Hendy asked members of the New Zealand Association of Scientists (in a 2014 online survey) whether they had ever been prevented, by either management policy or fear of losing funding, from making a public comment on a controversial issue. Within days, 150 scientists responded with a resounding “yes”.

Hendy references the Education Act (Section 162) that expects academics to be the “critic[s] and conscience of society.” Also he quotes the Royal Society of New Zealand’s Code of Ethics and

Professional Conduct that affirms the responsibility of members to “endeavour not to compromise the well-being of society.”

Yet constraints—such as overt or self-imposed censorship—impact scientists working on government or business contracts. Hendy states science is vulnerable where power, money and politics collide and suggests the need for a new protective institution.

Speaking out on public health issues can result in media smear campaigns. In New Zealand, Hendy concludes, few scientists feel sufficiently secure to speak out. As for DOC sponsored researchers in the pesticide field it is easy to see why they may be pressured or compromised.

DOC works with an island restoration trust whose corporate sponsor is Bayer New Zealand. As Bayer’s website proclaims, “It’s important for business to get behind such conservation projects. Our mission at Bayer is Science For A Better Life, not only in business, but also in relation to our support for the community.” Where does that collaboration leave DOC sponsored researchers?

In the South Island, the superphosphate purveyor Ballance Agri-Nutrients has partnered with DOC to save the smallest of the nine species of giant weta. The potential for conflict is exacerbated when product promoters sponsor product research. The chemical/industrial complex continues to be implicated in compromised or tainted research.

Fortunately there are a handful of scientists prepared to speak out on New Zealand’s conservation policy.³⁰

Since 1991, tens of millions of dollars have been spent by the Department of Conservation, regional councils and the Animal Health Board on questionable studies of toxin 1080. The Department of Conservation continues to promote aerial poisoning of our wilderness and to proclaim 1080 toxin has been well researched. They are clearly not telling the full story.

Despite the focus on control of exotic wild animals, undeniable evidence has emerged to prove that 1080 operations are a threat to, and have a devastating impact on, native and introduced birds, invertebrates and our only native mammal, the bat (*Mystacina tuberculata*).³¹

There is no science to support DOC’s claim that this poison kills only the target species. Non-target species are killed, but such negative impacts of 1080 are rarely studied and when discovered, less likely to be advertised. When kea (*Nestor notabilis*) birds were

killed on Fox Glacier after eating 1080 poison, the data was kept under wraps until leaked to a newspaper.³² There is overwhelming published scientific evidence of harm to many native species. (See Appendix III)

Pat Whiting-O'Keefe, PhD (Chemistry) and Quinn Whiting-O'Keefe, MD, MA (Mathematics), BA (Chemistry), both graduates of the California Institute of Technology having served on the faculties of major US universities, investigated the body of published "science" on aerial 1080. They found, "Most of it reaches only the lowest levels of control quality. Statistics are often poorly done, absent or selectively reported. These studies are short term and narrow in scope.

"There is not one randomized, blind experiment. Results are frequently misrepresented and distorted, often with obvious bias. There are numerous errors of inference, omission and commission. Roughly half of the studies are only published internally by DOC or Landcare Research. Most of the others are published in a single journal, the New Zealand Journal of Ecology. There is only one study that appeared in a peer reviewed international journal. Worse, the entire lot, excepting one or two, was produced by researchers, who are pecuniarily dependent on DOC's goodwill." Landcare is one of two businesses manufacturing 1080 preparations outside of ACP. Their product—1.0% 1080 Waste Paste is sold along with Kiwicare Corporation Ltd's No Possum 1080 Gel Bait.

The Whiting-O'Keefe's conclude, "There is not a single scientifically credible study showing that aerial 1080 pest control is either beneficial to or necessary for New Zealand's native forests or their inhabitants. There is strong evidence that aerial 1080 kills substantial numbers of native birds, invertebrates, and our only native mammal, the bat. The effect of aerial 1080 on populations is not known, and even less so of repeated applications of aerial 1080 over time. The net overall effect of aerial 1080 on our forests and forest ecosystems cannot be determined." (See <http://1080science.co.nz/wp-content/uploads/2016/06/Whiting-Okeefe-2.pdf>)

So the question must be asked: Why does New Zealand continue the practice? One option is to follow the money.

DOC's Financial Commitment

The sad truth is that most evil, is done by people who never make up their minds to be good or evil.

Hannah Arendt

By 1994, the Department of Conservation was deeply committed to its war on possums. DOC ecologist John Parkes summed up the financial picture—"The present system allocates tagged money for control of a few pest species perceived to have the worst overall impact on conservation values, and that (unlike deer, thar, chamois or pigs) are not harvested by other means...The 'few pests' are possums and feral goats, which between them consume over 90% of the money allocated for pest control by the Department of Conservation."³³

Clearly there is money to burn—taxpayer dollars. Poisoning is big business and adds to GDP. Similar economic activity could be achieved through possum harvesting for fur, fibre and meat industries, but this would subtract money from the poison industry.

The formation of the Animal Health Board in 1993 and the transition to government ownership of 1080 poison production roughly coincide with a historic peak in beef exports to the USA. Trading with the USA began post World War II. Prior to 1945, New Zealand had formal contracts to ship everything produced, beyond that consumed at home, to the United Kingdom. The other driver for beef to the USA would have been the rise of the hamburger business, again largely a post-war phenomenon.

Most beef shipped to the USA is from "used dairy cows". Cull cows provide lean, low-fat beef that is typically mixed with fat off-cuts or fatty beef from US feedlot operations. The trade was well established by the 1990s, but there were major negotiations about quotas and tariffs at that time, including as part of the Uruguay Round of international trade negotiations, managed by what is now the World Trade Organisation (WTO).

The United States was, and remains, very protectionist with regard to trade in agricultural products. From 1960 to 1970, meat tonnage to the US doubled, reaching its peak during 1990-91 of 221,808 tonnes, or 73% of total New Zealand meat exports.³⁴ In the early 1990s, the New Zealand government sought to protect its meat industry, and the "new" threat of possums as a possible

vector of bovine tuberculosis may well have provided the impetus for a major increase in imports of poison 1080.

DOC's own website describes the cash flow of available funding for poison operations and research at the time as a "lolly scramble." The site offers a short history of DOC and tells of the 1993 national possum control plan that brought an "additional boost to biodiversity conservation...Field centres around the country joined the lolly scramble to inject more cash into their programmes.

"It was thought that native wildlife on the mainland had reached an equilibrium, with introduced predators. DOC needed to lift its game."³⁵

Researchers in New Zealand have been able to build life-long careers studying toxin 1080. While ostensibly furthering debate and increasing the amount of available knowledge, researchers in any contested field, may in fact be fostering public ignorance. New Zealand ecologist, Mike Joy opines, such work can produce "inaccurate or misleading scientific data to spread confusion and deceit, usually to sell a product or win favour."³⁶

In New Zealand, researchers keep the industry-slanted output mounting, thereby helping to maintain a firm grip on government funding for 1080 toxin. And the media lap it up. The strategy worked for the tobacco industry and is currently doing a good job promoting the health benefits of sugar-loaded processed food, genetically engineered food and victuals laden with pesticides and herbicides.³⁷

On occasion, scientists do publish work suggesting toxin reduction. John Innes and Gary Barker state, "Research on toxin use should continue on its present broad front, but we suggest that priorities are to measure net ecological outcomes at the community level, to reduce toxin use, and to improve pest control strategies and techniques in the maintenance phase of control operations."³⁸

The claimed cost-effectiveness of toxin 1080 is a notion vigorously promoted by the poison industry. Yet the real costs are concealed. Consultation costs can extend to helicopter rides for iwi and local farmers, hui and even picnic lunches. Substantial expenditures arise for newspaper advertisements, truckloads of raw materials such as carrots, heavy equipment to clear helicopter loading and landing pads, storage facilities, security including

multiple police cars on flight days, and many additional DOC contractors and their vehicles.

Even as far back as 1995 aerial 1080 costs were large. According to Phil Cowan and Chris Pugsley, in their seminal *Monitoring the Cost Effectiveness of Aerial 1080 and Ground Hunting for Possum Control* had this to say—"Planning for aerial poisoning is more complex than for ground hunting, because it requires coordination of a wider range of operational activities, compliance with more involved legal requirements, more extensive public relations activity and environmental monitoring." They go on to state "Occasionally even the most carefully planned and executed aerial poisoning operations fail to achieve the operational objectives, as at Puketi. The probability of such failures can presently only be guessed at, but over the last 10 years has not exceeded the one in five estimate used by Warburton et al...

"Such failures are, however, expensive; a one in five failure rate could increase average costs/ha of aerial poisoning by 15-18%." They believe "It is also not clear whether such failed operations [as at Puketi] necessarily create flow-on problems, such as increased levels of poison shyness in the survivors. Indeed the whole strategy of habitat protection by regular aerial poisoning at 5-7 year intervals is still to be validated."

And more recently The Hokonui Environmental Action group found aerial 1080 costs were considerably more than ground-based baiting and trapping. Action group member and farmer Shirley Hudson estimated costs following the AHB aerial drop of 1080 onto the Hokonui Hills in July 2004. A local possum contractor had offered to do the work on the ground for \$16ha.

Hudson investigated and received the costs of the aerial 1080 poisoning. The helicopter, pre-feed and toxic baits added up to \$56.40ha and that figure does not include public liability insurance, consultation with several iwi and farmer groups and locals, the resource consent hearings, a security firm employed for a number of days and nights to patrol sites, freight, graders to upgrade road and gravel for the road, a digger to prepare the site for helicopter landings and a spare helicopter on stand-by in case of sabotage. Aerial 1080 is not the cheaper option.

Inserting some realism into the debate, the Forest Animal Advisory Group compared the effectiveness of hunters, with that of toxin 1080 used to control possums in Pureora (Morgan and

Warburton, 1987). The conclusion? Both methods were found to be equally effective.

Poison 1080 continues to be “investigated,” with plenty of cash for even more reports. A compliant media disseminates crucial and often misleading sound bites. Getting your message across and your point of view into the media is critical, and both DOC and regional councils employ highly paid public relations professionals to do just this job—telling their story, their objectives and their “facts” on a timely basis. On the receiving end, a few threadbare media companies employ a few journalism students who take a press release, slap on a headline and send it in. To them this is “news.”

Public relations is expensive. It costs money, and the industry has it and uses it with the results one would expect.

A sample can be found in the *NZ Herald* of Feb 28, 2008 where a headline reads *Morepork thrive in poison areas*. This so-called research, subsequently published in the *New Zealand Journal of Zoology*, resulted from just 45 minutes of listening at 16 sites in the Waitakeres to find out what poisoners want to hear. According to the 22 year-old funded ecology student Elisabeth Fraser, “More than twice as many calls were recorded in the poisoned areas.” Apparently, that is all it takes to prove morepork/ruru do not eat poisoned rats or baits...that they categorically do.

Fraser's original thesis was to focus “on the potential detrimental effects of the pesticide brodifacoum at Ark in the Park in the Waitakere Ranges.” By the time her funding from agrichemical giant Bayer NZ arrived, her revised job description was not to look at the “potential detrimental effects,” it was to look at the “benefits.” Sources of funding for “research” can influence its outcome...unless you are living on Neptune.

Naturally, there is a paucity of press coverage when research shows the overwhelming majority of surveyed New Zealanders oppose inhumane methods of killing wild animals.³⁹

While government money is reliably funnelled to DOC and Landcare Research for studies to demonstrate “benefits” of aerial poisoning, the occasional small grant is awarded to industries relying on possum harvesting, such as fur, meat and skins.

Ruakura Agresearch granted \$3000 to Bryan Bassett-Smith to study the nutritional qualities of possum meat as it was found to contain very high levels of Omega 3 oil. Up to 2007, Bassett-Smith's

Te Puke pet food company had exported over 290 tonnes to Singapore, Malaysia and North America. However, an order of 100 tonnes to Japan was cancelled, due to fears of 1080 poison contamination.⁴⁰

In defiance of the desires of the majority of New Zealanders, who choose shooting as their preferred method of killing wild animals, the DOC “lolly scramble” has resulted in hundreds of millions of dollars being handed to the chemical-industrial complex through a distribution network of helicopter companies, regional councils, DOC, AHB and the factory producing the poison.

The Local 1080 Poison Business

An agency producing a contaminant is innocent until proven guilty in a court of law.

Sean Weaver

Production of poison 1080 products from imported pure toxin was the business of New Zealand-based Animal Control Products (ACP) for decades. Established in the 1950s with funding from regional pest control boards, the New Zealand Forest Service and the Ministry of Agriculture, ACP became a Crown-owned entity in 1991 and eventually a State Owned Enterprise (SOE) in 2004.

The company, rebranded under the trading name ORILLION in 2016, manufactures and supplies an array of poison products for retail outlets, government bodies and licensed operators. Pure 1080 powder is also supplied to research laboratories throughout the country.^{40a}

While the Wanganui-based company has diversified into other poisons and bait preparations, it is dependent on toxin 1080 for 60% of its business, as of 2009. Its authorised distribution agent is Bell-Booth Ltd in Palmerston North.

The year in which ACP became a Crown business coincided with a dramatic increase in government funding for 1080 poison research and use. As a state-owned entity, the company is ultimately subject to political direction and control. Both major parties, along with the Greens, continue to support widespread use of poison to this day.

In June 1992 the government made an attempt to sell the company's two poison factories.⁴¹ Correspondence in the collection of Coromandel conservationist John Fowler included a memo from Brian McLay, then CEO of the National Council of the New Zealand Local Government Association Inc (NZLGA). McLay pointed out the risk to regional councils should the Crown dispose of its interest in the factories. A private purchaser could well close down 1080 toxin should there be "insufficient profit".⁴²

The plan to sell the factories had been raised by then Minister of Agriculture John Falloon who, according to McLay, "appeared

happy that local government might, in one form or another, take up shareholding in the factories. The Minister conceded he would personally be prepared to give local government a pre-emptive strike on the ownership, but that would be subject to the views of colleagues."

Title searches were undertaken for both the Wanganui and Waimate factories. The South Island, Waimate factory was found to be on Crown land, with titles vested in the Agricultural Pests Destruction Council, but the underlying use "appears to be residential." According to McLay's memo, Waimate District Council was asked "in confidence" to allow the existing use.⁴³ The Waimate factory was never sold.

Why all the secrecy? To keep the plan from the eyes of ratepayers, or potential competitors? In the same memo, Ian Forrester, chief scientist with the Ministry of Research, Science and Technology, warned that, "1080 may well be prohibited for export agricultural products to succeed in the American market before many years are out."⁴⁴

As DOC was a committed poison customer, McLay suggested the best method of involving DOC might well be to trade with the Crown—"requiring DOC for X number of years to buy Y quantity of 1080 poisoned carrots etc. thus underpinning the economic viability of the operation of the factories". McLay also met with Malcolm Lumsden, vice president of Federated Farmers, and with representatives of the Ministry of Agriculture and Fisheries and the Animal Health Board.⁴⁵

A search at the New Zealand National Archives of McLay's personal papers, failed to reveal any negotiations between Tull Chemical in Oxford Alabama (manufacturer of 1080 poison) and its number one customer, the government of New Zealand.

Charles Wigley, owner of Tull Chemical, inherited the family business. According to news reports Wigley's grandfather, Tull Allen, started the company in 1956, after "purchasing the process to make compound 1080 from Monsanto, which had made the poison at a nearby plant that later became infamous for polluting Oxford and nearby Anniston with PCBs (polycarbonated biphenyls).

"Faced with complaints, the chemical was also killing eagles and other animals, the Nixon administration banned the use of Compound 1080 for livestock protection in 1972. The Reagan administration reversed course in 1981, and the EPA said the

poison could be registered for limited domestic use in poison-laced collars worn by sheep.

"[Wigley] reinforced the buildings and installed a chain-link fence topped by barbed wire after an EPA review noted inadequate security and other problems. Wigley said he makes as much as five tons of the poison annually, with most of it being exported to New Zealand."⁴⁶

If the multinational agrichemical industrial giant Monsanto sold this business, it would seem profits were always going to be marginal.

The government initiative to sell off its poison factories stumbled—but only temporarily. In 1998, the Government again suggested it wanted out. This time it was the SOE shareholding Minister Lockwood Smith who said, "We have no great desire to own a poison company forever."⁴⁷ Conservation Minister Nick Smith said, "Government had ended up owning Animal Control Products because extensive investment was needed in research and development to improve the bait." This disclosure is recorded in one of Terry Brosnahan's four *Straight Furrow* articles of 1998.

Brosnahan visited the Waimate factory and chatted with manager Peter Thompson. The factory was originally set up to make 1080 poison baits to kill wallabies and rabbits. For every kilo of bait, 1.5 grams of 1080 solution was added. Thompson had left the local rabbit board to start the Waimate factory in 1975.

Brosnahan's requests to look inside the factory were declined. He wrote, "Peter couldn't even be persuaded to take a photograph on the paper's behalf...[Thompson said] 'I'm not even allowed to take photos for my own personal reference.'"⁴⁸ Workers at the Waimate factory had never seen the owners of the plant. In his report, Brosnahan also interviewed locals who were unaware a poison factory was in their midst.

Seemingly conflicted, Nick Smith defended ownership of these factories as a "means of ensuring the levels of purity." ACP's chief executive claimed 1080 production had been reduced to 50% of total output, so as not to "rely so heavily on one product in case there was trouble sourcing the raw material or 1080 was suddenly banned."⁴⁹

The degree to which workers might inhale 1080 poison or suffer from skin absorption are safety concerns that have been raised by scientists. According to Brosnahan, AHB and DOC commissioned

a study of the toxin's safety by US-based MPI Research. Preliminary results found deformities in rats during gestation.

Chief Advisor Occupational Health and Safety (OHS) Geraint Emrys later wrote, "The Department of Labour is very concerned about the health and safety of workers" and went on to explain how OHS together with the Environmental Risk Management Authority (ERMA), AHB and DOC had adopted a Biological Exposure Index (BEI) for 1080 in urine. Emrys said, "This was made possible by recent investigations into the effects of long-term exposures in experimental animals that shed more light on the possible chronic (as opposed to the better known acute) toxicity of 1080."⁵⁰

Whether any retirees from either factory have poison-related health issues is unknown, as are any health statistics of those who handle and potentially inhale the poison bait while loading helicopter hoppers. According to Emrys, the range of studies yet to be carried out included, "possible side effects of repeat 1080 exposures, possible infertility, birth defects or tumour induction. There were also comparatively few studies of the effects of exposure via skin contact or dust inhalation, the common modes of contact in industry."⁵⁰

The data available in 2000 indicated 1080 is not a mutagen (an agent causing mutations) but it is "teratogenic (causes malformations in embryos), and may cause degeneration of the testes, renal failure, cardiotoxicity, or neurological effects, which dictates the need for extremem care when handling 1080."⁵¹

By 2009 researchers found that "Further protective measures and ongoing workplace monitoring are required...Compliance with the current BEI cannot guarantee complete safety. Any information regarding chronic adverse effects in humans, along with the associated urine levels, would assist risk assessment...

"Early monitoring indicated a need for improvement in aspects of the cereal bait manufacturing environment and in aerial carrot baiting procedures. The latter (at preparation stage) involves dipping carrots into concentrated solutions of 1080, with risks of splashes to the face and other skin areas; it was not uncommon for operators to be wearing contaminated, damp clothing for prolonged periods. Air levels during baiting operations were generally low. However those brief periods of handling concentrated powders during manufacturing are cause for concern. This is particularly

so as (unfortunately) only respirable levels were measured, not total inhalable levels, which latter may have been substantially higher.”⁵²

On November 18, 1996 *Rural News* quoted a paper released by the Royal Society of New Zealand. Here, Michael Beasley, toxicologist based at the University of Otago Medical School and the National Poisons and Hazardous Chemicals Information Centre, warned of trade ramifications given the lack of scientific data on long-term exposure. Beasley said, “The data available on 1080 could not satisfactorily address the range of investigations stipulated under current New Zealand requirements for new chemicals.”

The poison business has its own *Guidelines for the Safe Use of Sodium Fluoroacetate (1080)*, prepared with the assistance of toxicology expert Michael Beasley. Information on male reproductive function, pregnancy outcomes and cardiovascular health status are “important components of health monitoring.” The guidelines recommend, “In the event of abnormalities, 1080 should be considered as a possible influence, though this is considered extremely unlikely with exposure levels associated with urine concentrations below the BEI.”

New Zealand may be the only country in the world where OHS has adopted a Biological Exposure Index (BEI) measurement for 1080 poison in urine, thanks to the flourishing poison business that continues to purchase the majority of the world production of 1080 toxin. The guidelines make the bewildering statement “Sodium fluoroacetate is not toxic in itself.”

Quinn Whiting-O’Keefe, a scientist, statistician, mathematician and academic physician, commented in relationship to this “not toxic” claim, “If you are talking about sodium monofluoroacetate (1080), I would say it is entirely non-toxic to moon rocks, but it is pretty hard on anything that has air metabolising mitochondria, i.e., essentially all animal cells. Indeed it is about as toxic as things get. It is true that the chemical that actually blocks the citrate cycle is fluorocitrate. Fluoroacetate is attached to CoA to produce Fluoroacetyl-CoA which produces Fluorocitrate, which displaces citrate in the Krebs cycle and stops it dead. This in no way should be considered as ameliorating for 1080’s overall effect.

“1080 is really never, “not toxic” once inside animal cells, because it is *always* converted automatically and irreversibly

into fluorocitrate. Once ingested it will get inside cells where conversion to fluorocitrate is inevitable and fluorocitrate is extremely toxic to cellular metabolism. The author may be trying to give an impression of decreased toxicity by stating it the way he has. The statement is like saying a bullet fired toward your skull is not dangerous in itself. It only becomes dangerous when it hits your skull."

As environmental health advocate Sean Weaver noted in the *New Zealand Journal of Rural and Remote Environmental Health* (2003), "...an agency producing a contaminant is innocent until proven guilty in a court of law." And in 1990, the US Environmental Protection Agency decided there was "no validated analytical method with detection limits low enough to determine concentrations of compound 1080 at the level of concern". This was one of the three reasons given for their denial of 1080 registrations in Colorado and California. In New Zealand contaminants such as 1080 "get out of jail free."

In 1995, the Wellington Regional Council actually performed tests on 45 handlers of 1080 poison for local pest control. But they did not test for 1080 residues. They tested for "bovine Tb, a test [that is] similar to that applied to cows by MAF, and got 28% reactors." Slaughter was not an option. Of those supposedly infected humans, 13 test reactors were X-rayed, and all were cleared of bTb. Another six were given a BCG vaccination. This merely confirms what farmers have always known, the skin test is next to worthless.⁵³

Plans to close the Waimate factory were announced in *The New Zealand Farmers Weekly* on October 20, 2008. An upgrade for the Wanganui plant was to happen by the year's end, according to ACP's Derek Kirke. As of 2008/09 the company held approximately 4 years supply of toxin— 8.2 tonnes of pure powder at a cost of \$1.52 million.

ACP did not disclose whether the facility in Wanganui would gear up to produce synthetic 1080 powder (ingredient for 1080 baits) in the event of a supply cut off from the United States. ACP did alert its ministerial shareholders of its concern should pure 1080 toxin be banned, but by 2010 the ACP Annual Report declared there should be no need to "construct a plant to manufacture 1080 powder here in New Zealand."

Poison company ORILLION continues to be held by the government, and the push to accelerate use of toxin 1080, comes from Federated Farmers, Forest & Bird Society employees, a host of government departments, the major political parties, and the current Parliamentary Commissioner for the Environment. They all agree that a pest free country is more important than a poison free country. So it is business as usual for New Zealand's 1080 poison business.

Challenging the Status Quo

Trapping and shooting are widely regarded as the most acceptable methods of pest control, being considered the most humane and species specific...In addition, they are regarded as environmentally friendly.

Anthony Fraser

The Australian brushtail possum was brought to Aotearoa in 1837, with the specific goal of establishing a fur trade. But like other imported fauna, it multiplied and eventually lost its protected status—a status it still enjoys in its native Australia.

In spite of the New Zealand government's prevailing wild animal strategy, it could be surmised that the overwhelming majority of New Zealanders actually support inhumane methods of killing. But that would be a lie.

Anthony Fraser, in his 2006 review of the New Zealand literature, noted that poisons are “the least acceptable of all methods reviewed” and “fail to satisfy any of the three key criteria that influence acceptability” as they are not regarded as humane, specific or safe.^{53a} And three years later a review by Gerard Fitzgerald “also found that poisoning is one of the least publicly acceptable forms of pest control.”

Fitzgerald's review of Australasian and international research found “the public believes that the key criteria for deciding between different forms of animal control should be, in general order of importance: humaneness, ability to generate economic and social benefits (e.g. jobs, incomes, food etc), specificity and safety (i.e. not affecting other animals, especially humans) and effectiveness.”⁵⁴

With no consideration of the validity of these preferences, studies by poison advocates are funded to prove wrong the “intuitive toxicologists”—especially impoverished women as higher earning educated men were found to be somewhat less concerned about chemical risks. Patronising researchers stoop with titles like *Avoiding tears before bedtime: how biological control researchers could undertake better dialogue with their communities* Hayes et al. 2008—their answer? “People are brought together

in an environment where it is safe to express opinions and concerns, where they are encouraged to listen and deepen their understanding, where they can discover common ground and build trust, and collectively find acceptable, or even novel, ways to move forward." Forward to poison and on the marae—"We tested our initial process four times between September 2003 and April 2004 at four different marae."

Refuting T.S. Eliot, such reports do not go out with a "whimper" but with a bang. They "rage against the dying of the light" to quote yet another poet. They sign off dramatically—"Failure... could mean that pest management agencies face a further decline in public support for the use of a control method that currently has no equal in its efficacy in reducing Tb levels and protecting native flora and fauna." (Green and Rohan) Singing from their funder's song sheet.

Poison advocacy remains a top government priority with no regard for the welfare anomaly that results in millions of marsupials, rodents and native species dying grisly deaths, against the public will. When "people identify more strongly with the risks of using toxins than with the ecological consequences of not controlling pests" what is to be done? How to respond to "The strongly negative reaction to 1080 by residents in the West Coast."

How to interpret these views when your brief is to counter them? Where to begin? Sexism? Classism? Green and Rohan in their 2011 government sponsored report, *Opposition to aerial 1080 poisoning for control of invasive mammals in New Zealand: risk perceptions and agency responses* set out, on the taxpayer dime, to help the poison agencies understand the benefits of "good risk communication." A plan of attack that is heartily supported by regional government and DOC in small rural communities where opposition will just not go away. Their attempts to fragment communities continue.

Challenging the status quo, in the small scientific community of New Zealand, has never been an easy. Investigative work that infers criticism of established poison policy has resulted in suppression of research, attempts to censor publication, attempts to destroy careers and, in the case of one internationally recognised herpetologist, seizure of his laboratory work. As funding dries up, scientists look for alternative job offers, usually accepting overseas appointments. The problem has persisted for decades.

Outdoor writer Tony Orman, in his book *On Deer and Deerstalking* introduces three scientists who questioned the growing anti-introduced species obsession.⁵⁵

In the late 1950s, a California professor of zoology William Graf, came to look at our wild deer population. Graf found an “anti-exotic animal phobia, to an extent that much of the public as well as many government officials do not and cannot view the situation with an objective perspective.”⁵⁶ For this he was ridiculed.

Studies by another American biologist Thane Riney, found deer did not eat themselves out of house and home as New Zealand’s conservation management establishment maintained. Following an eruption phase, deer stabilised to the forest’s carrying capacity. Riney commented on his years with the New Zealand Forest Service as a time when most employees seemed incapable of knowing how to measure the effects different animals have on their environment. He held that several botanists promoted policies based on fear of the unknown, that were then “offered to the public as proven fact.”⁵⁷

In the 1980s, world-renowned New Zealand ecologist Graeme Caughley raised the issue of vegetation browse by moa. His doctoral research found that three species of Himalayan thar followed the eruption/stabalisation pattern that also applied to deer.

Caughley surmised that browse of shrubs and bushes had stopped after moa were hunted from an estimated 60,000 birds to extinction. This, he posited, led to massive ecological change resulting in the closed-in state of the New Zealand bush that greeted the first European settlers. Caughley proposed that deer and other wild animals had brought about a kind of return to the original ecosystem through their browsing of the native bush. Caughley and his friend, Thane Riney, both left New Zealand to work overseas.

The Nature Conservation Council (NCC), established by legislation in 1962, comprised independent experts in the field of conservation. Their role was to “coordinate scientific and technical information on nature conservation, to inquire into the effect of proposed public works on any aspect of nature conservation, and to act as an advisory body to Government on matters affecting nature conservation.”⁵⁸

In 1977, the NCC prepared a report for the Minister of Lands after the council’s call for submissions and its investigation of

poison 1080. The report contained eight recommendations. The first reads, "The Nature Conservation Council believes that the use of any chemical is potentially hazardous to the environment. Perturbed at the widespread and sometimes indiscriminate use of the poison 1080 and the lack of environmental reporting procedures, the Council urges the establishment of an effective and independent technical and advisory committee to rationalise and co-ordinate the use of 1080 and all related research."

With reference to calls at the time for an intensification of quantity and density of 1080 poison, NCC recommended "that the Ministry of Agriculture and Fisheries be asked to provide some indication of the incidence of bovine tuberculosis in areas other than those in which possums have been implicated, and also to outline the other more direct methods of dealing with it, which have been, or could be applied."

Recognising the "cumulative evidence of bird deaths [as] sufficiently reliable to indicate that there are significant effects on non-target organisms," the NCC aligned with those who questioned the use of this hazardous toxin. "Of concern to this Council and to farmers and other land users are the large numbers of unused baits and poisoned carcasses which are rarely collected, and the Council recommends that methods be developed for the disposal of unused baits and poisoned carcasses and that the Crown be bound."

NCC recommended, "The use of 1080 should not be permitted in any significant wildlife area or reserves and especially in takahē/kākāpō areas, forest sanctuaries, biological reserves and national parks."⁵⁹

These qualified, government appointed scientists stated the case against poison 1080 forty years ago, in much the same way as contemporary critics. "Because control operations utilising 1080 may induce bait shyness, are only temporarily effective, and often create favourable conditions for noxious animals by reducing competition, and releasing nesting sites and feeding areas, this Council believes that alternative means of dealing with problem animals should be investigated including noxious animal management studies and the development of attractants and repellants specific to the target animal."

The NCC was acutely aware of the positive role played by hunters and trappers. "In addition the social value of recreational

hunting and the willingness of recreational hunters to co-operate in control operations should be recognised and further encouraged."

Commercial recovery for the fur trade was to be actively encouraged in the last recommendation of their report—"In view of the extremely high market value of skins at this time, this Council believes that there is an opportunity for the encouragement of commercial recovery operations for the fur trade which would overcome the necessity to use poisons in selected areas."⁶⁰

The Council was disestablished in 1990, just around the time toxin 1080 received its first major funding boost from government. It would appear the NCC recommendations were inconvenient truths.⁶¹

The NCC recommendations—largely unreported and unrecognised by government policy makers—form an appendix to a 1990 *Technical Report* by Beat Huser for the Waikato Regional Council. He quotes Peter Notman's 1989 invertebrate research that found at least nine orders of invertebrates prone to 1080 poisoning. Notman's investigation—*A review of invertebrate poisoning by compound 1080* concluded "Therefore, 1080 should not be used where susceptible invertebrate species or rare insectivores are found." Notman also found that in spite of the overwhelming excess of 1080 poison, possums are not eradicated and "a large variety of non-target animals is prone to secondary poisoning. This means that control of target species is being accomplished at some cost to native fauna."

Huser also quotes John Hutcheson's study of sub-lethal and lethal poisoning of weta, with some weta taking up to two weeks to die. Huser wrote, "Invertebrates are known to be affected by 1080, and the compound has been used in the past as an insecticide... Herbivores, root and soil dwelling organisms, omnivores and detritus feeders are most likely to be affected."

While it was shown weta readily feed on non-toxic and toxic grain, Huser reported "invertebrates may also be poisoned indirectly by eating 1080 containing carcasses and may subsequently affect insectivorous birds further up the food chain... It should also be noted that there are many rare and localised species of invertebrates which are as yet undescribed."

Huser also writes of secondary poisoning of birds, especially insectivorous birds and "birds with specific feeding habits such as

the native pigeon (kereru), which prefers to drink from stagnant water sources.”

In a roundabout way, Huser supports the NCC recommendations—“Available data on the environmental fate and potential impacts on non-target populations (e.g. invertebrates) by direct and/or secondary poisoning is fragmented and unsatisfactory. The variable, often species-specific pharmacological response of 1080 poisoning poses a management problem, particularly in areas containing protected species which are potentially susceptible to 1080-poisoning (e.g. native birds such as kōkako and invertebrates such as wetas or kauri snails)...The use of 1080 in ecologically sensitive areas (wildlife reserves, forest sanctuaries, National Parks) should be assessed and evaluated against alternative options.”

Conservationist Ron Eddy of Wairau Saddle wrote how Forest & Bird members were fearless anti-1080 campaigners for “40 years or more (they even had joint meetings with the Deerstalkers Association in the 1950s), and then suddenly in the mid-1990s did a sharp U-turn and aligned themselves with DOC.” Tragically, Tony Ellis QC, a great humanist and friend passed away suddenly in 2007. His distinguished career included eight years as president of the Royal Forest & Bird Society. He and his whole family opposed the indiscriminate dropping of toxin 1080.

As the NCC were being disbanded by government, a 1991 survey of public opinion of pest control methods, carried out by Lincoln University researchers Sheppard and Urquhart, found the majority considered shooting and trapping the preferred methods of possum control. And the general public wanted an end to aerial 1080.

In 1990 and 1993, the first Parliamentary Commissioner for the Environment (PCE), Helen Hughes, received complaints concerning aerial 1080. And in 1993, the possum control agencies also asked for an investigation to offer an independent view on the use of 1080.

The PCE chose to report on a wider context, including issues of legality, accountability, transparency, monitoring and the risks posed by possums, as well as the appropriateness of control methods used by the poison agencies.

Her report noted, “Continued heavy reliance on 1080 or any other single toxin is not advisable over the long term.” She

held that cost-effective possum control could be achieved with “possum hunters operating under performance contracts over considerable areas of accessible terrain.” For this option to be viable over a significant part of New Zealand in the medium to long term, Hughes declared, “more adequately trained hunters are required.”⁶²

DOC personnel in Wellington confirmed that a firearms training programme had in fact been set up, albeit briefly, under the umbrella of Ngā Whenua Rāhui. Ngā Whenua Rāhui had been set up as a DOC funding programme to “provide significant operational support for Māori landowners.” To establish ground hunting as part of DOC’s overall possum management strategy, Warburton et al. (1992) found DOC needed to develop a system of accreditation thereby enabling multi-year contracts that would provide stable employment for skilled hunters. However the limited programme folded after a couple of years.

PCE Hughes made a further compelling statement with regard to mental health issues. “Landholders should be allowed to control possums in their own way, if 1080 or other methods preferred by control agencies are unacceptable, as long as required levels of control are achieved. The inability to prevent the imposition of unwanted pesticides may affect mental if not physical health, certification for organic growers, and the ability of tangata whenua to exercise kaitiakitanga.”⁶³

Although these considerations are no longer part of the public debate, due to suppression of opposition, environmental scientist Jamie Steer, posits a refreshing stance with his inclusive conservation concept—a forthright challenge to New Zealand’s long-standing and dogmatic nativism in conservation policy and politics.⁶⁴

“Over the last half-century, conservationists worldwide have taken every opportunity to deride introduced species, certain in the knowledge that their views would escape serious scrutiny. We’ve all been singing from the same song sheet—the louder and more passionate the denouncement, the more praise it has attracted.”

Steer continues: “Many of us have built entire careers out of identifying which introduced species inconvenience natives. We explore and quantify their effects, and then crow about how important it is to rid ourselves of these ‘invasive’ nuisances. So,

for some, it is with considerable trepidation that they witness this complacent formula starting to unravel in recent years.

"Study after study, across discipline after discipline, is showing that introduced species are not, and never were, as bad as we thought. An aging rear guard has devoted itself to the defense of old-school nativism, with all its irregularities, quirks and eccentricities. But many of us can now see that that ship was flawed all along and is now best abandoned."

Steer was interviewed on Radio New Zealand. The broadcaster's website sported the following rarely seen caveat *"The views expressed in this interview are those of Dr Steer alone and are related solely to his academic research."*

What controversial issue is at stake? Steer has challenged official New Zealand poison orthodoxy by suggesting a more reconciliatory approach to wild animals. For those who challenge the status quo the resistance comes from all quarters.

Meanwhile, out in rural New Zealand, both Māori and Pākehā want to prevent inhumane wild animal control.⁶⁵

Inhumanity to Wild Animals

It is a cruel, relatively slow-acting poison, and no one who has watched an animal die of it could be other than disgusted that it is used in the name of conservation.

Bill Axbey

Try to slip into the shoes of scientists designing experiments to observe the daily death throes of animals poisoned by 1080. The test animals could be possums, ferrets, wallabies, or even dogs, goats, sheep, pigs and cats.⁶⁶ The pursuit of death, or dosage to death, is the underlying experimental theme.

From the cache of papers collated by Coromandel farmer John Fowler comes a copy of a 1990 fax from C.T. Eason to DOC's Anne Stewart on Forest Research Institute letterhead.⁶⁷ It is entitled *Acute Toxicity of 1080 to wallabies* and includes distressing instructions and approvals. "Finally, in support of your request I have obtained Animal Ethics Committee (ACE) approval to cover your acute toxicity study of 1080 baits to wallabies...

"Key points: Animals should be trapped with minimal stress... Animals should be housed comfortably in cages and allowed free access to food and water. Animals should be allowed several days to acclimatise to their cages prior to the experiment. Animals should be presented with bait before feeding for that day and observed closely but discreetly. It will be important to ensure that all the bait(s) are eaten. Following ingestion of the bait(s) animals should be allowed free access to food and water. All animals must be weighed to provide useful data on the lethal dose of 1080 on a mg/kg basis.

"Following ingestion of the baits the animals should be observed until death or for at least 4-5 days. Ideally toxic bait should be assessed in groups of a minimum of three wallabies per dose group to define the effectiveness of toxic possum baits. Doses (number of baits) will be increased in steps, using different animals for each dose group until a consistently toxic effect is obtained...If at all possible I should really be present on Rangitoto on the first day of dosing...sincerely Charles T. Eason for Acting Director."

The Animal Ethics Committee approval had been granted by, "a veterinarian, an RSPCA member, and a lay person."

It appears that 1080 baits are posted or couriered around the country, as Eason is quoted, "By now you should have received the toxic baits sent to you last week."

Earlier research carried out in the Animal Ecology Division, Animal House at Taita, during March and May of 1961 used 10 different doses of 1080 given to ferrets in captivity. "At two hours the animals became violently ill with extreme head throwing from side to side, arching of head over back, strenuous paddling of front feet with flexing of forelegs way back, rapid breathing and heart action and no control over direction of movement. These symptoms lasted about four hours...some violent paddling and stretching backward of forelegs occurred. At six and eight hours both animals were lying on their backs with very slow breathing. At 22 hours both animals were dead."⁶⁸

Responsibility for this animal suffering rests with all New Zealanders. Fortunately, there is an organisation that supports action to Save Animals From Exploitation (SAFE). Their website recounts the ordeal of possums dying from poison 1080. "Clinical signs of poisoning include rapid and laboured breathing, tremors and muscle spasms, terminal convulsions and death. From about four hours after poisoning until death all lethally dosed possums exhibited spasms involving the limbs or body.

"Possums vocalised during spasms, tremors or seizures. Vocalisation was loud and prolonged. (Squeaking, gasping and gagging noises were also frequently heard during retching and terminal breathing.) Seizures included stiffening of limbs with hunching of the shoulders; jerks in limbs, head, abdomen or shoulder; leg paddling; rolling onto the back with a stiffened body; continuous body rolling; trembling; and rigidity of the entire body. Possums were sometimes propelled into the air by these movements..."⁶⁹

Poisoned domestic cats (*Felis catus*) exhibit vomiting starting at "approximately 1 to 2 hours, followed by salivation, pupil dilation, rapid breathing, hyperexcitability, then inability to move limbs. Convulsions develop suddenly after approximately 2.5 hours, persisting for several hours. Death occurs from four hours due to either depression of the respiratory centre or resulting from

ventricular fibrillation, but may take up to 24 hours depending on the dose received."

Poisoned pigs (*Sus scrofa*) suffer vomiting, tremors, "increased excitability and/or increasing lethargy, followed later by violent convulsions leading to either respiratory depression or ventricular fibrillation and death."⁷⁰

Independent researcher Dr. Jo Pollard comments on a ministerial technical paper titled *How humane are our pest control tools?*⁷¹ "1080 has not been assessed as moderately humane by scientists, rather it has been assessed as having intermediate effects compared to other poisons. It is very unlikely that its humaneness could be improved by altering the bait design. Aerial poisoning is less ethical than ground control in which pests can be harvested for commercial use."

The poison industry knows the term *inhumane* carries unwanted freight. Loaded terms, such as *slaughter* or *massacre* or *kill* are concealed behind bland euphemisms, such as *control*. So, too, *inhumane* does not feature in any poison campaign publicity.

Animal cruelty in the laboratory and in our forests is thoroughly ignored by government and industry. But it is an issue of grave concern to most New Zealanders. It goes to the heart of New Zealanders' historic and modern day relationship with the natural world.

In the case of toxin 1080, animal cruelty is not just a peripheral issue or a necessary, but regrettable, side effect. In the case of toxin 1080, animal cruelty is a grotesque and horrifying central feature.

Betty Rowe, longtime campaigner for the Arapawa goat population in Marlborough Sounds writes, "Animal welfare is an issue that cannot be ignored. People are now demanding humane and ethical treatment of animals, and a slow death by poisoning is not seen as either humane or ethical. Many countries have banned the use of this poison, and it is time we did also."⁷²

On the Coromandel, conservationist Val Findlay protests DOC and Waikato Regional Council use of taxpayer and ratepayer money "to inflict cruelty and suffering on domestic and wild animals in an inhumane way before death. 1080 takes from 16 hours to two days of trauma—vomiting, spasms and seizures...and the SPCA turns a blind eye to this practice. Shame on you." Findlay points out that, while SPCA policy opposes cruelty to animals, the group takes no action when wild animals suffer that cruelty.

Outdoor writer Tony Orman points out that 1080 is a slow-acting poison. He quotes a Marlborough pest-monitoring officer, Robin Pearce, who witnessed a red deer hind dying from 1080 poisoning. "She was hunched up, her eyes bulging and dribbling at the mouth." Orman said "The same officer watched a dog screaming with the pain of 1080 and doing agonised back flips, biting at everything. He was forced to shoot the dog to put it out of its misery. Dogs go through agony in dying from 1080 poison. In Marlborough farmers' dogs have been poisoned 9 to 12 months after a 1080 drop. The AHB downplay the cruelty saying dogs are different from other animals. I believe this to be irresponsible and unethical. Deer, by nature, are not vocal animals like dogs and do not cry out to the same extent."

Dogs are in fact most susceptible to poison 1080. Only 0.07mg per kilo of body weight will lead to a tortured death. Lethal dose for a possum is 0.4mg per kilo, and a mouse, much more resistant would have to consume close to 13mg per kilo body weight, according to research carried out in Wellington at the Animal Health Division of the Ministry of Agriculture and Fisheries in 1978.

Jon Jonson of Hamilton wrote to Robyn Kippenberger, the former head of the Royal New Zealand SPCA (February 2010) commenting on the group's hypocrisy. On the one hand it calls for stronger penalties by way of fines and jail sentences for animal cruelty. But takes no action when it is a well-known fact that 1080 kills in a gruesome and cruel manner. He asked why DOC bureaucrats walk "around scot-free after being party to far, far greater acts of animal cruelty over a far, far greater time than Joe Citizen. The RNZSPCA has a member on all New Zealand Animal Ethics Committees, committees that give approvals for all animal experiments."

Lynley Brown, co-founder of Coromandel Landcare, asked the SPCA for its policy on the use of 1080. "The SPCA replied stating they are aware of targeted and non-targeted animals facing a cruel, agonising death, which results from ingesting 1080." She said the SPCA policy "is opposed to the use of poisons which cause animal suffering [and the] SPCA advocates the withdrawal of such poisons from the marketplace.

Brown asks "How can anyone who cares about animal welfare stand by and allow our animals to suffer such a cruel death by

continued use of 1080 when there are much kinder alternatives? Next time it could be your pet that accidentally ingests a lethal dose.”⁷³

Deerstalker advocate Hugh Barr recorded the extreme cruelty endured by four polo ponies that were killed, along with 20 sheep, near Turangi as a result of accidental 1080 poisoning. One of the horses had coughed-up its lungs.⁷⁴

Thames Landcare founder Graeme Sturgeon points out, “Experts now tell us there is a link between cruelty to animals and cruelty to children and other humans.” Sturgeon says his group sought guidance from the SPCA. The SPCA chief executive Kippenburger responded, “I hope this will go some way towards reassuring you that this is not a done deal. We will certainly do everything that we can to get the use of 1080 reduced and better controlled and then eventually replaced by another more humane method. While we reluctantly accept that pest control protects our export trade and environment, we do not regard 1080 poisoning as a humane death for any animal. We know it can take up to three days of agonising suffering for a deer to perish and have made it clear to Government that this is totally unacceptable.”⁷⁵

In February 2012, Des Gyde of Whitianga wrote to National Party MP Simon Bridges congratulating him on his proposal to upgrade the Animal Welfare Act 1999 and for increasing penalties for cruelty to animals. Gyde complained however “There is a real problem of hypocrisy between what is being done about obvious animal cruelty and the not so obvious. By all accounts, 33 dogs were killed near Wellsford and it was widely claimed as a cruel and inhumane act. Yet just over the ‘fence’ throughout New Zealand, thousands of animals, birds and fish are being killed in a far more cruel and inhumane manner by 1080, taking many hours to die.”

Rural News December 4, 2007 reported an Australian study that confirmed 1080 is an inhumane poison. RSPCA Australia’s Miranda Sherley concluded, “We can no longer kid ourselves 1080 is an acceptable option. We urgently need to focus efforts on finding ways to make 1080 more humane, or otherwise finding more humane ways to control pest animals.”⁷⁶

In the meantime, then Minister of Agriculture Jim Anderton announced new restrictions on leg-hold traps ostensibly for animal welfare. Apparently serious leg pain is an issue for the government

while gruesome suffering and tortured death over many hours is not a problem at all, and is swept under the carpet.⁷⁷

Under the new law, "Any breach of the regulations is an offence under the Animal Welfare Act punishable by up to six months imprisonment and/or a fine of up to \$25,000 for an individual, or up to \$125,000 for a body corporation."⁷⁸ Intentional cruelty by toxin goes unpunished.

DOC researchers John Innes and Gary Baker write, "The precautionary principle can be applied to toxin use. This says that managers should not apply toxins unless they know what most of the resultant ecological consequences are."⁷⁹ Given that much is known concerning the ecological consequences of indiscriminate wild animal poisoning, managers should definitely not apply toxins.

Throughout this poison saga, farmers who lose stock as a result of poison 1080 accidents must sign secrecy agreements before any compensation is paid. In a May 1998 *Straight Furrow* story, four bulls and two dogs suffered horrific 1080 deaths on one farm near a drop zone. In the same story a Māori environmental consultant, said he believed that DOC's "reliance on 1080 would lead to the extinction of the kiwi on the mainland within 20 years. People not poison, is the best way to protect the environment."

The consultant said many iwi were opposed to regional council and DOC use of the toxin and in the Uruwera, Māori even blocked roads, as they "believed DOC was mismanaging the forest and that its national pest management strategy was not working."

Traps, cyanide and shooting have long been acknowledged as more humane methods of killing wild animal pests that have reached unsustainable densities. They represent existing efficient and effective alternative to 1080 poison. But these alternatives face constant government opposition.

In 1995, Ross Annabell writes in *Rural News* on September 4 how "Wellington Regional Council pest control bureaucrats" squelched a sensible trapping scheme on six farms in the Wairarapa/Castlepoint region. The plan was to trap possums, cats and ferrets with suspicious lesions and to test for bovine Tb."

And Wellington Regional Council also reversed the two-year-old policy that allowed farmers to employ their own trappers and be reimbursed by the council from its pest funding, provided pest controls reached an agreed level. As the article concluded, "WRC

seems to be lukewarm on any proposal that would loosen its grip on the pest control 'empire' it operates under the Animal Health Board's money shower." Wellington Regional Council is far from alone in opposing hunting and trapping proposals.

Andrea Fox reported in a 1996 *Waikato Times* feature, "There is hot debate between the DOC and environmentalists as to whether 1080 use is responsible for the return of native birds to the bush, or for killing them, along with the insects birds feed on."

"We are in a war zone," declared Stella Penny, DOC's Waikato regional conservator, affirming the former supposition. Disputing this concept, Fox's article goes on to record the dismal failure of 1080 to kill only the target pest—possums. Tomtits, robins, falcons, teals, fernbirds, dogs, and cattle all have died grisly deaths in South Waikato district.⁸⁰

Steve Veail, president of the New Zealand Deerstalkers Association, wrote in Wellington's daily paper—*Dominion Post*, "We've been trying to win a full, independent, scientific review of [1080] use for more than 60 years and are very concerned about the long-term possibility of environmental damage. The poison kills slowly and painfully and seriously breaches animal welfare issues...Unfortunately, 1080 kills much more than the target pest. It kills all air-breathing organisms."⁸¹

Direct animal cruelty is not the only concern. It can lead to indirect cruelty to humans. Victoria University environmental scientist Sean Weaver wrote, "If 1080 were capable of causing *direct* adverse health effects at levels considerably lower than those that would cause acute symptoms (e.g. if it is an endocrine disrupter), then it is also possible that it could cause *indirect* adverse health effects at low levels through secondary poisoning. This could potentially occur through the consumption of meat contaminated by 1080. Of particular concern here is game meat (especially venison), which may be killed following exposure to 1080 by the animal."⁸²

Weaver referenced the linking of cancer and tobacco where it remained extremely difficult to prove that smoking caused cancer, as mortality data is an insensitive measure of environmental toxins. Yet mortality data still forms the basis of most regulatory standards for environmental toxins.⁸³

Cruelty to animals and indirect potential cruelty to humans carries on. Public awareness and concern for animal welfare mounts.

Whether actively pursuing its policy, or effective in making its voice heard, the SPCA's Ric Odom has in fact stated, "1080 poisoning is a horrible way to die and it is indiscriminate in what it kills. The Department of Conservation (DOC) is dropping more 1080 poison this year than ever before across huge swathes of our forests, despite the inevitable damage it will do to a wide range of 'non-target' animals and birds. We are saying there has to be a better way.

"These 1080 drops are not surgical strikes that only knock out so-called 'target' species. On the contrary, 1080 poison is a weapon of mass destruction that leads to the agonising deaths of many 'non-target' species, including deer, pigs, and, yes, native birds. DOC is dropping many tonnes of 1080 poison bait across New Zealand's forests and streams, potentially killing every living thing within the drop zones. This is unacceptable and there is much evidence to suggest that it is not the answer to the problem: the target species, particularly rats, always seem to bounce back, which necessitates more 1080 poison drops."

CEO Ric Odom recorded (in the SPCA release titled *Time to find alternatives to 1080—weapon of mass destruction*) "It is simply not a sustainable way to manage wildlife in New Zealand. Are we going to keep dropping 1080 poison all over New Zealand forever? Is that the future we want? Moreover we appear to have set up a double standard regarding the welfare of pest species, such as rats, stoats, and possums. The law permits the elimination of these and other inconvenient species and turns a blind eye to how inhumanely they are killed. We as a country have decided there are two kinds of animals: those we care about and those we don't. If I fed 1080 poison to my dog, the SPCA would prosecute me with vigour. But if I fed the same poison to a possum there would be no repercussions at all.

"The Royal New Zealand SPCA exists to prevent cruelty to animals and to promote animal welfare – and that means all animals, not just the ones we keep as pets or on our farms. Make no mistake, 1080 inflicts terrible, prolonged suffering on the animals that it poisons. We believe there must be alternative methods of pest control that do not inflict such awful suffering.

“We are not arguing against pest control. We recognise that rats, stoats, and possums pose a real threat to native bird species and must therefore be controlled in some way. What we are saying is there has to be a better way – and it’s our duty as a nation to find it. The Royal New Zealand SPCA is standing by to work with DOC to help find more humane, more targeted, more sustainable, and more effective methods to control pest populations and protect our precious native wildlife. And we call on the Government to stump up the cash required to fund the search for these alternative methods.”

Odom’s statement was made a decade ago and to date has fallen on deaf government conservation ears.

New Zealand has been poisoning nature heavily for decades with little regard for wild animal welfare. Apart from its cruelty, toxin 1080 is clearly implicated in the ongoing loss of native invertebrates and birds. All the while, the ongoing survival of possums and increasing rat populations offer evidence of a failing conservation policy.

Controversy has dogged the official government policy for decades. Opposition has come from various quarters... from environmental scientists to animal welfare advocates. But government has not hesitated. In fact the plan is to increase poison use. To do that there needs to be a very visible official green light from New Zealand’s highest environmental management authority.

Enter the Environmental Risk Management Authority (ERMA) reassessment process on the in late 2006 where nearly \$2 million would be spent buttressing the 1080 poison industry—not with science but with secret strategic meetings between colluding industry players and enabling government bureaucrats. The fix was on.

Part 2

Poison Reign— Manipulating the Process to Obtain a Predetermined Policy Outcome

*I am in favor of animal rights as well as human rights.
That is the way of a whole human being.*

Abraham Lincoln



Behind Closed Doors

Adopt the pace of nature: her secret is patience

Ralph Waldo Emerson

The floodgates of expanded use of supertoxin 1080 appeared to open in late 2006. That is when ERMA's reassessment went public. However, the process had been secretly underway for years.

Laws and regulations could pose significant potential risks to the industry. What if 1080 drops were stopped on grounds of cruelty or evidence of harm to native wildlife? What if risks to human health were exposed? What about potential liability on the part of councils and helicopter contractors? What about communities banding together to halt poison drops in their backyards? No industry wants to deal with these.

A joint application by DOC and AHB for the reassessment of poison 1080 was officially submitted to ERMA in October 2006. This was the first public signal that a fresh official review of the supertoxin is underway. A reassessment could establish a definitive legal foundation for the poison's expanded use far into the future, effectively neutralising all opposition. DOC spokesman John Ombler parrots the party line—1080 is the most cost-effective possum control tool available. Both DOC and AHB look forward to a "thorough and professional scientific and public process," he wrote. To quote the Tui beer ad, "Yeah, right."

So the public is then invited to participate, but it was way back in February 2002 that DOC and AHB made their original application to the Authority for a decision as to whether there were grounds for a reassessment of 1080 and the substances containing it. ERMA agreed in March 2002 that a 1080 reassessment process was justified on three grounds: "the large increase in the amount of 1080 being used and planned for use; new information relating to the effects of 1080 since it was first registered in 1964; and considerable public concern about the use of 1080." However it was not until publication of the 2007 ERMA Annual Report of toxin 1080 that the public learned the reassessment process had been well underway...with a four-year head start stacking the deck for DOC and AHB.

That one of the grounds for reassessment was to exponentially grow the use of poison 1080 before the substance itself was fully reviewed came as a shock. While ERMA acknowledged “considerable public concern,” DOC and AHB made their intention to expand 1080 poison use clear from the start—to ERMA, not to the public. The general public knew nothing of the private multi-year meetings allowing the poison advocates the luxury of four years to get their ducks in a row. The public submission process, however, was limited to just three months. Coromandel conservationist Bill Axbey articulates the impossible challenges faced by public submitters.

“It is virtually an impossible task for the ordinary working individual in opposition to 1080 to deal with and disprove the huge volume of statements and findings on a page by page basis. The two government departments producing it have not only done so on an unlimited timeframe, but are funded by the taxpayer and have staff whose sole purpose is to justify their actions no matter how unwise or incompetent those actions may be.” The Upper Coromandel Landcare Association (UCLA) along with others demands an extension to the public time frame, resulting in the granting of an additional four weeks.

Almost a year after submissions are closed and ERMA has given a green light to continue and expand 1080 use, UCLA learned that secret meetings had been underway for years. Copies of the minutes were requested using the Official Information Act (OIA). In August 2007, a letter from Grant Baker, DOC’s general manager, Business Management Division was received, denying the OIA request to divulge the contents of meetings held from 2002 to 2007 between the organisations campaigning for continued use of toxin 1080.

This cabal called itself the “Steering Group”. A private consultant, Sara Clarke of URS NZ Ltd, was paid to co-ordinate meetings. The Steering Group comprised DOC, AHB, the government owned poison company, Animal Control Products, (ACP), plus regional council representation in the person of Hamiltonian John Simmons of Environment Waikato (EW).

According to official public figures, of all the land area in New Zealand subjected to aerial 1080 drops, more than 41.3% is in the Waikato region. And of all the land area in New Zealand subjected to either, aerial and ground-based 1080, more than 46.6% is in the

Waikato region. The data showed approximately half of the regions use no aerial 1080 poisoning at all. Of the remaining regions aerial or ground-based 1080 is used on only a few thousand hectares. The Waikato region is a heavy user. It was no surprise that EW manager John Simmons was local government's chosen mouthpiece.

While denying UCLA's request for Steering Group minutes, DOC's Grant Baker defended the ERMA decision report. He quoted from the Chair's introduction claiming without 1080 "our native bush and agricultural production would otherwise be at serious risk." Baker noted ERMA had appropriated the word 'difficult' to define terrain that now must receive doses of aerial 1080 poison. Why? Apparently because results are "rapid and effective", whereas "ground control places significant limitations on the areas able to be treated because of the time and resources involved."

Undeterred by DOC's refusal to provide minutes of Steering Group, UCLA requested the intervention of Ombudsman David McGee. McGee wrote to the director general of DOC formally notifying him of the complaint, requesting he be provided with "the information at issue together with a report explaining the essential reasons why the Department wishes to withhold this information in terms of the provisions of the Act."

It is only through the Ombudsman's intervention the majority of the minutes were eventually released in June 2008 with sections redacted. A second group of correspondence was subsequently received with fewer redactions. By excluding the public from their deliberations and planning, the Steering Group promoting 1080 poison use had effectively denied New Zealand citizens access to substantive information integral to a fair hearing.

Police and security officers however, would be employed to accompany the hearings horse and pony show that travelled the country—presumably to protect the highly paid grey suits from Wellington, some of whom definitely did not wish to tour at all. Why would poison promoters require police protection? Why would they be afraid of submitters?

Surely citizens are merely participating in a public process where the narrative implies their voices will be heard. Therein lies the public safety concern. The fearful authorities allow citizens to speak to their submissions, and to oppose the official poison line—but only with safety precautions. The historical disregard for the

voice of opposition had seen the state's security apparatus used in an earlier process where voices raised against genetic engineering were also vehement and numerous.

The sham review process would ultimately cost taxpayers nearly \$2 million even though toxin 1080 represents only 5% of the total vector control arsenal used in the country. The four years of meetings produced their desired outcome.

In August 2007 ERMA issued its rubber stamp. ERMA recognised the years of hard work on the part of the 'Gang of Four' 1080 advocates with a searing endorsement. Its decision in part reads, "9.3.1 The Committee considers that extensive pest control measures are essential to ensure that the condition of New Zealand's native ecosystems is maintained in order to ensure the ongoing survival of native and valued introduced species and the maintenance of indigenous biodiversity. The Committee notes that 1080 is the only tool currently available to achieve rapid and effective pest control in difficult terrain."⁸⁴

So there it is, in a nutshell. Conveniently ignored is the banal futility of the poison strategy and all serious public concerns. The only certainty is the repetitive nature of dumping the same poison into waterways and onto land with no proven success when it comes to saving endangered species.

The Reassessment Strategy

Publicity is like poison; it doesn't hurt unless you swallow it.

Joe Paterno

In assessing the risks, costs and benefits, of an extremely toxic chemical in the environment, one might expect input and recommendations would be invited from the manufacturer. However Tull Chemical Company was not a participant in the Steering Group and did not play a substantive part in the reassessment process at all. And no wonder—the way this poison is used in New Zealand routinely violates their product warnings and recommendations for appropriate use.

The absence of Tull gives pause for contemplation, as one might reasonably expect a vertebrate toxin manufacturer to be asked to provide all research demonstrating the safety of their product. Not so in New Zealand and not so at ERMA. In New Zealand, as environmentalist Sean Weaver observes, "...an agency producing a contaminant is innocent until proven guilty in a court of law."

Section 7 of the HSNO Act 1996 reads "all persons exercising functions, powers and duties under this Act...shall take into account the need for caution in managing adverse effects, where there is scientific and technical uncertainty about those effects." Weaver states in his substantive review of the 1080 toxicological literature—

"Whether regulators choose to err on the side of caution or on the side of negligence is for them and their political managers to decide. History has taught us though, that the negligent option can lead to adverse and sometimes irreversible environmental and public health impacts."⁸⁵

The four years of secret meetings led the Steering Group to an eventual favourable outcome. Harry Broad, DOC's representative on the Steering Group, resolutely pushed the toxic ball along. The minutes record the group's desire to get Charlie Eason of Landcare Research and Connovation Ltd on board to provide the kind of "scientific" positive statement Broad wants nailed.

Eason finally appears cajoled, and on 27 April 2004 agreed to say 1080 is safe “with appropriate precautions.” This was the same scientist, who in his 2002 *Sodium monofluoroacetate (1080) risk assessment and risk communication* report found, “Long-term exposure to sub-lethal doses can have harmful effects” and that “strict safety precautions are enforced to protect contractors and workers in the bait manufacturing industry.” “Strict?” “Appropriate?” It worked for the Steering Group agenda.

Bordering on the absurd were Steering Group apprehensions concerning the bill—who will pay for what? DOC and AHB and ACP think ERMA will cover costs, as the reassessment is “the first of its kind.” There appeared to be some resentment by Steering Group members who believed ERMA initiated the process.

And on the issue of publicity, the minutes mention how DOC employed the global public relations company Hill + Knowlton Strategies Inc. Headquartered in New York, Hill+Knowlton are notorious for their work on behalf of fracking interests, the Church of Scientology, the tobacco industry, and possibly even the false priming of the U.S. Congress prior to war with Iraq.

In July 2017, the USA Bioscience Resource Project uncovered what they call *The Poison Papers* exposing decades of collusion between industry and regulators over hazardous pesticides and other chemicals. They found “Corporate concealment is not a new story. What is novel in the Poison Papers is the abundant evidence that EPA and other regulators were often, knowing participants, or even primary instigators of these cover-ups.

“These regulators failed to inform the public of the hazards of dioxins and other chemicals; of evidence of fraudulent independent testing; and of widespread human exposure. The papers thus reveal, in the often-incriminating words of the participants themselves, an elaborate universe of deception and deceit surrounding many pesticides and synthetic chemicals.”

Locally, an advertising business had been employed by Timberlands West Coast Ltd to win support for logging native forests. They surveilled environmental groups and even provided pro-logging educational materials for schools. Their actions were fully documented by Nicky Hager and Bob Burton in *Secrets and Lies: The Anatomy of an Anti-Environmental Campaign* (2002). Hager later claimed, “that any time there was a controversial issue, there would be a public relations company behind it.”^{85a}

These public relations strategies are usually successful, as few citizens have the time or the inclination to dissect mischievous data or incompetent research. A PR firm can work with data to create and place select gems in tractable media. Also, the general dumbing down of corporate media puts investigative journalists on the rare and endangered list.

Harry Broad wants an "advocacy document", and on July 10, 2002 he gets what he wants. Oddly it appears their PR machinery has fallen down on the job by taking a defensive posture. "There is nothing sinister about the fact that New Zealand uses more 1080 than any other country," the promotional piece declaims. But "sinister" is exactly what springs to mind when one pictures a hazardous toxin flung randomly into the environment. "Sinister" is spot on, when one considers how inhumanely 1080 poison kills sentient beings. And "sinister" is how communities define DOC, regional council and AHB obstinance in the face of community preferences for alternative wild animal control. By utilising a heavily freighted term, DOC's PR team unwittingly raises alarm bells, well before kick-off.

The advocacy document touts "key facts", many of which are unsubstantiated or distorted. We are told the poison was "originally developed in the United States to control mammal pests" when, in fact, 1080 was originally developed as an insecticide in the UK and was patented in the USA as a moth-proofing agent in 1927 (Twigg and King 1991). Post war American researchers *used* 1080 to control gophers, squirrels, prairie dogs and other rodents and coyotes, but DOC's message fits claims of the poison's mammal specificity. This distorted "fact" also helps staff and poison advocates disregard broader consequences including native invertebrate vulnerability.

Some disturbing tomtit "facts" are presented, propped up by typical spin. "Although significant numbers of tomtits died during a 1080 operation in Pureora Forest, the overall tomtit population had recovered a year later to 75% of its pre-poison level. They were able to rear two broods in a season, and even three on occasion."

However the actual research is alarming—"After monofluoroacetate 'treatment', robin (a threatened species) and tomtit populations suffered 55% and 100% losses respectively." On further investigation, scientists Pat and Quinn Whiting-O'Keefe found, "There were no P-values or confidence intervals presented on the relative population losses. In subsequent years, the kill rate

for robins apparently was lower although, as P-values were again not calculated, even this claim is dubious. The earlier robin and tomtit slaughter was hardly mentioned in follow-up reports."

Tomtits were dropped from follow-up studies as the initial study noted they were wiped out by 1080. The Whiting-O'Keefe state, "As bad as all this is, the critical point is that DOC's own study, one of the few, suggests that the monofluoroacetate 'treatments' executed over at least a preceding decade were almost certainly mass-killing robins and tomtits and DOC did not know it."⁸⁶

Under the heading *The Benefits of 1080*, another "key fact" is certainly too good to be true. In October 2001 there were an estimated 729 kākā in the Waipapa Ecological Area in the Pureora Forest Park. One 1080 poison drop and five short months later, the document claims, there were 975, an impressive increase of 246 inquisitive parrots—"Without a doubt, these figures show the positive effects of pest control, both through aerial 1080 and poison baits in bait stations". Stoats were apparently wiped out by 1080 leading to a vast increase in bird numbers. However stoats do not eat 1080 poison baits. Stoats may well dine on a few poisoned rats, but turn to eggs and chicks when their favourite food disappears.

Kākā populations had been discovered in the Pureora Forest Park three years earlier by researchers Terry Greene and James Fraser. But they discovered, after 25 years of aerial 1080 poisoning of the very same Forest Park, kākā populations had a "significant sex bias toward male birds, a sure sign of a population in decline." This report—*Sex ration of North Island Kaka (Nestor meridionalis septentrionalis), Waihaha Ecological Area, Pureora Forest Park 1998*, cites along with nest predation, lack of high-energy food sources and a slow breeding rate as threatening kākā long-term survival. Neither the slow breeding rate nor food restrictions are mentioned in the tidbits promoting the benefits of poison 1080.

A decade earlier the hefty DOC bias had yet to be universally adopted. Researchers were able to extrapolate and publish the accurate lethal effects of 1080. In their science and research internal DOC report—*Conservation of Kaka in New Zealand* Gretchen Rasch and Colin O'Donnell write, "1080 poison is being used extensively for possum control in areas inhabited by kaka." They declare—"Poisoning could be a greater threat to kaka than competition with browsers. Trials done by Eric Spurr (Forest Research Institute, Christchurch) on bait acceptance by captive kaka showed that they

ate many, probably enough to obtain a lethal dose of 1080." DOC's claim of population increase due to 1080 poison takes the cake.

Top pick in this array of bite-sized "facts" in Broad's advocacy paper was a simplistic, personal anecdote attempting to refute the common observation that forests fall silent after 1080 drops. The story was from a conflict-laden former DOC staffer, who at the time of the Steering Group meetings, was employed as operations manager for EPRO Ltd, a company that held lucrative consents to drop 1080 in the Waikato.

One actual fact is however exposed—"the extent to which forests recover can be slow, and possum numbers may rise again before recovery is possible." Essentially this statement implies periodic use of 1080 is failing. So what is stopping yearly or even six-monthly poison drops?

Firstly, studies have proven the toxicokinetics of the compounds in poison 1080 severely impact non-target species. Risks to non-target animals is to some degree dependent on the frequency and degree of exposure, as well as the animal's intrinsic susceptibility. However these risks are grave. And secondly, costs would presumably sky rocket. It is a lose-lose proposition. Neither nature's forest cover nor its forest inhabitants reap long-term benefits. It is not a failing of the poison itself. It is an inept and wreckless failing of all agencies using poison 1080.

Then there is the thorny issue of bait shyness—a by-product of constant poison use. Poisoners have known bait-shyness occurs since the 1996 publication of Morgan, Morriss and Hickling's research in *Wildlife Research* 27. Then in 2000, according to researchers Shaun Ogilvie et al. bait-shyness had been observed in the "wild possum population and is considered a threat to the control of this pest in New Zealand."

The poison was once thought to be tasteless and odourless, yet by 1994 it was found to have a slight odour and an acetic acid-type taste. It is not known whether the poison, or its impurities, can be detected. As consumption of sub-lethal amounts is associated with ill effects, possums subsequently avoid poison baits.

As the 1994 parliamentary report noted, the use of 1080 poison to keep populations of wild animals low enough to protect native ecosystems and locally eradicate Tb risks "may be in question. Successful 1080 poisoning operations may leave behind a population, not only of possums that did not encounter baits

and those that experienced sub-lethal doses of 1080, but those which chose not to approach or eat baits...It is unknown whether genetic resistance to 1080 has or may occur with field poisoning of possums in New Zealand."⁸⁷ Bait shyness is clearly an issue.

Then the advocacy document claims kiwi success at Northland's Trounson Reserve with 1080 drops contributing to "greatly improved bird breeding success and populations" including kiwi chick survival rates of 54%. Whether these claims are specious or plausible ignores the possibility of success without use of aerial 1080. Over on the Coromandel up at Moehau, DOC's official field reports document phenomenal success rates where kiwi chick survival, at the time, exceeded 70%. No aerial 1080 poison contributed to that success. Up until 2013, no aerial 1080 poison had dusted the mountain.

A decade later, DOC's 2012 *Annual Report* raises the curtain on a fraught vista—aerial 1080 use makes not a jot of difference to numbers of bird species. This is conclusively shown in the section entitled *1080 — what is its effect on birds?*

"There is debate about the negative effect of 1080 possum bait on bird communities in forests on public conservation land. Across 70 sample locations nationally the number of native bird species found per site (nine) or introduced species (three) in forests that had been subject to recent possum control was the same as those that had not received possum control. Similarly, the total number of species that were found across areas that had been subject to possum control was no different from those areas that had received none."

Where beech trees form the bulk of a forest, there were indications possums occurred less frequently in sites that were poisoned than in sites with no control whatsoever, "but that difference was not statistically significant."

The *Annual Report* describes forests as dynamic ecosystems where changes arise "for many interacting reasons. However, we are confident that the reason for change is unrelated to possum control. The rate of loss of stems of kāmahi was no different between forests that had been subject to possum control and those that had not...there is no evidence that possum control had any effect on whether weeds invaded forests."

Kim Suzanne McBreen reported more than ten years earlier (as part of her 1999 kāmahi research in Tongariro,) "There is still

a dearth of statistically sound research looking at regeneration in New Zealand forests. Until the largely anecdotal, or descriptive, body of information is backed up with empirical and experimental evidence, predictions on the effect of ...canopy health...cannot be made with confidence."⁸⁸

When hard facts are unpalatable to the poison industry they are simply buried.

Neutralising the Opposition

I believe in censorship, I made a fortune out of it.

Mae West

Any scientific challenge to the status quo is to be pummelled. Harry Broad's advocacy document contained a whole section debunking invertebrate specialist Mike Meads' research that showed insects such as weta will eat, and can die from, 1080 poison. Broad claimed, as of 2002, "There is a report in progress by Penny Aspin at Massey University, which will demonstrate there is little evidence of any interaction effect of poison even in sites with experimentally increased bait densities." This report, if it exists, does not appear on any web searches. And the comment that the report "will demonstrate" what DOC wants, evidences the clear bias of industry-funded research.

Meads findings were compelling. From his 1995 presentation *Effects of sodium monofluoroacetate (1080) on Non Target Invertebrates of Whitecliffs Conservation Area, Taranaki* he states the poison—

"Can act as a systemic and contact insecticide. Whether applied to the leaves or roots, 1080 proved an extremely effective systemic insecticide and was considered too dangerous to use as an insecticide in Britain. In New Zealand, 1080 has recently been used for controlling common and German wasps, and a literature review in 1989 found that invertebrate species from 10 different orders were affected by 1080...residues in single small insects are not measureable with current techniques. Eason et al. (1991) detected 1080 residues in cave weta, tree weta and cockroaches for up to four weeks after a 1080 poison drop. It is first and foremost an insecticide!"

Farming publication *Rural News* of 7 August 1995, reported Meads' research that recorded major effects on life cycles of several invertebrate larvae, including moths, flies, springtails, large numbers of beetle species and the iconic weta. Meads found a "complicating factor is the unusually long life cycle of many New Zealand forest floor invertebrates, for instance the cicada with a 17 year life cycle and the weta, two years. One air drop can wipe out

17 generations of cicada larvae in the leaf litter, and they and weta are an important factor in the kiwi's diet."

Conservationists on the Upper Coromandel were delighted to host the wry, sagacious scientist Mike Meads before his untimely death in December 2009. He had worked at the DSIR from 1962 to 1992, transferred to Landcare Research but was made redundant after completing his one-year study for DOC on the effects of 1080 on non-target invertebrates.

Having had his scientific research used as a political football (in the columns of Wellington's daily *The Dominion*) between the 1080 Action Network and conservation minister Denis Marshall giving the Department of Conservation's reasons for continuing use of 1080 poison together with a supporting editorial Meads wrote on 20 September 1995, "I wish to refute false claims attributed to me, and correct a few misleading statements that because of their brevity, serve to mislead the reader...

"Your editorial uses Kapiti and Rangitoto islands as demonstration of how prospects for native birds, as well as trees and shrubs, vastly improved after the possums were cleared. You do not reveal that these islands were cleared, not with the use of 1080, but by hand with traps and cyanide.

"Mr Marshall gives the reason for DOC not publishing my research as an unfavourable evaluation after an independent assessment by other scientists. First, it was only one scientist (unnamed), also employed by the Crown, who gave that assessment. Previous to this assessment, four Landcare research scientists and their editor all favourably peer-reviewed the research and gave their approval. I was given no right of reply to DOC's assessor, but informed by DOC 'The manuscript will be held on file and investigation 1414 will be considered terminated.'

"Mr Marshall correctly quotes me as saying about my study in Taranaki 'a 1080 drop in the area had significantly affected insects on which birds such as kiwi fed', but goes on to say, 'Mr Meads said residual 1080 would therefore find its way into the birds with unknown and possibly catastrophic effects.' I have never made this statement, nor do I believe that residues will have any significance.

"What I have said is that kiwi rely heavily on subterranean beetle larvae, worms and cicada nymphs, some of which have up to 17 generations in the soil. The removal of this food from the

kiwi's diet may cause starvation and a lack of breeding conditions for kiwi in the long term.

"Mr Marshall also states 'a variety of species were monitored for a 1994 study including ants, chafer beetles, millipedes and mites, all of which feed on decaying vegetable matter.' Wrong. Neither ants nor chafer beetles feed on decaying vegetable matter, and chafer beetles (relations of the grass grub) are never present as adults during the winter when most 1080 aerial drops occur. None of the mites, millipedes, spiders, or snails in the 1994 study are insects. Even my research revealed it was only the leaf-mould-inhabiting insect species that were significantly reduced after the aerial application of 1080.

"Finally, Mr Marshall states 'Inconclusive studies and misinformation should not be used by anti-chemical lobby groups to condemn 1080 as a control method for possums.' If the cap fits. Surely this must also be the rule for politicians and crown employees as well. Until something better is found we must continue to use 1080, but in targeted and controlled situations only, and not randomly dropped from the sky."

That Mike Mead's invertebrate study continues to fester for the Steering Group reveals their sensitivity to the slightest piece of research grating against their poison grain.

On the issue of human health the minutes record, "Whether 1080 can cause birth defects in humans is not known, but the chances seem extremely remote". Seem? The Steering Group's approach is clearly unscientific.

Further evidence of silencing opposition is found in *Brief Encounters with Archey's Frog*, by behavioural ecologist Bruce Waldman. "Our necropsies suggested that dying frogs suffered from a variety of diseases. I suspected that something in the environment, possibly pesticides or poisons, such as those used to kill introduced mammals, was causing sub-lethal stress on the frogs that compromised their immune systems. This, in turn, might make them vulnerable to pathogens, possibly including chytrid fungus but also bacteria, viruses and other fungi that normally would pose no risk to them.

"I feared that the species was in danger of imminent extinction, so when approached by a reporter, I discussed my concerns (Ross 2005). Soon thereafter, DOC halted research at my UC laboratory and the Archey's frog colony was transferred to Auckland Zoo."⁸⁹

“Water Water Everywhere”

Live or die, but don't poison everything

Anne Sexton

Poison in your water? Rural communities say “No thanks”. After a helicopter drop of poison 1080, nearby communities are troubled that samples for possible contamination are taken well after the poison has been washed downstream. Water testing informs the Steering Group discussions merely to confirm the water supply is free of residual poison. If testers wanted to find toxin 1080, polluted water would be tested immediately after the drop. This rarely occurs.

Scientist and specialist on pesticides, Dr Meriel Watts writes, “1080 appears to be broken down to fluorocitrate (which is toxic) and fluoride ions and glycolate by microbial action. This means when microbial activity is low, such as at low temperatures, 1080 and fluorocitrate are likely to persist for longer periods...and we know that 1080 residues have been detected in approximately 5% of water samples taken after aerial application (Eason and Wickstrom 2001). Fluorocitrate levels have not been measured. Although we are assured that the levels found are insignificant, this is only with respect to acute lethal doses, not possible endocrine disruption.”⁹⁰

G.R.G. Wright authored the *Landcare Research Protocol for Environmental Water Sampling and Testing Associated with 1080 Pest Control Operations*. The protocol reads, “Each 1080 poisoning operation requires approval by the MOH, the regional council (under the Resource Management Act 1991) and district or city council (under Pesticides Vertebrate Pest Control Regulations 1983 and the Hazardous Substances and New Organisms Act 1996.) Water monitoring may be requested by any of these agencies, although it is usually the MOH who makes the request where water from the area is used for human consumption.”

The protocol was altered in 2008, foreshadowing change mooted by central government and enacted mid-2016 to no longer require regional council issuance of resource consents for aerial drops. The new protocol, co-authored by Lynn Booth and Geoff

Wright reads, "Each aerial 1080 poisoning operation requires approval by the MOH, and in some cases the regional council (under the Resource Management Act 1991)." Until this change, regional councils had to approve every aerial poison drop.

Disturbingly missing from the new protocols and excised from the old one, is the following paragraph of utmost importance to rural communities: "Large-scale poisoning operations often raise concerns about environmental impacts. A well-managed and implemented project will provide time to discuss the operation with the local community, and a robust water-monitoring programme will help reduce concerns relating to drinking water and the deterioration of stream water quality and potential adverse effects on aquatic biota (e.g. fish)."

The earlier protocol asked *Where to take samples?* "The number of sampling sites for water monitoring is dependent on the nature of the terrain, the surrounding land use, and the number of streams running out of the area. Because each area is different, the selection of water sampling sites will be specific to each operation."

The new guidelines read, "The number of sampling sites for water monitoring will be dependent on the questions addressed, the nature of the terrain, the surrounding land use, and the presence of domestic water supplies in the area." Questions of concern to rural residents could include what residue is in the water at the point of the drop? What residue is in microbial matter?

Wright's original sampling recommendations explained, "Because most samples are taken at timed intervals, it is important to ensure that sample times cover the most likely occurrence of 1080 in the stream/s. The data from previous monitoring programmes suggest that most positive samples, and certainly the ones that have been above 1ng/mL (part per billion), have occurred in the first 2 days of sampling.

"Samples should be taken immediately after poisoning and continue daily until after the first significant rainfall water reaches the sampling site. Samples may also be taken before poisoning and from adjacent sites, to provide a check on the sampling process. This may be especially useful to eliminate cases of accidental sample contamination. In all instances, sampling times should be decided by the local regional council hydrologist, whose advice should be sought when designing the water monitoring programme."

The new 2008 guidelines state: "In all instances, appropriate sampling intervals and frequency should be confirmed with the regional council hydrologist, whose advice should be sought when designing the water monitoring programme. It is important to ensure that sampling is undertaken during the most likely time period for occurrence of 1080 in waterways. Previous monitoring data suggest that most water samples with detectable concentrations of 1080, and certainly the ones that have been above 1 ng/mL (part per billion), were collected within 48 hours of aerial bait application.

"Recent research by Suren (2006) showed that 1080 was rapidly leached from pellet baits placed in small streams (>90% of 1080 leached within 24 hours), and 1080 was detectable in the water for a short period of time. Water samples taken within 8 hours of bait application are expected to provide the greatest likelihood of detecting any residual 1080. Ideally, sampling from the same relevant point on a waterway at 8 hours and again at 24 hours after bait application will be useful to confirm whether or not 1080 is present in detectable concentrations." The experiment however did not show that 1080 baits landing in streams do not affect fish. Investigation of sub-lethal effects on fish, were not attempted.

Records of water samples taken within 8 hours are few. The protocols were further reviewed in 2016.

From a toxicological standpoint the maximum acceptable level of 1080 in water is problematic as the calculation is based on acute toxicity, taking no account of sub-lethal effects and is only based on gross observable teratological effects. Low-level contamination, and associated chronic effects, among organisms along the exposure spectrum remain unknown.

Sean Weaver's extensive research, *A Review of Toxicological Research on Sodium Monofluoroacetate (1080) and its Policy Implications* 2003, questions the lack of knowledge regarding the length of time 1080 takes to degrade in streams surface waters, and soils. The likely concentrations that may persist, perhaps for a short time, is yet another concern.

Weaver questions the potential environmental risks of fluoride ions freed as a byproduct of 1080 breakdown in water. "The amount of inorganic fluoride ions was measured by Ogilvie et al (1996) in stream water at 11C and 21C, and showed an increase with time. The highest rate of fluoride ion release occurred between 24 and 72

hours in the warmer water, which corresponded with the period when the highest rates of 1080 breakdown were demonstrated.”

Like Dr. Meriel Watts, Weaver asks whether concentrations of free fluoride ions in solution “following the biodegradation of 1080 in water are likely to be high enough to pose any environmental risks”. This has yet to be determined.

The Steering Group references Landcare research that would develop a “glowing” bacterial biosensor to detect 1080 in soil and water more cheaply and easily than current lab tests. As of 2016 the work had yet to surface. The authors mentioned are Joanna Lloyd and Jacqui Horswell, based at the Institute of Environmental Science and Research (ESR). On August 24, 2016 ESR responds to queries—“Joanna undertook this research as part of her Master’s thesis. We use biosensors to detect pollutants in soil on a regular basis here at ESR. What we wanted to do with the 1080 biosensor was to make it very specific to only detect 1080. Unfortunately, Joanna was not successful in doing this and we’ve not pursued this project further.”

The Ultimate Poison Promo

We can judge the heart of a man by his treatment of animals.

Immanuel Kant

To get the public onboard with 1080 poison requires stage crafting through managing public opinion, managing the process, the agenda and controlling the media. This requires advertising personnel. And plenty of public money is spent in the process. As noted earlier, DOC employs public relation heavyweight Hill + Knowlton Strategies Inc. during the reassessment process. Noted by Corporate Watch, it is never easy to uncover the truth about such companies. Whilst managing the public perceptions of client companies and issues, “they do their utmost to remain discreetly anonymous themselves, maintaining a culture of secrecy about their activities.”

“Meet the Needs of the Media” is one of EPA’s *Seven Cardinal Rules of Risk Communication*. Highly paid staff are encouraged to form “long-term relationships of trust with specific editors and reporters” as media “play a critical role in setting agendas and in determining outcomes. The media are generally more interested in politics than in risk; more interested in simplicity than in complexity; and more interested in wrongdoing, blame and danger than in safety.” This, from the organization entrusted with public health and safety when registering new hazardous substances.

At the Steering Group meeting in February 2006, the regional council appointee states bluntly, “we need a strategy to develop a regional network of advocates of 1080.” And by the following year, DOC’s Harry Broad says he, along with Nick Hancox of AHB and DOC’s Herb Christophers, have been working with local networks and regional councils to get everyone talking with newspapers and radio to ensure “some positive news coverage.”

When the product on sale is facing negative publicity, there is a need to cover all bases. So providing tailored content to a cash-strapped or lazy press is an important tool in the toolbox.

A perfect DOC example is a study called, *The development of Operation Nest Egg as a tool in the conservation management of kiwi*

wherein it is claimed the project is a major public relations coup. Not only can the kiwi programme be used to produce many feel-good photo-ops, to beguile and seduce a gullible public and occupy vacant space in daily or weekly newspapers, it can also, according to this 2005 study, “assist iwi in their conservation strategies”.

DOC’s programme—Operation Nest Egg (ONE), involves plundering kiwi eggs from nests. Carrying eggs out of rough terrain can prove tricky. A kiwi egg robbery near Moehau resulted in three eggs declared ‘infertile’. Shaking a chick can kill a chick, shaking an egg can be equally catastrophic for viability. The effect of residual poison ingestion by parent kiwi has received no attention.

The stolen egg is then transported to a facility where it is washed, weighed, and monitored until hatched. When the programme first began, the strategy was to feed the chick until it weighed sufficient to combat the wily stoat, its main predator, at which point it was returned to the wild. These cage-farmed kiwi miss out on adult mentoring, natural social bonding and the protection of older birds.

The study found that taking kiwi eggs was “an ideal vehicle for getting messages across to the public. It also “... provided excellent media opportunities, and opportunities for iwi to be involved and assert their interest in the conservation of their taonga or special species.”⁹¹ The disturbance of nesting kiwi by interfering kiwi robbers in the name of conservation PR is challenged by a growing number of conservationists, including Landcare Associations on the Coromandel.

The public controversy surrounding poison 1080 has been a tactical concern to DOC for decades. In 1994, DOC’s Simon Kelton reported, “In this age of MMP and political awareness, public opinion about control technology, even if ill informed, can have a major impact on our management practices. Its influence is often underestimated but it can lead to the redirection of resources (e.g., Task Force Green possum control schemes), the delaying of operations, the soaking up of an inordinate amount of personnel resources in attending public meetings, conducting additional monitoring to allay public concerns about non target species impacts or water quality, through to providing responses to ministerial letters.

He continued, "Much public debate has been generated in relation to the use of 1080 in New Zealand and there is a perception that 'indiscriminate' aerial application of baits threatens human health, non-target animals, hunting opportunities and disrupts farm management... To a large degree, public perception about the use of possum control techniques is likely to be a reflection of the information the public has available on which to base a judgement... The question must be asked why are managers and scientists alike failing to get through to the public on these fundamental possum control issues?

The Parliamentary Commissioner for the Environment (Hughes 1994) pointed out, the "public view of the risks (real, unknown or perceived) by using pesticides is also influenced by a history of 'safe' chemicals proven 'unsafe' or persisting the environment over time (e.g., DDT, Thalidomide, PCBs, PCP, Agent Orange). Regardless of the specifics of each case, this has in general reduced the level of public trust in government officials and scientists."⁹²

Helen Hughes in fact, went further and waded into the public relations debate, going so far as to suggest that information "may need to be made available to overseas countries, perhaps through embassies, marketing boards, and environmental and consumer groups with international links." She said, "agencies are improving the quantity and quality of information made available to the public and at the same time are making a more coordinated and sophisticated 'public relations' effort to explain and justify their strategies."

Successfully lassoing reporters is a poison advocate's dream fulfilled. Albeit two decades later, Rachel Gross reported conservation spin for the American magazine, *Atlantic* boosting DOC's image overseas. Elizabeth Kolbert, writing in the December 2014 *New Yorker*, seemed to discern a fault line running through the recent promotion of a so-called predator free country when she learned the fenced sanctuary she visited had yet to eliminate mice from their highly policed enclosure. She described her experience—

"To get inside, human visitors have to pass through two sets of gates, an arrangement that made me think of a maximum-security prison turned inside out... After about half an hour with Sirocco [a dysfunctional kākāpō], we were hustled out to make room for the next tour group." Kolbert also quotes a conservation volunteer she

meets who announces, "Conservation is all about killing things." The title of her story does not mince words and even bears the historically loaded term "crusade" — *The Big Kill, New Zealand's Crusade to rid itself of Mammals*.

In New Zealand, access to media by poison advocates is unequivocally disproportionate. Not only does the media broadcast government policy, oftentimes verbatim, they receive hundreds of thousands of dollars in direct advertising. DOC employs both external public relations firms and their own designated in-house media staff.

Small rural communities cannot compete with well-funded agencies based in Wellington. Susan Bidwell's thesis (*Talking about 1080: risk, trust and protecting our place*) submitted for the degree of Master of Public Health, in 2011 confirms this disparity.

"In environmental risk disputes both government and advocacy groups have learned to make skilful use of the media to draw attention to new issues, reframe older ones, or to transform what has hitherto been an accepted condition into something that is contested...Small citizen groups with no paid employees or public funding largely rely on the general news media to get their message heard beyond their own fairly small circle (Koopmans, 2004). However, that means that they have to do something newsworthy to get media attention, particularly if they are remote from the main news consumers."

On the West Coast of the South Island the local environment group, Karamians Advocating Kahurangi Action (KAKA) created a successful sticker campaign that mimicked the Tui beer ad. Adjacent to the words "100% Pure New Zealand", they printed a dead tui lying under the numbers 1080. KAKA received a cease and desist message from Tourism New Zealand. "This is the extent we had to go to, to get any media interest in the subject. We had to create media events...to get publicity on the other side of the 1080 debate."

In stark contrast to the modest, grassroots KAKA action, the Steering Group tout a well-financed and highly sophisticated initiative by DOC's West Coast Conservancy. DOC tackles the 1080 debate by creating a showcase programme at Otira in the Southern Alps. On the surface the concept is deceptively simple: invite travellers to a roadside visitor module adjacent to a popular tourist highway where they are invited to participate in an informal study

of bird conspicuousness and forest health in an area with a 30-year history of aerial 1080 possum control.

As DOC strategists point out, "The two unique features of the Otira operational area are that it is intersected by State Highway 73 and has the small Otira settlement in its centre. The highway greatly simplifies the problem of accessing an operational area for advocacy purposes. The route from the conservancy office to Otira also presents opportunities to view possum-induced forest canopy collapse outside of the treatment area."

Back at the visitor module, the experience "begins with a short presentation showing how unsubstantiated commentary in the media has wrongly claimed that aerial 1080 operations create silent forests. The presentation plays video and sound recordings made at regular intervals at two observation points inside the Otira aerial 1080 operational area...A feature of each visitor trip is the intention to record new material at the observation points. This gathers new material for the presentation and it thoroughly engages the visitors in the experience of birdsong listening and recording. It also creates opportunities to deliver key messages in a field situation.

"The programme is delivered by the Hokitika area manager and Area Community Relations Programme manager, with the Conservancy Public Awareness Unit providing support. A purpose-built microphone was designed and built by the conservancy to reduce the difficulties inherent in recording diverse general birdsong."

While boasting of their own media prowess, DOC strategists also cite a side-benefit—de facto censorship of opposing viewpoints.

"The success of the concept was graphically illustrated by hosting the editor of the local paper on the initial trial in May. He was very impressed by the process and by what he heard at the Otira observation points. So much so that he immediately stopped publishing anti-1080 letters and has indicated that he intends to only publish news relating to 1080...the programme is also helping to lift staff morale."

DOC's Otira showcase told only half the story. What DOC spin masters did not highlight was that this very heavily poisoned area is the exact same region where monitored endangered kea birds have been killed by 1080 poison. The population of this highly inquisitive species inclined to investigate unusual 1080 baits, is said

have severely declined since 1080 poisoning began. In response to documented kea deaths DOC simply responded the results were “disappointing.”

A second example of DOC media strategy occurred in the Wanganui Conservancy, where media relations team Bill Fleury, Dean Stronge and Kirby Weiss prepared an eight-page newsletter informing the Taranaki public of the need for aerial 1080 operations in Egmont National Park. Their stated goal is to get “our information and view across in a format and style DOC could control...to be proactive and minimise any traction anti-1080 groups might gain from misinformed public.”

As the media strategists explained, “The focus was on making this local, something that the local community felt they should or needed to get behind. We talked about local snails or local blue duck or whatever will be gone if the possums are not stopped. The issue is not “about 1080 but about saving what little bit of unique biodiversity is left, and 1080 just happens to be the best method we have at present.”⁹³

But a 2004 DOC paper by Carla Wilson and Justine Cannon, *Community consultation processes for aerial 1080 applications* demonstrated the technique was not new for the conservation department. “The news media play a vital role in the aerial 1080 debate at both national and local levels and can help to set the agenda by ‘telling people what to think about’ and by ‘emphasising what is important’ (McGregor et al. 2002)”

The authors document an ‘open day’ in Waioimu/Te Puru, where DOC staff “prevented a mob of angry people trying to swamp us by numbers.” And building on the labeling of opposition (“mob of angry people”) the authors note, “In some cases the local paper focused on scandal and emotion, others were supportive of DOC and did not publicise the activities of protestors. According to one staff member, ‘The [protestors] get wound up and start getting attention. In the newspapers here they’ve started ignoring them. The paper wouldn’t put the protest in the paper. We’ve had support from the editorial staff who were already supportive of 1080.’”

The Steering Group’s idea to highlight the Otira action, may well have originated from this paper as it quotes a DOC staffer bragging—“I took the Grey Star editor up to Otira [where there was an aerial 1080 operation a year ago]. We started with a video

presentation then took him up the valley. We got good editing after that.”

But silencing opposition in local media never makes opposition go away. International publications and the internet create new opportunities to challenge poison industry collaborations with government agencies. A well-researched example is found in a September 15, 2015 *Harper's Magazine*. Entitled, *Weed Whackers, Monsanto, glyphosate, and the war on invasive species* Andrew Cockburn's article can be easily accessed at harpers.org.

And opposition continues to this day. A June 11, 2017 *New Zealand Herald* published an opinion piece by a Coromandel commentator on environmental and public policy issues in the Waikato—*Many oppose DOC's 1080 drops on the Coromandel*.^{93a} This story outlines the ongoing efforts by farmers, environmentalists, iwi and local Council in their attempts to encourage DOC to continue trapping rather than to blanket poison 1080 over 22,500ha. The story concludes “Locals, businesses, council, and activists for the environment hope they will be heard in the coming weeks and that agreement on safe and sensible alternative controls will be reached. If not, the disaffection, will certainly only smoulder.”

That the national daily will print an opinion piece opposing 1080 poison drops, offers rural communities some hope. However a major anti-1080 protest in July 2017 in the streets of Whitianga, remained undocumented by neutered local newspapers. DOC advertising appears to be successfully controlling the narrative.

The Short Strokes

At the end of the day, it comes down to who you want to believe—those working in a voluntary capacity, advocating caution and for environmental, economic, and public health...or those representing an industry which receives over \$100 million a year of public rates, taxes and farmer levies...Who would you trust?

Dean Maisey

Money lamentations appear in the Steering Group minutes of February 2002. In fact, it is the first order of business. “Jeanie passed around copies of a letter AHB had received from ERMA concerning any possible monetary contribution from ERMA.” ERMA contributing to costs? This is the very same government agency supposedly charged with making an independent, unbiased determination. The details of this unsavoury exchange are only exposed when UCLA receives correspondence from ERMA in February 2008 that includes facsimiles of correspondence regarding costs.

ERMA had received a letter from Sara Clarke, an employee of URS NZ Ltd, on URS letterhead. URS was the consulting firm employed by the Steering Group to co-ordinate the 1080 reassessment. The letter suggested tens of thousands of extra dollars had to be found to fulfill ERMA’s key requirements, in particular, assessments of “adverse effects on human health and the environment”, as well as “exposure pathways with quantified numbers (where available).”

“We reiterate that we originally entered into this process for the public good with the intention of ERMA providing an ‘in kind’ contribution,” the consultant wrote. To outsiders it would seem appropriate that most of this work would be the responsibility of the manufacturer. But New Zealand law does not expect this of poison producers. The public was already paying handsomely—over \$1.6 million toward the reassessment costs.

Apart from money matters, Māori are high on the agenda and hui are organised by and for the promoters of toxin 1080. But these hui/meetings are seen by many participants, for what

they are—government sponsored propaganda engagements held in government offices or marae around the country. But hui cost money and a hui facilitator could cost \$80 an hour. Fortuitously, the group learns “Herb Christophers would be a good person to fulfill this role and it would only cost us \$30/hr.” Only nine of the 20 hui record minutes.⁹⁴

General public meetings were another consideration however at the March 2002 Steering Group meeting, DOC’s Harry Broad claimed he “did not feel public meetings were necessary and that, instead, consultation with interested parties by way of mail would be all that was required. This was agreed to. Māori consultation, however, would involve full hui.”

Squelching public input appeared to be high on the agenda, but by May 2002, Giff Davidson, chairman of ACP mentions “the growing incidence of ‘anti-1080’ publicity and stated there was a need to be more pro-active in countering the ‘anti-1080’ lobby.” Noted at this meeting, Landcare Research has not completed “a previous project regarding the compilation of 1080 research” thereby earning some measure of opprobrium.

At the 9 July 2002 meeting, Broad reports DOC is finalising an internal advocacy document. By August he is concerned the positive benefits of 1080 are not to the fore in their consultation document and wonders “whether or not it would be possible to establish the amount of 1080 that was broadcast aurally, for inclusion within the consultation document.” The group was advised this would be difficult to determine and would involve contacting the vector managers individually. More headaches.

But bigger head pain is ahead. AHB’s Nick Hancox (formerly of DOC) mentions, “a study on 1080 and endocrine disruption is currently being undertaken by Landcare Research.” The group is advised however it is unlikely that the results will be available for inclusion within the consultation document.” This work has yet to see the light of day.

Initially censored, is the news that the Steering Group cannot get what they want out of Landcare with regard to the “safety” of toxin 1080. According to minutes, “Harry mentioned that in a previous meeting Landcare Research (represented by Charlie Eason) was not supportive to DOC and the AHB about giving an opinion that 1080 is safe if used properly. Nick said that Landcare Research appear to be unwilling to provide a view on the general

merits of using 1080 as they feel that their job is to provide scientific data only." Should this come as a surprise to DOC?

And there is more—an internal conflict of interest. At this same meeting questions are raised as to whether it is "ethical to have URS bid on some or all" of the request for proposal for consultancy services given URS employee Sara Clarke is already their project manager. But lo and behold: "It was decided that as long as Sara did not talk about the project or divulge any information on the RFP with anyone (including people outside of URS) then this would be acceptable."

In April 2004, Landcare's tender for consultancy services is dismissed as being "too expensive". Giff Davidson thought it "outrageously expensive" and that Landcare "went into overkill as far as the amount of detail that was described in the tender." Simon Kelton, attending from DOC, "thought that Landcare Research had a 'real cheek' as the tender was not only very expensive, but also much of the work was 'double-dipping' in that the knowledge had already been collated and reviewed by them previously at DOC and AHB cost."

At the end of the April meeting, Harry Broad asked about "the work to be done on evaluating the endocrine disrupting potential of 1080 on androgen receptors." Penny Fairbrother stated that, "the AHB would not be undertaking this work, as Landcare Research have now been contracted by the Deer Stalkers Association."

The Steering Group is very concerned about the potential effect that endocrine disruption research could have on the reassessment process. Fairbrother says she would try to gain Landcare Research's permission for the Steering Group to see the original proposal, "If there are any concerns, the Steering Group may take further action on this." This makes for unnerving reading after the fact. As of 2017, as far as could be recollected by a leading deerstalker advocate whose group commissioned the endocrine study, the results were inconclusive and required further research and funding.

The Steering Group strong-arming of Landcare was originally redacted. Only after appeal to the Ombudsman were the following portions revealed. "It was previously stated that Landcare Research have shown an unwillingness to provide an opinion supporting the use of 1080. The Steering Group felt that as the holders of the bulk of the scientific information on 1080 we would want their

support at the hearing. As such, Harry [Broad] was to meet with Landcare Research to discuss this issue with them."

The independent Crown Research Institute is under pressure to produce exactly what the Steering Group wants. That Landcare is supposed to have an "opinion supporting 1080 use" is disgraceful and without the good work of the Ombudsman's office this Steering Group intrigue would have remained under wraps.

"Harry had this meeting, and those present included Rod Hay, Charlie Eason, Phil Cowan and Penny Fisher. It was agreed by Charlie that his default position on the use of 1080 would be that "it is safe to use it (1080) with appropriate precautions." However the agreement was reached, the Steering Group got what it wanted.

Even with Landcare Research backing DOC's Harry Broad felt a strong legal team was needed to manage the ERMA process. The Steering Group agreed.

Money worries continue to cause headaches. The Steering Group is not happy with the application costs. "Originally the AHB and DOC were encouraged to do this application by ERMA, and ERMA intimated that as this was the first of its kind they would cover the costs of the application barring a standard, nominal fee to be agreed upon by the applicants." Yet another letter on the frustrating money matter will be drafted at Broad's suggestion.

By May 2004 it is time for the risk assessment tender presentations. Landcare Research is missing from those selected. The presentations are limited to Nimmo-Bell, URS and MWH. "The steering group made a unanimous decision that URS best fit the criteria required by the steering group to undertake the risk assessment work." No surprise here despite the conflict of interest.

A second meeting in May 2004 takes place at URS headquarters where Broad believes evaluating conservation gains was going to prove to be "quite difficult." This dearth of essential research is picked up again at the June 2006 meeting where it is recorded, "Measuring the conservation benefits of AHB operations has been attempted in the past, but such efforts have generally failed". DOC's Herb Christophers is to send some examples from Tongariro and Wairarapa to help out and Bill Fleury will provide "examples of high value conservation areas that will suffer if we lose the ability to use aerial 1080." They are worried that the "importance of rodent by-kill in 1080 operations needs more emphasis. Greg

[Sherley] has two studies about stoat and rat by-kill that Wren [Greene] can cite."

Just "two" studies? By the time this insider group gathers in July 2006 at the Wellington Club, 88 The Terrace, loose ends are being tied. "It was stated that a comment about monitoring should also be included. Namely that large-scale aerial operations, require less monitoring effort and therefore have a further cost saving benefit. It was decided that any references to other possible 'alternatives' to 1080 that may be developed in the future should be deleted as we do not want to wrongly give the impression that there is currently a potential alternative out there that could be used in the near future."

Money is always on the agenda as the Steering Group, whose members earn six-figure salaries, is still "not satisfied with the response letter from ERMA. There was no reference as to sharing the costs." Their reassessment budget is roughly \$340,000 however the final figure will be more than \$1.6 million.⁹⁵

But one crucial consideration finally gets to the table. AHB's Nick Hancox queries whether their consultation programme is biased, "due to the fact that we may have targeted sending the discussion document to parties that are 'pro' 1080 and not to those 'against' 1080." Hancox has hit the nail on the head and asked the most crucial question—however all other members in attendance feel the discussion document has been distributed widely enough. So much for honest debate and a credible reassessment process.

At its November 2004 meeting at the URS headquarters, "It was felt by the steering group that there has been absolutely no collegiality shown by ERMA towards the applicants." They are all warned to arrive at the next meeting with empty stomachs as they are having a "special Xmas lunch." Predictably, there is no concern as to who will pay!

By June 2005 there is a problem with the Animal Health Board. According to AHB baseline statistics, the group learns, "it does not sound like 1080 is essential in reaching the AHB's goals." (See Appendix IV) And later the minutes record they are "not filled with confidence that the figures were portraying a good case for the continued use of 1080."

The Steering Group continues to manipulate the process. Regional council representative John Simmons highlights the importance of coordinating public opinion by building a regional

network of advocates to “encourage people to make submissions once the application process has started.” Simmons warns they “need to be careful not to ‘bag’ the alternatives to 1080 too much as we still want to be able to use them.” Simmons is “concerned that by emphasising the majority (approximately 95%) of 1080 work is aerial, we are underselling the ground work done with 1080 which is also very important.”

There was also some general concern that “as 1080 only makes up 5% of all vector control work, it may be perceived that 1080 is not all that important...It was noted that...pest control by the regional councils will increase markedly. This expansion is due to the regions undertaking more possum control as AHB operations change.” AHB was supposed to be phased out of existence by 2013, but like all healthy bureaucracies they reinvent themselves. Farming newspapers regularly pump the AHB line.⁹⁶

On August 24, 2005 DOC's Greg Sherley suggests, “If ‘being scientifically impossible to answer’ was a plausible defence against providing any extra information that ERMA may require.” Angling for a stint as a stand up comic perhaps? Meanwhile URS disclose they are over budget by at least \$30,000.

DOC's Greg Sherley is to chat up the Ecological Society and encourage them to write a submission. John Maber of the NZ Agricultural Aviation Association offers his services free of charge and gives assurances that “aerial operators had been involved in the provision of accurate and detailed information to do with the aerial application of 1080.”

By April 2006, DOC is organising a trip for ERMA's “staff to view an aerial 1080 operation.”

At DOC HQ on 7 August 2006, brush strokes are getting finer. “It was stated the wording around, ‘ecosystem services’ needs to be carefully worded as there is not a lot of hard science to back this stuff up. It was also stated the ‘Māori’ content may be a bit overstated.” The words “spiritual values” are seen as problematic so were changed to “intrinsic values”. There is no serious consideration given to trapping or bounties or hunting as alternatives.

And in February 2007, DOC's Broad is “most worried about stringent conditions being applied which may make the use of 1080 not feasible or cost-effective.”

Although the reassessment process has finally gone public, press coverage is limited and most supports government policy. The only time the *NZ Listener* questions the use of 1080 is in February 2007 when they publish—*Bitter Pill* by Sean Weaver, senior lecturer at the School of Geography, Environment and Earth Sciences at Victoria University.

The article is subtitled *1080 poison helps control the possum plague. But are the risks too great?* Weaver comments on the “controversy raging in paradise.” There will be more articles in the magazine on this topic but they are all biased toward toxin use.

Weaver reminds readers there is no rapid biodegradation of 1080 in New Zealand, as it is used in winter when stream temperatures are more likely to be lower than 10 degrees centigrade. He points out that under some conditions, biodegradation may take several weeks or months, depending on the species of microorganisms present and availability of the toxin to the microorganisms.

In conclusion Weaver remarks, “ It seems appropriate there is room for some movement in 1080 policy in New Zealand, given the evidence of harm now available. This may mean using it in some areas but not others, with trappers being used in areas close to human settlement.”

Who Will Be in Charge?

Research...is a blood sport in which the opponents are other researchers.

Graeme Caughley

Years of secret Steering Group meetings between DOC, AHB, ACP and regional councils are wrapping up. It is now time for the main event. The ERMA reassessment process is formally underway.

The ERMA decision committee is to be headed by former diplomat Neil Walter and comprises a chemist, George Clarke, a former DOC scientist, Richard Sadleir, an iwi representative, James Doherty of Ngai Tahu, Auckland Business School Associate Professor Manuka Henare, and a lawyer, Helen Atkin. A highly qualified entomologist, Max Suckling, could have been, but is not, selected from the eight members of the ERMA Authority.

From the top of the Coromandel peninsula, scientists Pat and Quinn Whiting-O'Keefe challenge the appointment of Richard Sadleir. Their first letter, written on March 14, 2007 states—

“We believe that Sadleir’s appointment is inappropriate and that he should be recused for the following reasons. Sadleir is a former high-level employee (director of science and research, 1987-1995) of one of the applicants (DOC), which by any standard constitutes a conflict of interest. Furthermore, he served in a period when the current policy of widespread use of aerial 1080 was largely developed and promulgated. He has long been a public advocate of 1080 presenting a biased and one-sided view of the science supporting DOC’s current practice of dropping food laced with tonnes of 1080 into New Zealand’s forest ecosystems.

“From 1996 to 2000, he worked as a contractor to MAF setting the research direction for the possum biocontrol programmes within MAF’s overall bovine tuberculosis programmes. As such he was instrumental in influencing the Animal Health Board’s current emphasis on possum control with aerial 1080. He was director of DOC science and research in 1992, when an important study regarding the collateral consequences of aerial 1080 was suppressed by DOC. We refer here to a paper by Meads that

indicated there are profoundly negative effects of aerial 1080 on forest invertebrates.

“In his former positions as Director at DSIR and director of science and research at DOC, Sadleir was instrumental in the production of much of the 1080 advocacy research, which constitutes the scientific basis on which rests DOC’s reassessment application. It is precisely the scientific quality and validity of this research that is now being challenged... it would be difficult to find an individual with more vested career interest in 1080, or one less qualified to render an unbiased judgment on the effect that aerial 1080 is having on our environment and the biota of our native forest ecosystems.” (For further correspondence see Appendix V)

Initially ERMA denies the recusal request. The Whiting-O’Keefes together with their Port Charles neighbours pursue this issue through Radio NZ, national newspapers and more letters to ERMA. In April Sadleir is finally withdrawn from the committee. ERMA’s Andrea Eng confirms Sadleir is no longer “part of that committee” but will be providing “advice on his area of expertise”. He was the only biological scientist on the committee, and he is not replaced.

But the Sadleir recusal boiled down to Sadleir staying on the payroll and travelling the country to listen to submitters. At the same time, ERMA spontaneously decides to sideline Jim Doherty, a highly respected Tuhoe kaumātua and expert on tikanga Māori. The official media release reads—

“It would also be unfair to expose the two experts to continued attacks on their integrity.” For the record, there were no attacks on the integrity of Jim Doherty. This is confirmed in May correspondence from Andrea Eng. No member of the public requested Doherty’s recusal. It appears that the removal of one obvious 1080 advocate on the committee had to be matched by removal of another member whose advocacy could not be assumed.

Mark Fisher of Kotare Bioethics, Ross Cullen, professor of resource economics at Lincoln University, Stuart Ford, a director of The Agribusiness Group, and ecotoxicologist Peter Fisk are engaged as “external experts.” In terms of “who will be in charge?” it would appear Mark Fisher’s work is sidelined. His report—*Animal Ethics Issues associated with the use of 1080 to manage pests* finds, “Failure to fully acknowledge the harms to animals is disconcerting, especially amongst public institutions. Pest animals

are often labelled as enemies and their capacity to suffer ignored, with control programmes justified in terms of their agricultural and environmental impacts (Oogjes, 2003). Pest control programmes often bring the death of other species—at times some of these species are considered as pests and at times resources (e.g. feral deer and pigs).

“Other non-targeted species may also be accidentally poisoned (e.g. sheep and cattle). Among these the dog is especially sensitive to 1080, and to the risk of ingesting toxic carcasses long after the target animal has died (Meenken & Booth, 1997). The long and special relationship between dogs and people inevitably means any suffering and death is associated with human suffering.

“In conclusion, the justified use of 1080 to control pests must include consideration of the harms caused to target and non-target animals and of the efforts to minimise those harms. Cyanide should be used in preference to 1080 wherever possible, since it appears to be more humane, and research should continue to investigate more humane techniques, methods of targeting pest animals only, reducing the pain and discomfort poisoned animals experience, and making alternatives more humane, practical and economically viable.” This view is effectively silenced by ERMA.

Professor Ross Cullen's work is likewise dismissed when it does not follow the party line. His report looks at the analysis of effects on the market economy. He states, “The economic case for the use of 1080 is largely based upon the assertion that aerial pest control is lower cost and more effective than ground pest control and can be used to manage large and rugged areas. Surprisingly, given the importance of these items, no references are cited in support of those assertions...

“It is reasonable to comment that this section [economic research on use of 1080, pest control, or Tb] is unsophisticated, uses crude approaches to estimate even the largest benefits and costs associated with use of 1080, lacks awareness of many pertinent economic research techniques, seems unaware of almost all relevant economic research, and cites a total of three publications focusing on economic aspects of pest control...the Application is amateurish in the way it addresses those issues...The Application, regrettably, does not provide quality economic analysis and fails to cite existing relevant economic research.”

The ERMA *Evaluation and Review Report* brazenly declares “Professor Ross Cullen has noted that while the total value of ecosystem services may be large it is the marginal effect, or the changes that would occur if 1080 were not being used, that is relevant to this assessment (see Appendix J). Professor Cullen goes on to note that there is a lack of information in the application about the size of any such effect. Therefore, the Agency has not assessed this potential effect further.” Further evidence 1080 poison was merely reapproved through some kind of process. To call that process, a reassessment, is a misnomer.

As the hearings panel travels the country they will be accompanied by members of the Steering Group who will act as a quick response team to provide immediate rebuttal to any critical testimony. Prior to the road show the Steering Group continue to meet so they can review the written submissions and prepare responses.

Some submitters raise very substantive concerns. Waikato conservationist Clare St Pierre’s submission on endocrine disruption is one such challenge. “This response should be a general summary on 1080’s potential to disrupt human endocrine function, taking into account likely exposure. It should not be about rebutting every point in the St Pierre submission. Nick will contact Charlie Eason to arrange this.”

As the hearings proceed, the Steering Group feel the need to expand information around animal welfare and ethics, sub-acute effects from sub-lethal poisoning, and bioaccumulation in invertebrates. At their March 23 meeting, the difficulty of defending the “manner of death” was an issue. They decide to compare the suffering of birds dying while being eaten, to the suffering of possums dying from 1080.

The Steering Group will be making their own introductory presentations at each hearing location so it is suggested their presenters need to be senior managers. But more importantly, they must have “personality and independence.” They hope John Innes and Eric Spurr will be available, and Broad says the DOC “journalist” (known to most of the world as public relations staff) Bernie Knapp will attend some of the hearings. It is agreed they don’t need Landcare’s Penny Fisher but Charlie Eason will be kept on as the toxicology expert.

The plan is to showcase poison 1080, with a straightforward and uncomplicated slide show. The AHB technical team will be on deck to answer any bovine Tb questions. Ian Westerbrooke, a DOC biometrician, is employed to analyse Pat and Quinn Whiting-O'Keefe's submission and "is able to demonstrate they have been very selective in their criticism of the science assessing the effects of 1080. He has formulated a few pages of excellent rebuttal material that can be used in the hearing and tabled for the decision committee if they wish to read it for themselves."

Meanwhile, media management and manipulation are underway. It is recorded that DOC's Harry Broad states "Nick, Herb and [he] had been working with local networks and regional councils to ensure that they were talking to the media and thereby ensuring some positive news coverage."

In order to fine-tune their presentations, the group will use a simple format—"Wren formulated some bullet points for DOC's opening presentation. It will focus on the conservation benefits, reiterating that the benefits outweigh the risks, and tell the stories of how the mohua were saved in the Eglington Valley and kiwi were saved in Tongariro...This presentation will be given by the director general of DOC, Al Morrison." Nick Hancox would like AHB's John Dalziell to tell his personal story as well as focus on bovine Tb control. But it can be guaranteed that story time will not reference data from the early 1990s, when Massey University's bovine Tb team found that much bTb could be sourced to possum denning in what they referred to as "slum areas." Intensive trapping on farm boundaries was the answer, not more poison.

The Steering Group acknowledges most submissions from iwi are supposedly focused on the need to be consulted, rather than opposition to 1080.

Māori and Business as Usual

In her kōrero Dr Rangimārie Turuki Rose Pere spoke of the answers being within the forest itself. With regard to pest animal species (like possums) she noted that they had been taken from their own homes and placed in Aotearoa, so it is not their fault they are deemed 'pests'.

Te Pūtara

Māori and 1080 is the title of a 2006 Landcare Research paper by Chrys Horn and Margaret Kilvington that investigates how to gain iwi “agreement” to use 1080. What do they discover? It is all about “building trust,” they write as “research is, by itself, not sufficient to allay community and iwi concerns. Horn and Kilvington conclude, “non-expert iwi and community groups need to **feel** that their concerns are being addressed.”

Iwi concerns are substantial. They include loss of native birds, poisoning of deer and dogs, the potential effect on water supplies and human health, and how poison disturbs spiritual principles.

The authors focus on mind control. They don't call it mind control. They use the term “perceived control,” and it is this underlying psychological construct that must be communicated to “help” Māori communities adapt to change and adversity. The prevailing question is how to get agreement on the use of toxin 1080, so rather than trying to convince communities of the merits of 1080, they change tactics to “convincing them of the merits of pest control” or the merits of “eradicating Tb”.

“Dismissing a community's views as irrational, or imposing unpopular measures on them, is not supportive and undermines trust,” they write. But here is their paternalistic clanger... “Interestingly, it appears that it is the element of choice that is important rather than the quality of the options.”

The paper looks at what “communication processes had been used where local iwi had agreed to the use of 1080...without major public outcry.”⁹⁷ So there we have it—a piece of taxpayer-financed research designed specifically to glean tips on how to sell poison to Māori communities.

Horn and Kilvington repeat myths and unscientific falsehoods, going so far as to affirm there “is” an antidote to 1080 poisoning. There is no antidote. The statement is patently untrue.

The authors state, “It would be fair to say that, as a whole, Māori prefer not to use poisons as a matter of principle.” They concede the struggle for community acceptance of poison 1080 takes effort and time. They claim at least a year of groundwork is necessary for agencies driving the use of poison 1080 to succeed.

The cost of this yearlong strategy is not factored into any financial analysis of poison drops. “At a time when communities are increasingly negative about the use of 1080, time and resources must be allowed for consultation processes.” The authors are concerned that DOC staff do not “recognise the difference between information and consultation.”

The critical role of Urewera Māori within DOC is disclosed. DOC tried to give “all the community groups involved a high level of *perceived* control over the possibility of aerial drops in the area.” So DOC transported Māori into the Uruwera bush to show “damage caused by possums” and their effect on “birdlife”. DOC’s “take a Māori into the bush” strategy did not work on Moehau in 2013. DOC-sponsored helicopter tours and catered lunches failed to quell Māori opposition. DOC dropped toxin 1080 anyway.

Horn and Kilvington write, “Another way of improving the relationship between an agency and a Māori community is through involving them in monitoring the effects of 1080.” They cite the successful example of Ngāi Tahu, who were recipients of AHB’s “capacity-building process” leading to improved trust and “smoothing the way for a more constructive campaign against bovine Tb over much of the South Island.”

AHB and DOC generally employ a “liaison person who can work with local people” using “cultural impact assessment tools”. Their research concludes, “It is unproductive to try to convince people that 1080 is good, harmless or effective. Setting out to persuade or convince, therefore, can be counterproductive. Instead, agencies could more constructively use their time to work with communities to find ways to address their concerns.”

Such official agency methodology can often drive a wedge right through a community. Toss a DOC uniform on a few unemployed and presto—opposition to 1080 mysteriously fades away.

A similar approach was successful in overcoming Māori resistance to the opening of the Kauaeranga to gold mining in the mid-1860s. According to historian Paul Monin, “One person broke ranks—Wiropo Hotereni Taipari, son of the senior rangatira of Ngāti Maru, Te Hauauru Taipari. Taipari was to acquire “substantial income” and to spend “the new wealth for his own direct benefit, with the tribe receiving no more than limited indirect benefits.” Other Hauraki leaders, “like Tukukino and Te Hira of Ngati Tamatera, were little interested in the new wealth... These Māori leaders gave priority to the protection of existing tribal estate and political autonomy over the pursuit of the new wealth and new mana.”⁹⁸

ERMA’s Māori advisory group, Ngā Kaihautū Tikanga Taiao (NKTT), is charged with protecting and upholding the integrity of tikanga and mātauranga Māori and the Treaty of Waitangi. NKTT’s *Te Pūtara* newsletter of November 2005 outlines “the cultural values that any [1080] application must consider”. These include “Māori cultural well-being; cultural, spiritual, ethical and socio-economic values; protection of the mauri of culture, language and knowledge; maintenance and control of traditional practice (rāhui, kaitiakitanga etc.); mauri of flora, fauna, water, air and land; taha wairua, taha whanaunga, taha hinengaro, and taha tinana.”

The socio-economic benefits cannot be blandly dismissed. Harvesting possums can provide “secure long-term employment where it is most needed and by supporting the local community’s kaitiakitanga (traditional guardianship/duty of care) of their forest environment.” This statement comes from a group of scientists whose paper—*Serving two masters: Reconciling economic and biodiversity outcomes of brushtail possum (Trichosurus vulpecula) for fur harvest in an indigenous New Zealand Forest* includes the fact that “commercial trapping could deliver the same degree of control at lower cost than standard ground control. Further, aerial methods are not economic for repeated control, whereas harvest can be.”^{98a} These findings continue to be ignored.

NKTT employees walk a fine line determined by the corporate chemical industry and National/Labour/Green party policies. The Mana Party aims to “ban the use of 1080 poison and invest in alternative methods (and employment opportunities) to control the spread of tuberculosis by pests and rodents” and New Zealand

First opposes aerial 1080. The Ban 1080 party is the only political group opposed to all use of 1080.

When ERMA released its decision of the *Application for the Reassessment of Sodium Fluoroacetate (1080)* on April 26, 2007 they published a slender report penned by James Ataria—*An Independent Assessment of Oral Submissions and Process for the Ngā Kaihautū Tikanga Taiao-Māori Advisory Group at ERMA*. Landcare researcher Shaun Ogilvie signs off the introduction. At the time, Ogilvie and Ataria were members of NKTT. By 2009 Shaun Ogilvie was one of the team investigating 1080 uptake by pūhā and watercress, with funding provided by AHB.⁹⁹ And by 2012 he was investigating the neurotoxin, tutin, as a potential alternative poison.

Ataria's "independent assessment" basically affirms the DOC/AHB position. According to Ataria, the DOC-sponsored publication *The Use of 1080 for Pest Control: A Discussion Document* written by consultant Wren Green provided a "good synopsis".¹⁰⁰ Although hui attendees were there to consider the AHB/DOC discussion paper, many found the document "difficult to comprehend because of the writing style and frequent use of scientific terminology and concepts. There were also a number of verbal and written statements expressing concern that the information contained in the discussion document and applicants' presentation were biased to support their application for the continued use of 1080."¹⁰¹

Ataria's "independent assessment" records the view that synthetic poisons "were often seen as unacceptable and contrary to the principles of Tikanga Māori," and "most Māori participants felt uncomfortable with the use of poisons in the environment". Participants also felt there was not an—"objective view," presented by DOC going so far as to call it a "one-sided propaganda machine" with "government representatives pushing government agency agendas."¹⁰²

According to Ataria's report some attendees voiced concerns whether Māori cultural values would be taken into account during the reassessment process, or would be dismissed as "mumbo jumbo".¹⁰³ Redirection of funds, to employ iwi representatives to carry out ground control as an alternative to aerial 1080, was proposed at four hui. The impact on the ability to harvest food/kai from poisoned areas was seen to harm mana whenua, with some participants recommending that, "all 1080 drops on Māori land should be banned."¹⁰⁴

The prevailing view from this record is clear. According to Ataria “almost all participants” were opposed to aerial 1080. Nevertheless his report failed to recommend halting aerial 1080. He records, in black and white, the “most contentious issue, facing 1080 use was the continued employment of aerial application of baits. Almost all participants opposed or had serious reservations about this method of application on the basis of the random nature of where baits land, the validity of contractors’ claims that they can aerially apply 1080 with a high degree of accuracy, when they cannot account for wind, or movement of poisoned animals.”¹⁰⁵

Distressingly, the final recommendations of Ataria’s report do not challenge the status quo. There is a request for impartial information on 1080 poison and a comment on the need to build levels of trust with pest control agencies.¹⁰⁶ Ataria appears resigned to ongoing aerial 1080, suggesting that “pre- and post-monitoring by Māori become a mandatory component of assessment of environmental effects of 1080 operations.”¹⁰⁷

However even that mild suggestion seems to have gone nowhere. In 2010 the EPA 1080 Annual Report confirmed approximately 40% of aerial 1080 drops remain unmonitored. And this is just for the target species. Non-target species are seldom if ever monitored after a 1080 poison drop. And there are no reports of iwi participated in monitoring of any sort.

Summing up his report Ataria records, “most Māori participants felt uncomfortable with the use of poisons in the environment, although a broad spectrum of views on 1080 exists. Some support 1080 use, providing there is more Māori involvement in the process, and others feel that 1080 is a threat to the environment and that its use contradicts their beliefs. Aerial 1080 baiting operations remain controversial, and some participants were adamant that alternatives to aerial application, and in some cases alternatives to 1080, are required.”¹⁰⁸

Ataria’s findings were nothing new. Māori community opposition to poison 1080 was recorded back in 2004 in *Forest & Bird* magazine—“While nobody has any firm ideas about how to control pigs, most agree that using 1080 is out of the question. Māori communities, like the ones with an interest in the East Coast Dactylanthus Reserve, are precisely the sorts of stakeholders DOC needs to keep onside. ‘They simply wouldn’t tolerate it,’ says Julie Black, manager of Nga Whenua Rahui (a Government fund to

protect natural values on Māori-owned land). 'They would have issues about the use of 1080 around a traditional food source, and also with waterways and people's diets. It's about traditional Māori beliefs and values about upsetting the natural system with introduced toxins.'¹⁰⁹

The results of poorly attended hui were accepted by ERMA as an objective and independent method of Māori participation.

At a bare minimum, ERMA could have required cultural impact assessments. The Assessment of Environmental Effects process for every 1080 operation should have taken into account the diminished cultural right to hunt for kai in the forests. The ERMA 1080 reassessment decision section entitled, *Risks, costs, benefits to Māori* reaffirms the view "that aerial 1080 operations, in particular, violate wairua and mauri. Therefore in a spiritual context Māori are generally opposed in principle to aerial operations and to the use of toxins that are perceived as a pollution of the environment. Protection of mauri is a concern not only for land, but also for waterways."

Māori economic aspirations to harvest fur, meat and skins are negatively impacted by aerial 1080 drops. Māori health and wellbeing are similarly impacted when toxins are deliberately dumped into waterways and onto ancestral land.

After years of effort to get Māori onside with 1080 poison, it may all be for nothing. Landcare research, published after the ERMA review noted, "Although it is likely that maintaining possums at low densities would result in some conservation benefit, we did not measure this directly."

It is disclosed, in the summary of this extensive research, that no one knows the history of the poisoning of some regions and "there was a general lack of institutional memory of the details of possum control operations in several of the regions surveyed."¹¹⁰

1080 poison does not maintain possums at low densities anyway, it temporarily knocks them out—and 3 years later 1080 poison must be used again. Over and over, more and more. This process is best described as a kind of farming practice benefiting helicopter companies and poison manufacturers who guarantee themselves permanent profits far into the future.

Further revelations come in June 2007, when Jim Doherty, James Waiwai together with Ataria and Ogilvie write a report *Overcoming barriers to Māori inclusion in the appropriate use of 1080:*

final report. An alternative title could be, *Navigating tactics to gain consent for a deeply unpopular policy (for brown people)*. These Māori 1080 advocates concede “support amongst Maori for aerial application of 1080 is probably minimal, particularly in culturally significant areas (e.g. sites where food and water are gathered, historical sites).” This separate strategy to bring Māori on board is arguably racist at its core.

The authors note “a recurring theme being voiced by Maori that the forests are dead after aerial 1080 operations...that there are no birds singing and all the life has been removed” and they found strong opposition among some sectors of the Maori community about the impacts of aerial 1080 operations on non-target species—with some hui participants unwilling to accept existing 1080 environmental data at all, because “that research was done by the same people that are dropping 1080...we can’t trust it”.

To counter these concerns the authors created a snazzy “visual web-based database that would provide a graphical representation of the fate of 1080 in forests” The pictorial format was created “based on an ecological food web as described by Innes & Barker (1999).”

Finally in 2009 a brief article—*Māori Perceptions*, co-authored by Shaun Ogilvie and Aroha Miller, is published as part of a 1080 poison promotion, endorsed by none other than the Ornithological Society of New Zealand. The cover letter signed by David Lawrie, refers to the report—*The State of New Zealand’s Birds 2008 Special Report: Conservation of Birds on the Mainland*—as a “peer reviewed assessment,” with Lawrie claiming 1080 poison is most “cost-effective” over “rugged or remote terrain.”

The disclaimer reads— “the views expressed by the contributors to this report do not necessarily represent those of the Ornithological Society of NZ Inc, the NZ DOC or employers of contributing authors,” would appear to undermine the nature of those peer reviews or at the very least call into question who read what...this is opinion, not science.

Ogilvie and Miller write, “Over half of Māori who made submissions to the recent ERMA reassessment of the use of 1080 poison stated there was not enough consultation with iwi in areas where 1080 use is planned. Many submissions expressed distrust in the information provided because the relevant research is mostly done, or funded by, the organisations that use 1080. Many

of the submissions indicated that Māori believed that there was insufficient investigation into the environmental effects of 1080."

Ogilvie and Miller's brief article of five paragraphs ends, "The way 1080 is used at the moment restricts customary practices. Many of these concerns are also shared by many other New Zealanders."

Restriction of customary practices should be a central concern in reassessing toxin 1080. Given that it is not, the question must be asked why such a serious infringement is not considered significant under the HSNO protocols for engaging with iwi.

The Unfortunate Decision

*The early bird may get the worm, but it's the second mouse
that gets the cheese.*

Jeremy Paxman

It was a foregone conclusion from the start. With the support of government budgets and a powerful industry orchestrating the entire process, the outcome was never in doubt.

In August 2007 ERMA stamps approval for the continued use of toxin 1080 with a few minor adjustments to control conditions for aerial drops.

At the end of the day the problem with the ERMA reassessment was there never really was a reassessment in the first place. Instead there was a carefully stage-managed re-approval process in which there was never to be any serious consideration of downsides, risks or alternatives.

The parties seeking reapproval, DOC, AHB and regional councils together with industry, worked hand-in-glove with the agency charged with giving a nominally independent appraisal. It was no wonder toxin 1080 was never properly reassessed.

The poison's inability to specifically target individual pest species and only those species was never assessed. Actual ecosystem benefits or lack of same, were never properly reassessed. Effects on human health from low level and long-term exposure were never reassessed. Damage to endangered native species, including invertebrates, frogs, bats and birds, were never adequately addressed.

Adverse economic impacts, such as those on tourism or the possum fur, skin and meat industries, were not reassessed. Obvious animal cruelty issues were never fully considered. ERMA made a decision but there never was a reassessment.

The reassessment process was deliberately weak, designed by the applicants themselves and agreed upon by the assessing agency, ERMA. No original independent research was commissioned. Only limited outside expertise was solicited. There was no aggressive

or robust initiative to investigate and few lines of inquiry were pursued.

An unfortunate result of the toxin's approval finds DOC continuing to fail to meet biodiversity goals all the while meting out constant damage to endangered species and ecosystems.

But trouble looms. Animal Control Product's *Statement of Corporate Intent 2010-2012* contained some sobering business concerns. The "ERMA re-assessment of toxin 1080 has galvanised a nationwide protest movement and 85% of ACP's gross revenues come from 1080 toxin and the non-toxic pre-feed baits...Given ACP's heavy reliance on 1080-based products, any materially adverse impacts which may arise from the implementation of ERMA's recommendations could present severe implications for the company and the industry in general."

Of concern to ACP are the mandated aerial 1080 annual reports by ERMA's new 1080 coordinator. "The 2009/2010 Business and Strategic Plan assumes the satisfactory adoption of ERMA's recommendations. In particular, the Plan assumes acceptable reports from the newly appointed 1080 Coordinator, who will closely monitor every 1080 aerial operation...In the event of materially negative reports from the newly-appointed 1080 Coordinator, the planning documents would require substantial review...ACP has agreed to hold reserves of 1080 stocks which exceed normal commercial requirements. As a result, ACP could potentially incur significant loss should severe restrictions be imposed on future 1080 use and the stocks become valueless." So the poison business required "acceptable" reports, as any hiccups would be bad for business. As the ACP report notes, the decision did not mean opposition disappeared.

Criticism of the ERMA decision erupted around the country. Pat and Quinn Whiting-O'Keefe question the claim that aerial 1080 allows forest canopies to recover from over-browsing. They could only discover one study that examined forest canopy health over 25 years. "Researchers found no correlation between canopy health and possum control. Canopies thrived and deteriorated based on factors independent of possum populations and control."¹¹¹

Conservationist and engineering consultant, Murray Dench faults the ERMA decision—"Possums do eat birds and eggs but morepork, harrier, falcon, kaka, weka and any number of others eat more. If the reported 70 million possums regularly ate birds there

would be no birds left... The comment ‘They destroy significant numbers of native trees’ is not supported by science.

“Of course possums eat trees (as do kōkako, pigeons, kaka, sheep and cows) and the amount has been claimed to be anywhere between 1000 tons and 30,000 tonnes per night. But this argument conveniently forgets that 300,000 tonnes of vegetation is produced each night.”

Dench states ERMA is a science based organisation and should have demanded to know, scientifically, what environmental outcomes were actually achieved from the extensive use of 1080 as a control agent for possums. Dench believes rats are the main contributor to bird deaths.

“Of the 58 bird species known to have become extinct in modern times, 31 were primarily via rat predation and another seven, contributed to by rat predation. When rats first colonised our islands, the bird populations had few defences against ground-based predators. They were ecologically naïve. While this naïvety led to many extinctions, some species developed a degree of ‘rat proofing’ and were able to withstand what some commentators have called the alien tsunami.”¹¹²

Writer and Council of Outdoor Recreation co-chair Bill Benfield affirms rats emerge as the primary beneficiary of toxin 1080 drops. He believes possums occupy “a similar ecological niche that the kākāpō did in the pre-human forests.” The historic loss of browsing birds (moa), Benfield notes, impacted native forests and resulted in major understorey clutter with tawa, kāmahī and taraire overtaking kauri and rimu.¹¹³

Rats are able to detect poison 1080 according to DOC’s *Scoping the potential to eradicate rats, wild cats and possums from Stewart Island/Rakiura*. Here the author—Brent Beavan disclosed poison 1080 has not been successful in any eradication projects.

This raises the thorny question—are rats developing resistance to poison 1080? This question has yet to be studied.¹¹⁴

But back in 1995 John Innes’s *Handbook of New Zealand Mammals* warned of potential consequences of poisoning rats. He wrote the net outcomes—the balance between so-called costs and benefits, “must be measured at the community level, because non-target deaths, secondary poisoning, diet switching, and other unexpected responses may counter-intuitively negate the benefits of reducing ship rat numbers.”

Bradfield and Murphy's 1992 stoat research looked at risks to native bird populations, as a direct result of diet switching, after aerial 1080 poison drops. Rats were the main course for stoats prior to poisoning, and as stoat abundance was unaffected by the 1080 poison, they switched from rats to birds. The number of birds then eaten by stoats, until rats recover in six months, may or may not be greater than would have been taken by rats had there been no poisoning.

However in spite of their research the writers claim, it remains "unknown whether the predation risk for any particular species of bird (or other animal) will be higher or lower with fewer rats but the same density of stoats." Nothing more research won't solve—"As large-scale poison operations are now common in New Zealand forests, a better understanding of predator-prey relationships in these areas is required as soon as possible."^{115a}

More recent research by Robertson et al. from 2016 confirmed—"Delivery mechanisms that work at a landscape scale and are safe to non-target species have yet to be fully established"^{115b}

Meanwhile in the Tongariro National Park, a disaster unfolds—"Rat abundance is higher in the sanctuary than in the non-treatment area, and is probably having a big influence on nesting success of other bird species (e.g. fantails and other passerines)." Subsequent reports note a boom/bust "kiwi chick survival and fantail nest success" with monitored kiwi call rates dropping in the Tongariro 1080 poison zones—confirming Bill Axbey's hypothesis that young kiwi birds are worst affected.¹¹⁶

Dench asks, "Why is it that surviving bird populations can withstand alien and native predation for 700 years yet suddenly cause concern in the last 40. The answer of course is not rats. It is humans. We are the worst pests in our environment. We have killed the birds with our forest clearing activities where habitat is lost and special ecological niches are destroyed. We have played God by displacing our neighbourhood species to suit our selfish needs. Pacific rats have been in this country for 700 years, Norway rats (*Rattus norvegicus*) for 240 years and Ship rats for 150 years. Stoats were introduced in 1885 and for 125 years have eaten lots of rabbits, and undoubtedly some native birds, but the main food source of stoats is rats, lots of rats. There is a very good chance that the introduction of stoats has provided an unintended ecological benefit to indigenous avian biodiversity in this country."

How to share this planet with fellow creatures continues to baffle, and while most people find rats difficult to love, rats don't find it difficult to love each other, according to research referenced in the *Guardian Weekly* story entitled *Experiment shows that rats have feelings too*. "The recent experiment reported in *Science* is going to make people think differently about what it means to be a 'rat'. Eventually, it may tell us interesting things about what it means to be a human being. In a simple experiment, researchers at the University of Chicago sought to find out whether a rat would release a fellow rat from an unpleasantly restrictive cage if it could. The answer was yes." And not to be lost in the rat debate is the issue of cruelty in the manner of death meted to rodents. Apart from kill traps and cyanide, rodenticides are inhumane. (See Appendix VI)

ERMA became an advocate for the product they were supposed to investigate. Their blinkered view did not alert them to the abject failure of poison 1080 to achieve any so-called environmental goals. It was not ERMA's job to assess risks to the New Zealand economy. Its job was to assess the risk to the environment and it was definitely not ERMA's job to find the cheapest way to kill possums.

ERMA's approval for the continued use of poison 1080 has taken the pressure off the search to find more acceptable alternatives, such as employing a bounty system for trapping or hunting, or the use of the only humane toxin—cyanide. A wise risk management organisation would have disallowed 1080 use until it was proven safe. Instead "The committee took full account of the deeply-felt concerns of many New Zealanders about the risks and costs involved in the aerial application of 1080." Note the reference to feelings, not actual risks or costs.

To illustrate the selective bias of government documents, Hugh Barr commented in *NZ Hunting and Wildlife* 2008 how DOC chose to ignore the conservation goal that demands "responsibility for rare introduced species". When the *New Zealand Biodiversity Strategy* was written, Barr observed the Arapawa goats were left unprotected, along with the Kaimanawa horses.¹¹⁷

The Whiting-O'Keefes responded to the ERMA decision, in *Rural News* on August 21, 2007. They determine the "scientific evidence produced by DOC, while biased, misinterpreted, of poor quality and tainted by researcher sponsor dependence, indicates that we may be doing substantial, and possibly irreversible, damage

to our precious ecosystem by an unprecedented, inherently anti-environmental practice.”

In their article — *Save our forests for future generations* they ask — “What can be done? We need hard facts, not vacuous promotion of a potentially disastrous practice. So we think it is time to stop. It is time that DOC stop propagandising us with infantile unsupported sound bites that pander to our emotions, it is time to produce the extraordinary evidence to support this extraordinary practice, it is time that every New Zealander demand the truth from DOC and it is time to demand that the use of aerial 1080 be stopped until the real effect of 1080 on our ecosystems is demonstrated to be positive by competent and independent scientific research.

“Our forests, their inhabitants and our international reputation as an environmentally sane nation are at stake.”

Part 3

Poison Legacy—Shame and Hope

Our task must be to free ourselves... by widening our circle of compassion to embrace all living creatures and the whole of nature and its beauty.

Albert Einstein



Ongoing Controversy

*I am especially grateful, however, to have known the fifties,
before we began to poison our own civilisation—or at least
before the effects of the poison began to be felt.*

Orson Scott Card

In the years following the ERMA approval, several farming publications and the *NZ Truth* newspaper carried numerous letters and news reports of protests and demonstrations against 1080 drops. In March 2009 *North & South* magazine published Matt Philp's *A Toxic Debate* that quotes Ian Shaw, professor of toxicology at the University of Canterbury. "It's the most non-specific of pesticides I know...Even DDT is more specific than 1080...I am very worried about the non-specific effects of it among animals, and I would very much rather NZ didn't use it."

Kerre Woodham's column for the *Herald on Sunday*, carried a story called *Possums – a money trap*, where she concluded, "This week, the Māori Party called for the Government to undertake large-scale trapping operations to provide employment, and make the most of the possums, rather than leaving them to rot. Tariana Turia says there's strong overseas demand for possum fur, and with a queen-sized fur bed throw going for around \$3500, you'd have to say that there's money in them thar hills."

Woodham offered a candid opinion—"I don't hunt, and it's years since I've been in the bush, so I can't offer any eyewitness accounts of my experience with 1080. DOC's arguments seem to make sense—yet there's something so 1970s and *Apocalypse Now* about spraying poison all over our forests. I'm no fan of rats and possums but surely there has to be a better way."

The insatiable demand for possum pelts and furs, in the merino/possum industry was articulated by Elizabeth Tennant, chief executive of Textiles New Zealand—"The major constraint is finding enough possum fur to meet the tourist and overseas market demand. New Zealand is sitting on a unique opportunity for export and job growth. What is needed is more possum trapping,

and the collection of more possum fur. A co-ordinated system of permits for possum trapping would be a good start.”¹¹⁸

But in 2011 Jan Wright, the new Parliamentary Commissioner for the Environment (PCE), endorsed the government line. In her unapologetically political document, she even advanced the idea that more 1080 poison should be used in our fragile ecosystems. The PCE’s lightweight report was a reaction to festering opposition to 1080 poison, and questions about the poison’s efficacy and efficiency.

Even Landcare’s *Kararehe Kino Vertebrate Pest Research Newsletter* reported, back in 2008, that the benefits of “pest control operations must be assessed at the ecosystem level if biodiversity assets are to be protected,” echoing earlier critiques.

And there were mounting questions about costs. Another 2009 Landcare report completed a cost-benefit analysis of conventional aerial control versus ground control methods, finding that “ground control is becoming increasingly cost-effective.”

In 2009, a major petition against the misuse of poison 1080 from Coromandel based Thames Landcare group was presented to parliament, along with another petition from the West Coast. Māori MP Rahui Katene proposed legislation demanding a moratorium on 1080 use.

With the media attention given to the PCE report, the government’s goal of chilling political opposition was achieved. Katene’s bill was dropped, the petitions ignored. Aerial 1080 operations continued and increased.

After the PCE wrote her inept report, ERMA admitted, in their 2010 Annual Report on aerial 1080, exactly why the PCE had spoken out. “Because of the ongoing controversy regarding 1080, the Parliamentary Commissioner for the Environment undertook an investigation to provide MPs, members of the public and other interested groups with an independent assessment of 1080. The call for a moratorium on 1080 from some MPs was a major impetus for the PCE’s investigation.”

In the case of the current parliamentary commissioner it is noted, her academic background included nothing related to toxicology, medicine, physiology or ecological science. And as a matter of course, she mixes in the halls of government and power on a daily basis—a consummate Wellington insider. Despite the

PCE's report conservationists throughout the country put pen to paper and the opposition continued.

Stunning for its lack of factual substance, its booster tone and dismissive attitude toward those who disagree, the career policy analyst's report failed to consider Māori cultural impacts while successfully making numerous unsubstantiated claims giving the misleading impression, her conclusions are fact-based.

As an example, she referenced a single study on kiwi populations, and made a highly emotional warning that six vastly different species of native birds "will almost certainly disappear". In actual fact, there is nothing cited in the scientific literature to back up her assertion.

Even worse, Wright's *Forests Under Attack* scare section, featured a major factual error. She highlighted tui and bellbirds (korimako) as examples of native species certain to "decline further". However, a close reading of the 2010 *Journal of Ecology* predation study Wright used to buttress her 1080 sales pitch, reveals both tui and bellbirds are actually expanding their range across New Zealand, and are not classified as threatened to any degree whatsoever. She warned of "loss or decline" of the seed-dispersing species and "cascading ecological changes in native forests", but the hard published data shows the exact opposite trend for these species. It appeared the PCE had not read her own sources.

Her report was based on work by individuals with direct or indirect, financial, and career relationships to DOC, tainting their findings with the potential for bias.

Despite the growing scientific opinion opposed to current 1080 policy, Wright ducked the issue, stating there simply were no good arguments against. She made an absurd claim that 1080 "scores surprisingly well" on humaneness. She ignored well-documented, disastrous explosions in rat populations after 1080 drops. She failed to seriously address rural community concerns. The report was astounding in its failure to acknowledge well-established dangers of 1080.

Even the 2007 ERMA decision concluded, that the effect on non-target animals exposed to 1080, is significantly adverse. And a 2007 Landcare Research summary of 1080 possum and rat control, warned of "negative long-terms consequences for robins and ground invertebrates."

Down on the West Coast, where the local council had supported the local petition to halt aerial 1080 poison, Paul Murray of Karameans Advocating Kahurangi Action (KAKA) wrote in response to the *NZ Listener's* glowing editorial praising the PCE report.

"It would seem that the editor of the *Listener* had a quick read of the report by the Parliamentary Commissioner for the Environment Jan Wright and read her erroneous statement (or many of them) '... almost no pest control is done within the spectacular Kahurangi National Park...' and Chinese whispered that falsehood into a full-blown fabrication.

"The truth of the matter, is that there has been a *lot* of pest-control work in the Kahurangi, for example, in 2008 the Animal Health Board blanketed 54,000 ha around Karamea with poison, much of it in the park, the Department of Conservation has poisoned the Heaphy Track many times, and has had an ongoing stoat trapping operation there for many years. DOC has a drop scheduled in the Kahurangi of over 20,000 ha this winter, so not only has there already been a whole lot of trapping and poisoning pest-control operations in the Kahurangi National Park, this highlights the fact that the many aerial pest-control programmes in the park have been ineffective...

"Or perhaps such false statements (and there are many others in both the report and the editorial) highlight the bias in the report toward supporting an unworkable Government pest-eradication policy at the expense of the very native fauna and flora the poison campaign is supposed to be protecting?

"The Wright Report is based on studies by the AHB and DOC and other government-sponsored analysis and ignores the many other independent scientific research papers ... it is a farce of the top order, it is a fallacious document meant to sate the general public into believing that the government is doing everything it can, to protect us from the perils of pests and their imminent threat to our environment and our sacred forests and birds.

"It is high time for a comprehensive study of the issue by an *independent* body, without hidden agendas, to thoroughly assess the subject of pest-control, the use of toxins, the impact of aerial pesticide use on the environment, tourism industry, agricultural exports, rural communities, the international image of New Zealand and to find a better way to address the challenge of protecting our

land, forests and animals...this would be a far better use of public money, than constantly trying to convince an increasingly aware public, that blanketing the country with pesticide is a good idea.

"I am one of the many rural people affected by aerial 1080 programmes. I live in Karamea and have experienced the horror of huge helicopters dropping poison around where my family and I live. I have felt the negative impact of the policy on my tourism business. I know the international reputation of New Zealand is being irreversibly damaged. I have seen rat populations explode after an aerial 1080 poison drop (this is supported by scientific studies by Landcare Research and Jo Pollard, both of which were ignored by the Wright Report).

"I have friends who have had their pets die horrible deaths, from 1080 poisoning, I have seen the poisoned carcasses of dead animals, floating down rivers near my home, and on the beaches that I invite travellers to come and enjoy. I have lived in the uncertainty and fear of having the environment around my home poisoned with a dangerous pesticide, that is banned in most other countries and I have seen the detrimental effect of the ubiquitous skull and cross bones 1080 (and other poison) signs, that blight our roads, our national parks, the very scenic attractions we encourage visitors to our country and my region to enjoy..."¹¹⁹

Public monies continued to bankroll ineffectual research. Over \$6 million of taxpayer money had been handed to DOC to fund five years of stoat research. One item gleaned from this bonanza found, "the public is clearly uncomfortable about using poisons to control stoats."¹²⁰ And the general public continues to be opposed to poisoning wild animals. For these experiments, stoats are not caught in the wild—they are produced in the laboratory. Stoats have a limited breeding season so researchers begin hormone treatments so that laboratory stoats will produce eggs, embryos and blastocysts both during, and outside the breeding season.

AHB and ERMA annually publish summaries of 1080 poison research, much of which is nothing less than repulsive. A cursory glimpse into these reports is an eye opener. The sensible request of Farmers Against Ten Eighty (FATE) spokesperson, Mary Molloy, who asked AHB to focus on the reason they were originally formed—to rid bTb from farm animals, not to rid the whole of New Zealand of every possible vector for bovine Tb is ignored.

Farmers would be perturbed to find their AHB levies funding such arcane matters as chocolate and caffeine to be used as alternatives to poison 1080. Connovation Ltd was paid to investigate chocolate and caffeine as possible possum poisons. Neither taste treat was found to be either humane or effective. Those resistant possums just would not die within “the pre-determined acceptance criteria of less than three hours.”

Approval for research is routinely sought from a so-called ethics panel, whose members include representatives of the SPCA as well as regional council. Researchers observe the excruciating deaths of captive deer in an AHB funded study, *Welfare of wild deer—where does 1080 poisoning sit on a relative scale of welfare impact?*”

That these panels approve inhumane animal research requires separate investigation. Most people do not even wish to see their shampoo tested on live rabbit eyes. New Zealand’s taxpayer funded live animal poison experimentation is no less horrifying, and is an affront to civilised values. It ought to be stopped.

Landcare Research is paid to investigate thermogenic compounds to see whether they improve the “welfare of possums poisoned by 1080” and to “check for any reduction in the signs of illness or time to death.” One compound had no effect, and the other reduced the time to death down from nine hours 48 minutes to five hours 39 minutes. That supposedly civilised individuals with science degrees can justify such lengthy experiments, observing the painful dying of sentient creatures, escapes common comprehension. But the public rarely sees this. Animal torture is carried out behind laboratory doors.

Another funding winner saw 90,000 compounds screened, identifying 987 with potential use as toxins. 45 identified as the best bet after more screening. Ten finalists exhibit high potential for use as toxins. These ten compounds “induce the secretion of water across intestinal tissue in possums, an effective way of killing animals very quickly.” Humans deserve to vacate the planet.

Some research is just about smoke and mirrors. One study looked at harvesting sufficient quantities of plants and seeds containing fluoroacetate in order to manufacture baits—“the use of a naturally occurring plant toxin has the potential to overcome some of the concerns associated with synthetic sodium fluoroacetate (1080).” New Zealand uses about three tonnes per annum, but researchers found they would need to grow 13.5

million plants on 1800ha at a cost of \$26,000/kg. Compared with a cost of \$200/kg for synthetically produced 1080. Bigger wastes of taxpayer funds are difficult to find.

Not to be forgotten is the fundamental reason for AHB poisoning of possums in the first place—to eliminate possums as a vector of bovine Tb (*Micobacterium bovis*). After decades of 1080 use, Landcare Research is finally funded to “determine the most likely cause of bovine Tb persistence in livestock at the Blythe Valley, North Canterbury” given the area’s low possum population. The study unsurprisingly concluded the cause “was likely to have been within-herd transmission.” This, at a time when there were just 91 (0.13 per cent) infected cattle herds. And there had never been a controlled experiment to demonstrate the degree to which possums may function as a vector.

All this research occurs years after the comprehensive 1994 PCE report by former commissioner Helen Hughes that found, “There is no demonstrated relationship between possum population levels and prevalence of possum Tb, and there are a number of other contributing factors to the incidence of Tb in livestock, so that falling reactor rates may be associated with other contributing factors even when many possums are being killed.”

AHB and farmers are aware the main cause of bovine Tb is in-herd transmission, but to re-discover (in 2010) farmer levies are to be further wasted on such research must gall. It seems the PR about possums as vectors has achieved some success and convinced farmers to keep paying their levies in spite of low disease incidence in possums.

In 2009/10, a business called Ecological Networks Ltd used funding to look at “long-term benefits of aerial 1080 operations on South Island tomtits.” Merely looking for “benefits” of aerial 1080 poisoning cannot be deemed science.

And there are tiny rodent problems. Mice need to be removed, however 1080 does not seem to do the job. 1080 poison does not kill enough mice. According to summaries published in ERMA’s *Annual Report on the Aerial Use of 1080* for the year ending December 2009, only 25% of wild-caught mice die in lab experiments after toxin 1080 feeding. So wily mice get further funded, and the race is on to find out how to “hide” the 1080 so mice will actually consume the poison.

After decades of 1080 poisoning there is a project looking at the *Movement behaviours of 1080-poisoned possums* that mentions, “the use of 1080 continues to attract significant public concern, and opinion remains deeply divided on its use.” How possums behave when they are infected with bovine Tb could be of some use to farmers. Trapping farm boundaries certainly seems a sensible plan.¹²¹

In 2013 Radio New Zealand’s *Country Life* aired an interview with farmer Colin Cox. In the early 1990s, Cox’s then partner, Peter Elworthy had taken possum fur to be analysed in Japan. The Japanese discovered possum fur is the only fur in the world with the same warming qualities as polar bear fur. According to the radio interview, they chose not to further investigate or exploit this quality.

Quite why this decision was made is not discussed, but it is taken at the same time as toxin 1080 use increases. As President of Federated Farmers, Sir Peter Elworthy did in fact head a pro-1080 organisation, but correspondence indicates a loyalty to wool had some bearing on the decision. Sadly Sir Peter passed away before the author could interview on this topic.¹²² It is only in 2013, Cox’s fur products are finally launched, with the imprimatur of an Olympic rowing champion, extolling the healthful, warming virtues of back support belts made from possum pelts.

Biased, blanket assertions promoting poison receive full press coverage. With no science to support their claim, *Forest & Bird* magazine declares that “ground-based control” is less effective than aerial poison 1080. And in local newspapers, readers are treated to the pontifications of Conservation Minister Nick Smith—“you could spend gazillions on trying to satisfy some of the ferocious opponents of 1080. It is not a scientific argument—it’s almost just a gut reaction against poisons.”¹²³

Demands for humane wild animal control receive little publicity. But local papers receive big government monies for full-page advertisements whenever a 1080 poison drop is to occur. Naturally, this helps control the dominant narrative and quell opposition.

And not long after the ERMA decision DOC consultant Wren Green addressed the Forest and Bird AGM on the problem of public “concerns about 1080”. Noting ongoing opposition Green’s advice to 1080 backers was simple—“initiatives need to be

created—starting in Coromandel.” Clearly exposed is the source of a grudge campaign against Coromandel citizens—nothing a little cash handout to local papers and eco-entrepreneurs won’t help.

Helen Hughes declared, back in 1994, continual “heavy reliance on 1080 or any other single toxin is not advisable over the long term”. Yet the poison continues to rain on New Zealand, more every year, seemingly without end.

New Zealand's "Dirty Little Secret"

In the consumer-oriented market, the continuous use of 1080 is a ticking time bomb for all New Zealand agriculture.

Rob Wilson

The international community is slowly being alerted to New Zealand's outlier status in as exceptional user of chemical pesticides. Increasing numbers of tourists, visiting international scientists and social media users across the globe are becoming aware of New Zealand's "dirty little secret."

Waterways are severely polluted. Farms use massive amounts of agrichemicals banned elsewhere. Standards for pesticide residues in food are lax. Organics are far behind many countries. As the world is discovering, New Zealand is far from clean or green.

The message has emerged through different channels and in different formats. Conservationist and filmmaker brothers Clyde and Steve Graf have produced two remarkable documentaries—*Shadow of Doubt* and the award-winning *Poisoning Paradise, Ecocide New Zealand*. Released in 2009, *Poisoning Paradise* has been seen around the world, garnering multiple awards. Their films expose the damage wrought by toxin 1080.

American publications such as *The Nation* and *Harper's Magazine* have carried sponsored advertisements—"Clean, green New Zealand! Think again. Environmental alert: toxic truth for travelers, consumers." And "New Zealand—toxic waste dump of the South Pacific."

But for the most part, New Zealand's little secret has been leaked by thousands of recent visitors in tweets, posts, texts, photos and blogs. These are the same young people who regularly happen upon skull-and-crossbones signs from the Coromandel to the West Coast to Southland, warning of deadly toxin only metres from their walking track.

New Zealand's reputation, sadly, has been tarnished and is worsening. The impact on the country's new number one export product—tourism—could be catastrophic. The "100% Pure" brand,

designed to attract environmentally conscious inbound travellers from around the globe, is no longer working.

Negative fallout concerning poison 1080 may see the tourism branding fall victim, in part, to the government's own pest control policies. The poison is a potential wrecking machine for the multi-billion dollar tourism industry, as disillusioned tourists increasingly attack New Zealand's fraudulent green branding.

Tourism New Zealand campaigns urge prospective tourists to "Get off the beaten track and discover..." yet highly popular tourist routes on the Coromandel Peninsula and throughout the country, are signposted by DOC, warning tourists and residents not to venture off the road and to exercise particular caution with regard to children and pets.

A formal complaint was lodged with the Commerce Commission in 2007, charging breaches of the Fair Trading Act with the use of the branding mark "100% Pure New Zealand" as both false and misleading, specifically in respect of the routine and increasing aerial application of sodium monofluoroacetate (or compound "1080" poison) by the Department of Conservation and regional councils throughout hundreds of thousands of hectares of easily accessible New Zealand bush each year.

The complaint, by the Upper Coromandel Landcare Association (UCLA) stated use of the "100% Pure New Zealand" brand may contribute to adverse consequences, such as causing visitors to the New Zealand bush to become ill by direct or indirect poisoning, resulting in long-term and chronic disorders, some of which may not become apparent for many years.

UCLA requested, in the public interest, that Tourism New Zealand immediately cease its use of the "100% Pure New Zealand" trading mark, and be directed to fully inform the public as to the health hazards identified with aerial 1080 poison drops. The complaint was reviewed by the Commission Contact Centre and was advanced to the Fair Trading Branch for further consideration and possible investigation or enforcement action.

An international campaign was launched attracting the attention of food safety management at several major international retail chains including Sainsbury's (UK), Whole Foods Market (USA) and Wild Oats Markets (USA). Health conscious and environmentally concerned travellers from Europe, Asia and North America were alerted through many Facebook postings so

their holiday decisions could be made with complete information regarding New Zealand's use of toxin 1080.

In the same year, the *New Zealand Geographic* published a story by Derek Grzelewski. He quotes Rob Wilson, of Wild Animal Management—"...the continuous use of 1080 is a ticking time-bomb for all NZ agriculture."¹²⁴

Author Kate Winters, who campaigned for decades in her community and on her website¹²⁵ published her novel, *Scenic Dream or Silent Nightmare, A Story of New Zealand*. Karamians Advocating Kahurangi Action (KAKA) presented an informed and serious case to both local and international tourists. Longtime conservationist Carey Dillon created an informative and well researched website educating thousands.

Wairarapa organic winemaker, architect, conservationist and angler Bill Benfield reached audiences far and wide with his serious critiques and thorough histories of how New Zealanders have contributed to the ecological destruction of Aotearoa.¹²⁶

The British *Guardian Weekly* published a letter declaring, "The majority of New Zealanders oppose possum poisoning. Researchers, without a conflict of interest, oppose the dumping of toxins into our wilderness, but vested interests promote them as the easy, cheap fix." (15 June 2012)

The campaign to alert the world continues, as further disastrous evidence of this poison programme finds its way onto the international stage.^{126a} The poison advocates appear distressingly blinkered. Their inability to achieve conservation goals in spite of, or more likely because of, decades of repetitive drops of poison 1080, goes unremarked.

A handful of strategies could go some way to achieve those very same conservation goals without poisoning the wilderness. They include, but are not limited to, a tiered bounty system, kill traps for landowners, government supported facilities for wild meat, fur and skin processing, tertiary and secondary school bush skills courses for young people and the development of a bovine Tb vaccine.

Ecoterrorism

*The care of our earth is our most ancient and most worthy,
and after all our most pleasing responsibility."*

Wendell Berry

In March 2016, poison products businessman Jeremy Hamish Kerr was sentenced to jail. Together with a letter, he had mailed packages of pure 1080 powder to dairy industry giant Fonterra and to Federated Farmers. Kerr's threatening letter read verbatim—"Enclosed is a sample of 1080 blended with New Zealand dairy infant formula currently in China. If after the 27th March 2015 this VTA is still in use in New Zealand several New Zealand infant and other formula will be released into the retail chain in the Chinese market and one other market with traces of 1080.

"The release will coincide with a media package supplied to the Chinese authorities will expose the past 30 years of flawed, self-serving science and bureaucracy that continue. Our group has no confidence in the political or democratic process concerning 1080. It is for you to manage the outcome.

"This notice is private and confidential to you and will [remain] as such. If there is no compliance it will form part of the media release. The magnitude of this issue is now beyond the temporary [sic] financial and personal sacrifice that will be made by the agricultural and tourism sectors of the New Zealand economy."

At the time, Kerr was a director of a poison development company. He was listed as representing Feral R&D Ltd. on a government-sponsored study that used the anticoagulant Feracol for stoats. In 2002, he completed a stint as a director of Connovation Research.

The 1080 threat electrified the nation. New Zealand was under attack. Its number one export industry had been targeted with potential losses of billions of dollars. New Zealand baby formula, at home and abroad, was possibly tainted. From the Prime Minister down, through various branches of government, down to the local level, political statements flooded the airwaves as to the terrorist nature of the threat. The nation's security apparatus and police

were mobilised. The country faced a crisis of massive proportion. The hunt, dubbed Operation Concord, was on.

As days and weeks unfolded conservation activists were targeted. Without a scrap of evidence, police, politicians and media specifically implicated conservationists opposed to poison 1080. Initially 60 people were considered of “significant interest” and approached for interviews by police. Court documents disclosed police eventually investigated more than 2600 citizens with strongly held views or those who “had in some way voiced opposition to 1080 poison.” There was never a doubt that the perpetrator was anything other than a 1080 activist. The investigation was purely political.

Fairfax Media proclaimed without facts, “The wild fringe of the anti-1080 campaign has resorted to violence and intimidation before.” Kate Wilkinson, minister of conservation slandered activists. “Anti-1080 activists on the Coromandel have a history of intimidating and threatening DOC staff.”

Trusted government allies Forest and Bird piled on. Ambassador McSweeney one of the leaders of the campaign against logging of native forests in the 1970s said, “One of the most important tasks we had then was to rein in our radicals...[some of the anti-1080 campaigners were] fringe people and fringe people do extreme things. The tragedy is they have not reined in their radicals.”

Casting about for further unsubstantiated, inflammatory accusations, McSweeney declares, “The wilder fringes of the anti-1080 movement remind [me] of the survivalist militias in the United States, people who oppose government in principle and care nothing about scientific evidence.” It was obvious to government and the media (in this instance the *NZ Farmer* of April 15, 2015) that this was a despicable act of terrorism and that it was definitely carried out by a fanatical 1080 opponent.

The ten-month investigation eventually cost police more than \$4 million and Fonterra nearly \$20 million. Their interviews of 1080 activists turned up nothing, just as they were told at the outset. Animal cruelty is a major concern for opponents of 1080 poison use. Opponents should have been the last group suspected of an inhumane tactic. Fulbright Scholar and environmentalist Rebecca Reider was quoted at the time, “We are motivated by a love of the community and other creatures. We would never harm anyone.”

Once the threat to taint infant formula with 1080 poison—scaring parents everywhere, and undermining national and international trade—was found to have been perpetrated by a poison business insider, what was once billed as an act of international terrorism was downgraded to simple criminal blackmail.

After Kerr's sentencing Radio New Zealand explained that "Kerr owned a company which manufactured an alternative to 1080 poison, and Justice Geoffrey Venning had earlier ruled that Kerr's financial gain was at least part of the motivation behind the offending. Crown prosecutor Christine Gordon said the combined losses to dairy companies and investigation agencies were in the order of \$37 million.

"Justice Venning said, the threat was made worse by Kerr including a fatal dose of 1080 mixed with milk powder. He said the potential impact on New Zealand trade could have been catastrophic. At a disputed facts hearing, the Crown argued Kerr's financial state was desperate at the time, and his desire to make money motivated his threats, while Kerr's lawyer said the businessman acted out of stupidity, and financial gain was not the primary driver."

The police dragnet was a political witch-hunt and government public relations exercise to intentionally undermine opponents of official conservation policy—specifically use of toxin 1080. Neither government nor police ever uttered the slightest apology.

The blatantly political profiling and targeting was especially invasive of two highly respected Takaka conservationists, Ute and Rolf Kleine, who were treated like criminal suspects, abused, questioned for more than 11 hours, with police taking fingerprints, DNA, and computers. Only a single radio broadcast gave voice to the Golden Bay conservationists.¹²⁷

The government and the compliant media will do, have done and continue to do anything to discredit opponents of poison 1080. When it turns out the high crime is committed by one of their own, they downgrade the alarm and sweep the case neatly under the carpet.

The Hopeful Future

I would say one alternative to forcing nature to tell us its secrets is to observe nature and adjust to its larger rhythms. Indians believe that everything in the universe has value and instructs us in some aspect of life. Everything is alive and is making choices that determine the future, so the world is constantly creating itself.

Vine Deloria

Commentators, academics and activists from around the country have addressed the failure of poison 1080 from various perspectives. On the following pages reproduced with permission from publishers, are a view from ground zero, a cultural view and a practical alternative.

Reproduced with kind permission by writer and activist, conservationist and poet, Rebecca Reider and the *OrganicNZ* magazine,¹²⁸ the following critique encapsulates action in rural New Zealand and reminds readers that efforts to care for nature continue in spite of media inattention and government public relations.¹²⁹

Introducing her article Reider opines, “We knew there must be some better way than having 1080 poison dropped out of helicopters all over our community. In their endless quest to kill possums, the Animal Health Board dropped 1080-laced baits over 18,000 ha here in Golden Bay this past winter: in our forests, around rural properties, in the streams that supply our drinking water. If angry letters to the editor in the local paper are any indication, it riled up our community more than any other recent issue.” She continues:

Objections to 1080

The objections to 1080 poison are well known. It kills all breathing creatures, not just possums and, as one of the world’s most toxic vertebrate poisons, it’s illegal or nearly illegal in many countries. Numerous native bird species have been found dead from 1080, and death is slow and excruciating. The already endangered kea, have been hard hit. People who hunt wild meat

for their families mourn the loss of deer. And the long-term low-dose human health effects of 1080 have barely been studied, even though the poison is dumped throughout rural watersheds. So we protested in the streets, we petitioned, we wrote letters, we pleaded with our local officials. I even personally confronted our poison-loving Parliamentary Commissioner for the Environment – in rhyme (see ‘The 1080 poem: You said it was safe’, on YouTube).

No Alternative?

But our pleas fell on deaf political ears, as has happened in many communities. 1080 is big business in New Zealand; a state-owned enterprise imports and sells it by the tonne, and almost everyone in the political food chain plays along. The Department of Conservation (DOC) and Animal Health Board people told us again and again that we had to get rid of possums and that there was no affordable alternative to 1080. But we still believed there must be a better way. So I started ringing folks around the country, and found there are indeed plenty of other sides to the story.

Te Urewera Success Story

Te Urewera National Park is one of those success stories. There, a dedicated ‘mainland island’ research site is pest-controlled primarily through trapping. Permanent possum trapping efforts take place on 22,000 ha. Poison use is limited to some cyanide for possums and occasional cholecalciferol (high dose vitamin D3) for rats – and no 1080. Managers of Te Urewera Mainland Island have experimented with various trapping techniques. Stoats and rats – which are less easily controlled with 1080 – are sometimes trapped along the same trap lines, as it’s more economical to tackle multiple pests at once.

Costs, Employment, and Bird Resurgence

Although some advocates of 1080 claim trapping is too expensive, DOC ranger Dan Baigent in the Urewera maintains that is not necessarily true. “It’s expensive to set up a kill-trapping system for possums, but cheap enough to maintain, especially when the long-term costs and benefits are weighed,” he says. Once trap lines are in place and possum numbers have been reduced to low levels, it costs under \$10 per hectare per year to check the traps. He also disputes the common notion that ‘people sitting in chairs’ have: that you can’t trap in steep terrain. The

Urewera are steep but walkable for a skilled fit person, he says: "We've proven that you can. There are more people out there that can do it than some people like to believe." The project also provides local employment. Tuhoe opposition to 1080 has been part of the drive not to use the poison, and now iwi members are consistently employed trapping possums and other pests in the park. The proof of success is in the resurgence of birds: in one area of the park, in the mid 1990s there were eight kōkako pairs, teetering on local extinction; now there are over 100 pairs.

Possum Fur Industry

Of course, not every bush block in the country gets as much attention as the Urewera site. However, in areas with high possum numbers, trapping has become so profitable that trappers don't need any government funding to do their work. Possum fur prices are booming, currently at over \$100 for a kilo of plucked fur. *Straight Furrow* last year reported on an 18-year-old who makes \$60,000 a year as a trapper. Still, the fur industry alone is not enough to keep possum numbers as low as conservationists want; hunters will hit an area quickly to get a big kill, then leave after numbers are diminished, but without fully eradicating the possums. However, in some areas DOC is looking for ways to work with commercial trappers to find win-win solutions. For example, in the Waioeka Conservation Area in the Urewera, DOC is forging a memorandum of understanding with a local fur company, to give trappers guaranteed long-term rights to a large bush block if they agree that after they've made their big kill, they'll go further and get the possums down to low levels. Local DOC area manager Andy Bassett says he'd rather use 1080 to get a quick, easy kill, but his area doesn't have the budget for it, so working with trappers is "the best alternative we've got at the moment."

Marlborough Locals Take Responsibility

Elsewhere, locals who oppose 1080 are taking the matter into their own hands. One example shines in Nydia Bay, in Pelorus Sound, Marlborough. Local residents, aghast at the disappearance of birds after a 1080-drop in 1999, decided to change the situation. In 2005, when DOC announced an intention to drop the poison again, the owners of the Nydia Bay Lodge tendered for the opportunity to trap the possums themselves instead. They created a successful trapping programme covering 3000 hectares of forest,

and eventually “the birds returned big time,” says Steve McClellan, one of the founders of the Mahoerangi Environmental Education Trust, which was set up for the project. DOC paid the trust the same amount they would have spent on the 1080 operation. However, to get the same kill level in a short time ended up costing more than 1080 would, so the Lodge owners used their own business profits to subsidise the trapping project. Rather than see this as a problem, Steve McClellan explains the Lodge/Trust business model as APE: “All profits to the environment.”

Trapping: Worth It in the Long Term

The cost issue may be one of time frames. Veteran possum trapping contractor Martin Foote has been picking holes in 1080 research for decades. Based on experience, he agrees with the Urewera figures and says he could keep an area clear of possums for \$10 per hectare per year, including set-up costs, if he was given a ten-year contract, which would make trapping competitive or cheaper than 1080. The key is the long-term contract: a lot of work at the start is balanced by easier work down the track.

And now, enter the game-changer. Goodnature, a small but innovative Kiwi company, has been perfecting its self-resetting traps since 2005. With a carbon dioxide cylinder powering a quick shot to a possum's head, each trap can do 12 kills before being reset by a human. The company is currently perfecting its lures so bait doesn't have to be replaced for a whole year either. Goodnature also makes rat and stoat traps. The traps are constantly being improved, thanks to the enterprising nature of the team and a government-funded partnership with the Department of Conservation. Goodnature focuses on engineering and testing of new technologies, and works with DOC on large-scale field trials. Goodnature doesn't take a specific stance on 1080 use, preferring to focus all their energy on their own traps. “If we just keep making our devices better and better, people will come to see this is the tool to use,” says Stu Barr, one of the company's founders. It's already happening. One DOC analysis concluded that the Department could save \$88 per trap per year by switching to self-resetting traps. On Stewart Island, DOC's own cost analysis has shown that setting up a network of Goodnature's traps would cost the same as a 1080 operation; and the traps would last much longer than the effects of a single 1080 drop.

Committed Locals Around Aotearoa

From the West Coast to the Coromandel, groups of committed locals continue fighting to fend off 1080 poison in their own communities. Our hope here in Golden Bay – and our hope for communities across Aotearoa – is that these fights will be made easier where committed organisations are able to create viable alternatives to poison.”

Will poisons save New Zealand's biodiversity? (excerpt published with kind permission)

This is the title of a talk given to the Nelson Science Society, New Zealand on 9 December 2014 by Jim Hilton, BSc Hons, Canterbury University (1972) is a Nelson Buller based wildlife biologist who has worked for two NZ Government Departments as a vertebrate ecologist. His experience with 1080 poison started in 1972 when he was employed as a scientist on a joint Agriculture, Forest Service study on Tb and Possums.

NZ's vegetation has more to worry about than being eaten to death by introduced animals.

Patrick J Grant, hydrologist and botanist wrote a book in 1996 called “Hawkes Bay Forests of Yesteryear”. He studied the diaries of missionary William Colenso, the first European to enter the Ruahine mountains in 1845 and 1847. Dead trees, canopy collapse and accelerated erosion were described and sketched in detail, years before deer and possum were released. Early photos taken in 1917 show high numbers of standing dead trees and these correlate with severe droughts. Pat Grant identified seven possible factors in forest damage, wind, droughts, heavy snowfalls (glacier ice), heavy rainfalls (floods), fire (volcanic eruptions), earthquakes and wildlife (like moa, and introduced animals).

Cockayne & tunnel vision

Failing to understand the impact of Moa and other browsing birds is where our present day advocates of biodiversity have got it so wrong. Natural Science in New Zealand got tunnel vision in the 1920's First prize for promoting this tunnel vision goes to botanist Leonard Cockayne. There has been plenty written about this plant collector and Government Botanist so I will be brief. He

had a phobia about introduced animals eating native plants and promoted the idea that New Zealand's biodiversity had evolved in the absence of browsing predators. To some botanists wildlife are simply predators, preying on plants. They don't see the bigger picture, the way the plant kingdom and animal kingdom coexist and co evolve. They depend on each other. Their inter relationships are complex, the natural world is full of surprises, sometimes predictable and at other times not. Plants and wildlife have evolved together for millions of years...Our native parakeets kill burrowing seabirds (storm petrels) on the Antipodes Islands and scavenge on dead birds. Pukeko kill stoats unlucky enough to get caught out in an open paddock. We don't have many native eels anymore, most end up as expensive meals in Europe, but they are deadly predators of ducklings. In the past, eels would have killed more ducklings than stoats do today. So the idea that introduced predators will extinct our remaining mainland native birds is wrong. Our native wildlife has coexisted (evolved) with predators since day one. Our shorter living native birds have a huge breeding potential, large clutch sizes and often raise several broods in the same year when food and weather is favourable. Our longer living native birds do not have to fledge young every year to maintain and expand their populations. The important thing for them is adult survivorship.

Predators and poisoning

Our most serious introduced non human predators, stoats and rats have been here so long that they are now in balance with our present day (contemporary) mix of wildlife. They merely replace some of the bird predators our birds have evolved with for millions of years. Sure, stoats eat birds, rats eat a few too, possums take the odd egg but the idea that birds cannot cope with predators is wrong. Similar birds in overseas countries are not going extinct because of predation by wildlife like stoats and rats. Our introduced rats and possums are basically vegetarian, rats diets are 95 % vegetarian, more so for possums, all the stomach analyses and behavioural studies tell us this. Bush birds and spectacular dawn chorus were common in New Zealand's lowland bush before "serial overkill " by aerial 1080 poison for possum control. New Zealand's biodiversity is richer because of the introduction, of foreign species. The new species mix and integrate resulting in a healthier environment,

one less likely to have wild swings in population numbers and better able to cope with human interference. Mass poisoning with toxic chemicals reduces biodiversity and promotes monocultures. It favours fast breeding species at the expense of slower breeding species. This is where we have made a huge mistake with Aerial 1080 poison, Brodifacoum and common farming insecticides like Diazinon. As well as killing our rare wildlife, many species, quite common until recently, like Black billed gull and Black fronted tern which like feeding on insects in freshly cultivated paddocks are now becoming rare. These birds have survived ok with introduced mammalian species for over 100 years but are not doing so well now that poisons are in the mix.

Poison technologies

Legislation permitting killing and poisoning is enshrined in law and special bureaucracies and private entities have been created to promote and assist in the hunting and poisoning of our wildlife heritage. Applied scientific research fine tunes the aerial poisoning, experimenting with baits, and the best ways to use them. The old poisons like arsenic, strychnine and phosphorus have been replaced by more modern, more toxic poisons like 1080 and second generation anti coagulants (Brodifacoum replaces Warfarin). We are world leaders in using the latest technologies.

We no longer fill strawberries with strychnine by hand to kill birds eating berries or use concrete mixers to mix 1080 poison with diced carrots like we did in the early days. Today's poisons are manufactured in special factories, packaged in convenient paper sacks so they can be quickly emptied into purpose built hoppers slung below heavy lift helicopters. Sowing rates have been reduced so that greater areas can be poisoned but the overkill capacity is still huge. Commonly 70 % of the baits disintegrate on the forest floor and baits contain twice the amount of poison necessary. GPS (global positioning satellite) technology is used to make sure poisons cover a wider area and no gaps are left. "Serial overkill!." We use all the technology at our disposal, just like the first humans to NZ did, 800 years ago. It's a shame we cannot learn from history.

Modern science tells us 80 to 100% of the targeted wildlife species are killed by poisons. Stoats, rats, possums, deer, pigs, goats, thar, chamois and wallaby are now in very low numbers in the forests which are regularly poisoned. We also know that

70 % or more of non-target wildlife like robins, tomtits, frogs and insects are also killed. All we are doing with aerial poisons like 1080 is constantly diluting our wildlife, native and introduced. It is an expensive exercise in futility, financially unsustainable, ecologically unsustainable and not doing the job of saving species at all. It is killing them, some faster than others.

The Future—Poison Free New Zealand

“Poison Free New Zealand” is what we need, and sensible wildlife management to “rewild” our forests with browsing wildlife and domestic animals again. That way our remaining native forests will more resemble their pre-human state of 800 years ago, a well tracked forest with an open under storey where our rare and endangered birds like kākāpō, takahē and saddleback can again thrive. The future looks promising. Worldwide countries are insisting on uncontaminated food products, they want ethically farmed natural food products. Not food pumped up with artificial chemicals and tainted with faint traces of biological poisons. Modern analytical laboratories can measure contaminants down to parts per trillion. Modern medicine has discovered that endocrine disrupting poisons like 1080 can reduce fertility and cause birth defects at levels as low as parts per trillion. The sophisticated markets which pay top dollar for our export produce are insisting more and more on a clean bill of health and have the testing procedures to make sure we play by the rules. Natural diseases like TB are easily avoided, not so the damaging effects of pollutants from our industrial age.

Modern tourists want to visit a country which is genuinely clean and green, not one where clean and green is simply a marketing slogan.

Fiona McQueen, an Auckland University professor and a consultant rheumatologist at the Southern District Health Board, published an opinion piece in the *Otago Daily Times* (17 March 2016). Here, excerpted with permission, Professor McQueen explains disturbing events that were not widely covered in the New Zealand press.

1080 Not the Answer to Saving Birds

“Something you don’t expect to find when tramping through pristine native New Zealand forest are carcasses of poisoned animals and native birds lying on the ground. Yet this was the experience of trampers in Fiordland following the massive aerial 1080 pest-control campaign of August 2014. A group of Glenorchy locals was walking the Caples-Greenstone track two weeks after the poison drop. As one of them recalls: ‘There were dead birds on the ground.’” The others were hunters, exploring the remote Hokuri creek, near the Hollyford valley. Although this was three months post-1080, they found deer carcasses, dead possums and native birds on the ground. These people witnessed something deeply disturbing. Our current pest-eradication policy has also excited adverse comment internationally.

Two articles recently appeared in the Biodiversity column of *The Economist* noting that invasive species are “fiendishly hard to eradicate” and that ‘NZ will not eradicate rats (using poison) any more than Britain was able to wipe out grey squirrels’. The author commented that the idea it is possible to restore the balance of nature to what it was before human intervention is at best ‘misguided’. There can be ‘no return to Eden’.

For those who wish to learn about 1080 there is much information from the Department of Conservation on the Internet. It is often referred to as a ‘rodenticide’. This misrepresents the fact it is toxic to all vertebrates including birds, as well as many invertebrates.

Typing in ‘Does 1080 kill NZ native birds?’ elicits the following: ‘Tomtits and robins are the most vulnerable native bird species, but as they are prolific breeders they recover quickly and thrive as a result of the reduced predation that follows successful 1080 operations.’ I personally do not find this reassuring. The answer is clearly ‘Yes’.

The information about the kea, now an endangered species, is even more disturbing. ‘Of the 150 kea that have been directly monitored, 20 (12%) have died after having ingested baits.’ Given that the total NZ (and world) kea population is now estimated at less than 2000, this surely represents an extraordinarily cavalier approach. The kea was given full protection under the NZ Wildlife Act of 1953. That a government department charged to preserve and protect native species is deliberately dropping poison into its

habitat beggars belief. In the 1970s kea were still thriving on the West Coast. The devastating fall in their numbers during the past 30 years has coincided with the increasing and repetitive use of aerial 1080 in that region."

Professor McQueen's opinion piece ends with the idea of incentivizing possum trapping, boosting the fur industry thereby relieving unemployment

And the final hopeful word comes from Ngatihine's Kevin Prime who graciously gave permission, as did the original publishers, Landcare Research in *Kararehe Kino Vertebrate Pest Research*, 24 June 2014 for this opinion piece.

Cultural Control of Possums

"About 15 years ago I was asked 'how would ancient (pre-European) Māori have addressed the possum problem in a culturally appropriate manner if possums had co-existed with them?' My views have not changed. The answer is simple. Māori would not have seen excessive possum numbers as a problem at all. Instead the possum would have been considered an extremely valuable resource in many ways.

"As a priority, possum skins with the fur attached would have been used to make kākahu (cloaks) and warm clothing. If possums were plentiful, the furs would also have been made into high quality mats and blankets. The skins would likely have been cut into continuous strips to make a type of string and thread for sewing and korowai (clothing and cloaks). Furthermore, if this thread were plaited, it would have been used to make medium strength ropes and fishing lines. If such rope (with a length of muka fibre as the central core) were re-plaited a really strong and durable multi-purpose rope would have been possible. Possum long bones would have been used for needles and the vertebrae used for necklaces and knucklebone games.

Possum flesh would have been cooked in many creative ways including grilling on hot stones, being boiled with tikouka, nīkau, pūhā, poroporo, parataniwha stalks or kōrau shoots, cooked in a hangi, barbecued over hot coals, smoked, or preserved (huahua) through drying and preserving in its own fat. Possum offal (intestines, stomach, liver, heart, lungs, and kidneys) would have

been classed as 'status delicacies' and consumed at large hākari (feasts). The head (eyes, brains, and tongue) would have been accorded the status of highly prized treats and eaten only by the chiefs (rangatira), tohunga (priests) and high-ranking visitors.

Thus, ancient Māori would have made full use of the resource, but how would they have specifically addressed a population explosion of possums and the consequential depletion of many of the forest species critical to their hunter-gatherer lifestyle? In my opinion local chiefs would have:

- Held competitions to determine who could catch the most possums over a given period, with the winner made the chief advisor (tohu rangatira, symbol of leadership) because of his ability to provide food in abundance;
- Such hunters accorded the status of 'tohunga whai kai' (expert hunter) and able to marry as many wives as desired;
- Stories told and retold of the prowess of hunters able to catch 250 possums (or some other high number) in one night;
- His skills, knowledge and expertise sought-after by many aspirants to fame and fortune;
- Decreed possum hearts (or livers, kidneys, eyes, or brains) the most highly prized food at any hākari, so any rangatira who could provide 3000 (say) such delicacies at a single hākari (feast) would be the envy of every other tribe in the country for generations;
- Encouraged adults to design ingenious traps to catch possums;
- Arranged for children to be taught competitive 'games' of climbing trees and catching as many possums as they could in the daytime, part of this 'game' would involve:
- Skinning a possum (including drying, treating and colouring the skin using hīnau bark);
- Gutting a possum (including cleaning and separating the various organs);
- Preparing possums for eating;
- Cooking: smoking, hangi, huahua (drying and preserving in fat), and tunutunu (barbecue on hot coals).

Most importantly, if possum numbers fell to an unsustainable level, a chief would impose a rāhui (temporary hunting ban), to allow possum numbers to recover before further hunting was allowed.

In my view such a cultural approach to killing possums, complete with variants to accommodate modern-day living (e.g. only one wife per hunter) is a preferable option in easily accessible habitat to controlling them with sodium fluoroacetate (1080), brodifacoum, cyanide or any other forms of indiscriminate killing to waste.

Is it worth a try?"

Afterword

The jungle is my home. The animals are my friends.

Tarzan

“In spite of the range and extent of pest management activities, there is no clear picture of how the overall pest management system is performing...It is not clear how much the system is improving over time or which approaches are efficient and effective.”

So where is this bottom-line assessment coming from? None other than an official Ministry for Primary Industries document—*Measuring performance of pest programmes and the overall system*, published as part of MPI’s Biosecurity 2025 project. And a clearer indictment of the government’s own policies could not be found.

Careful attention to performance indicators is naturally integral and necessary to inform any long-term pest management programme—or any operational programme, for that matter. Absent such indicators, improvement in outcomes through a process of adjustment and refinement of strategy and operational tactics is virtually impossible.

As a result, New Zealand pest management policy lacks both efficiency and effectiveness, with no clear goals. Target pest species are regularly redefined. Forests are reported healthy, but just a few years later are declared on the verge of collapse. Trapping regimes that produce good results are abandoned. Species reintroductions are declared a success, and then found to be failures upon re-examination.

All the while, the continual bombing of a hazardous toxin into forests and streams proceeds without a “clear picture” of what is, or is not, being accomplished. Along with the lack of performance-related monitoring toward specific conservation goals, is an absence of accurate condition and trend surveillance surveys of “at risk” values and species. Abandoned are monitoring and studies that measure changes, not just of vegetation that may take years to decline or recover, but of countless non-target native species ranging from kārearea (*Falco novaeseelandiae*—the country’s most

threatened bird of prey), to ants, spiders, frogs, bats, morepork, weta, eels, koura and skinks.

Lack of clear progress toward stated goals reflects basic mismanagement. But failure to guard against the potentially dire consequences of poison-based pest programmes reflects gross irresponsibility and recklessness. Industry-bought “science” absorbs countless public dollars to buttress existing policy, but steers clear of any possibility of uncovering adverse impacts, unintended outcomes, or outright environmental damage. Rather than following the “precautionary principle”, precautions are taken to stay the policy course.

From the standpoint of New Zealand's native wildlife, the widespread use of aerial 1080 has proven feckless. To stumble and lurch—from rata to beech, from tui to robin, from kiwi to kea—would appear to be a recipe for environmental disaster. As a so-called conservation policy, it has threatened rural communities north to south, where informed opposition continues to grow.

As a contributor to the economy, the 1080 business could be outstripped by wild animal fur, pelt and meat industries. But as a threat to New Zealand's shaky green tourism brand, the 1080 poison strategy is an accident waiting to happen.

Indiscriminate dropping of 1080 poison has been a massive failed experiment in New Zealand, just as Chairman Mao's “Four Pests” campaign was in the People's Republic of China.

Yet, after more than a half-century, the experiment continues... doing more and more of the same and expecting different results.

To mass poison a landscape in the name of conservation is ecological madness. It is time to end New Zealand's addiction to poison 1080. It is time to respect our majestic natural environment. It is time to defend our entire and amazing wild animal kingdom.

People Who Have Helped

*Lots of people talk to animals - Not very many listen,
though - That's the problem.*

Benjamin Hoff

Illuminating conversations, lavish friendships, kindnesses and wisdoms have been shared by many mentioned here. But I am most grateful to my flown parents and my living whanau.

This book might have remained under a stone without the vision, knowledge and friendship of inveterate campaigner John Veysey together with Lynley Brown. And to my gracious farming friends, Theo and Anthea Ward, and the entire Ward family, including Ross Gardner, Clare and Philip, Marcus and Anne—heartfelt thanks. The two-of-a-kind friendship and in-depth scientific research of Pat and Quinn Whiting-O'Keefe is irreplaceable. I am grateful to Murray Dench for sharing vast knowledge and to Graham and Ann Sperry of NZ Wildlands Biodiversity Management Society Inc whose tireless volunteer work inspires others.

Special thanks for the hard work and compassionate input of fellow nature lovers; Wendy Pond, Cr Tony Brljevic and Wanda Brljevic, Kathy White, Lloyd Hanson, Ron Eddy, Bud Jones, Bill Wallace, Jan Schofield Eaton and Barry Eaton, editors Tom Look and Jennifer Greene and to campaigners and friends Diana Halstead, Dick Featherston, Arthur Attfield, Graeme and Julie Sturgeon, Philippa Gavey, Victor and Tania McLean, Peter and Val Findlay, Stephanie McKee and John Allen.

Writers and campaigners of the calibre of Tony Orman and Bill Benfield continue to bolster morale when the tide of poison propaganda seems overwhelming. And thank you to Carey Dillon for your original unpurenz site—kia kaha.

An immense debt of gratitude to Clyde and Steve Graf, whose documentaries *Shadow of Doubt* 2006 and *Poisoning Paradise, Ecocide New Zealand* brought the wilderness, its beauty and its sorrow into the living rooms of thousands throughout the world. A partial list of heroic conservationists, scientists, hunters, some who are creative friends, others who are longtime campaigners

and supporters includes, Craig Hodge, Jim Hilton, Michelle Terry, Colin Harris, Sheryl Jonson, Shelley Balsom, Peter Bacchus, Mock Johnstone, Sean Weaver, Margie Jarman, Clare St. Pierre, Anne and Flea, Bruce and Shelley Haynes, Wyn Hibberd, Shirley Hudson, Bruce Waldman, Phil Thomas, Mary Molloy, Peter Weir, Ursula Walsh, Egon Graf, Bryan Bassett, Euan McBeth, Neil Stewart, Rick Cooper, Marlene, John and Shane Thomsen, Percy Thomas, Richard Prosser, Naomi Pond, Dean Maisey, Peter Salter, Justine Giddy, Karl Halstead, Jocelyn Rae and Grant Fitz-William of Naked Possum café, Carol Sawyer, Hugh Barr, Mike Bennett of Barrytown, Laurie Collins, the Opie Seager family, Jack Wells, Craig Solomon, Peter Scanlan, John Fowler, Rodney Renata, Trevor Addenbrook, Robbie Graham, Lewis Hore, Steffan Browning, Noeline Gannaway, Sandra Goudie, Lloyd McQueen, Kate Winters, Barry Brickell, Coromandel Colville Community Board members with Chair John Walker, TCDC councillors with Chair Philippa Barriball, Radio Active in Wellington, Steve Veail, John Gardner, John Henderson, Betty Rowe, Daryl Crimp, Graham Hickling, Annette Kaye, Pim de Monchy, Karla Ailles, Kimberley Wilkinson—CAS room 17 and Douglas Rauch.

Several journalists reported fairly over the years including Norman Jones, Gerry Church, Kevin Ikin, Denis Welch, Colin Vincent, Martin Tiffany, Lesley Staniland, Matt Philp, David Green, Alison Smith, Shenagh Gleeson, Jeff Smith, Carly Tawhiao, Rachel Breckon and Angelique Jurd.

I would like to separately acknowledge those we have lost during this struggle. Hahei icon Charlie Harsant, respected Ngāti Hei kaumātua Peter Tiki Johnston, and Colville farmer and friend Rex Denize. Anne Ward's passing meant decades of conservation and farm work and voluntary contributions to our community were stopped in their tracks. "Haere, haere, haere."

Earlier volumes mention the sad losses of Betty Rowe, Mike Meads, Bill Lightfoot, John Henderson, John Goudie and Philip Ward together with an encomium for Bill Axbey. Their legacies live on in the hearts and minds of our rural communities and beyond.

Coming from disparate disciplines—ranging from forensic entomology, wildlife veterinary pathology and ecological science to mathematics, chemistry and herpetology—the following list of scientists have chosen to speak against orthodoxy. They include Jamie Steer, Quinn Whiting-O'Keefe, Professor Ian Shaw, Peter

Scanlon, Professor Fiona McQueen, Graeme Caughley, Thane Riney, William Graf, Maggie Jarman, Sean Weaver, Kevin Prime, Rebecca Reider, Miranda Sherley, Mike Meads, Pat Whiting-O'Keefe, Jim Hilton, Jason Byrd, David Obendorf, Bruce Waldman, Peter Notman, Dr Jo Pollard, Alexis Pietak, Dr Meriel Watts, Marc Bekoff, Peter Scanlon, Annie Potts and Wayne Linklater, Nathan Winograd, Clive Marks and Robyn Kippenburger.

Appendix I

Guidelines for the Safe Use of Sodium Fluoroacetate (1080) OSH/
Department of Labour 2002

Formulations and Methods of Use

New Zealand is the largest user of 1080 in the world. It is imported as a relatively pure (at least 98%) powder, from which various formulations are prepared at specialist factories. It is then distributed to user organisations, by far the major ones being the Regional Councils, government departments such as DOC and MAF, and on a more limited scale, other research institutions. All of these must have approved operators to order the product. There are three major types of 1080 preparation: the stock solution (20%), 1080 pellets, and various pastes and gels. The stock solution is used at the factories in the production of pastes and pellet baits, but can also be sold directly to clients for application to field-prepared baits based on carrot or oats. Paste or “jam” baits often comprise apple pulp as the major constituent to which is added preservative, a “lure oil”, green dye and 1080 solution, giving a final strength of 0.06%, 0.08% or 0.15%. The pellet baits incorporate various types of cereal, dye and 1080 in concentrations ranging from 0.02% for rabbits and to 0.15% (and possibly even 0.3%) for deer. For possums, the usual strengths used are 0.08% and, increasingly, 0.15%. Baits can range between 1 – 20 grams in weight. The paste preparations are often applied with a so-called “jam gun” to pastoral areas, often to a sod upturned by an implement generally known as a grubber. “Mastic guns” can also be used to apply paste either to bait stations (often placed horizontally for weather protection) or more directly to trees. Gels at 5 and 10% 1080 are applied directly to foliage; gel bait blocks 0.15% are placed in bait stations. There is also a fish-based paste 1% 1080 registered by DOC for use against wasps—though it hasn’t been used for quite some time, the registration is still current while safer alternatives are explored. The great majority of pellets are used in aerial applications. At the landing strip the 25kg bags are cut open and the pellets tipped into

a container, from which they are loaded into the aircraft hopper, this procedure often occurring at about face level. At this stage the pellets are dry with usually some debris at the bottom of the bag, which can form an airborne dust when it is upended. Pellets are also used in bait stations. Field-prepared baits involve application of appropriate dilutions of 20% stock solution to a known weight of carrot. Preparations include 1 to 9 or 2 to 8 dilutions with water, giving 2% or 4% solutions. Ten litres is then sprayed onto 1 tonne (1000kg) of carrot, giving a final average level in carrot of 0.02% or 0.04%. Occasionally 0.15% bait strength may be produced from application of a 15% solution, and 0.08% strength is also used. Large operations may involve any of four types of carrot cutter: the Bental, Gibson, Haldee and Reliance. The spraying operation is an enclosed process. Concrete mixers may be used for small amounts.

Appendix II

Murray Dench letter 22 August 2007 to Andrea Eng, ERMA General Manager Hazardous Substances

I have now finished reading through the full decision document ERMA prepared for the Review of 1080 under evaluation number HRE05002 and have some concerns to discuss with your organisation. While I appreciate that the review process was long and probably stressful and you have no desire to continue to debate the issues ad infinitum I feel the need both as a submitter (9156) and as a concerned Kiwi to express my concerns...Section 10.3.48 displays a complete lack of understanding of how baits are delivered into the forest environment. Baits do not drop straight down from the aircraft and land gently on the forest floor as the 'major study' quoted above seems to assume.

The baits are hurled off a rapidly spinning distribution disc from an aircraft flying at something around 100 knots, the energy stored in the baits is enormous and they ricochet down through the forest canopy, off tree trunks and off the ground until the energy is dissipated and the baits roll to a stop. Every impact dislodges poison and every contact wipes off more. To claim that only a 20 cm circle around the, finally stationary bait has poison, which is accessible to invertebrates, indicates that the applicants have absolutely no idea what happens to the baits during the delivery process. The manual placement of baits on a forest floor for a scientific study can never replicate the actual operational distribution of them. Some problems with bait distribution density have been discussed in the DGPS section but there are others, which the ERMA decision also ignored—

1. Any poison which drains out of the aircraft hopper during transport to and from the delivery area either drips onto the spinning disc and is flung out as a fine aerosol or is picked up in the machines slipstream and delivered in a plume to whatever happens to be below. I am not familiar with the characteristics of pollard baits but with carrot baits the poison solution and carrot juice combine to create

quite a volume of lethal fluid available to drain out of the base of the hopper over areas outside the 'treatment' zone.

2. When relatively fragile cereal pellets drop onto the spinning disc the energy available to accelerate them out into the distribution pattern is more than enough to damage the integrity of the pellet and create vast amounts of frass (fine bait dust). This frass generation is clearly seen in video of helicopters sowing cereal baits.
3. This large volume of frass contains the highest concentration of 1080 per unit volume.
 - a. It coats the forest with the poison to a much greater extent than complete baits can.
 - b. It blows much further off target in wind currents.
 - c. It lodges more readily in the forest canopy (in the feeding zones of the many birds, insects, and caterpillars.)
 - d. The small particles minimise uptake by possums and rats so poison shyness and inherited resistance will become issues.

1080 is a powerful contact and systemic insecticide. Spreading frass like this is similar to dusting the forest insects with Malathion or carbaryl.

Appendix III

Quinn E. Whiting-O’Keefe public testimony (full testimony available at <http://1080science.co.nz/wp-content/uploads/2014/05/testimony.pdf>)

“There is overwhelming published scientific evidence of harm to many native species including: Robins [[i], [ii], [iii]] , Wekas [[iv]], Keas [[v]], Tomtits [i, [vi]], Fernbirds [[vii]], Moreporks [i, vii, viii] and others. To call this a “risk” is to greatly diminish the extent of the danger. It is not a risk; it is a known certainty that is well documented in DOC’s own publications, such as by Veltman in 2010 [[viii]]. Occasionally even DOC admits that effects on populations are not known [[ix]]. To compound the direct killing of native birds there is strong evidence of unanticipated negative effects and other collateral damage, such as,

- secondary poisoning of predators species such as the Morepork, New Zealand’s only native owl, [x]
- mustelids switching their food to native birds when their usual prey of rats is killed by 1080 drops [[x]i],
- three-fold increase in rat populations 24 months after a 1080 drop [[xi]i], and
- as much as 50% mortality among native invertebrates [[xii]i].

“None of this is surprising. These are exactly the kinds of effects that ecological science predicts will certainly occur when an ecosystem is presented with the kind of global disruption that DOC’s use of aerial 1080 represents. In fact, it is nothing short of ecological insanity.

- i Powlesland R. Knegtmans J. Marshall I. *Evaluating the impacts of monofluoroacetate possum control operations on North Island robins, North Island tomtits and moreporks at Pureora - preliminary results* Science for Conservation 74: 1-22 1998 >
- ii Powlesland R. Knegtmans J. Styche A. *Impacts of aerial 1080 possum control operations on North Island robins and moreporks at Pureora in 1997 and 1998*. Science for Conservation 133: 1-20 1999>

- iii Powlesland R.G. Knegtmans J.W. Marshall ISJ. *Costs and benefits of aerial 1080 possum control operations using carrot baits to North Island robins (Petroica Australis Longipes), Puerora Forest Park. New Zealand Journal of Ecology* 23(2): 149-159 1999>
- iv vanKlink P.A. Tansell A.J.S. *Western weka (Gallirallus australis australis) monitored before and after an aerial application of 1080 baits in the Copland Valley, Westland National Park. Department of Conservation Science Internal Series* 108 2003 >
- v Easton P. *DOC reviews 1080 use after endangered kea die. Dominion Post* 30 July 2008 >
- vi Powlesland R. Knegtmans J. Styche A. *Mortality of North Island tomtits (Petroica macrocephala toitoi) caused by aerial 1080 possum control operations, 1997-98, Pureora Forest Park. New Zealand Journal of Ecology* 24(2): 161-168 2000 >
- vii Walker K. *Effect of aerial distribution of 1080 for possum control on weka, great spotted kiwi, morepork and fernbird. Ecological Management* 5: 29-37 1997 >
- viii Veltman C.J. Westbrooke I.M. *Forest bird mortality and baiting practices in New Zealand aerial 1080 operations from 1986 to 2009. New Zealand Journal of Ecology* 35(1) 2011>
- ix Johnson G. Donoghue K. *Application to Environment Canterbury for a resource consent: AEE for rabbit control on public conservation lands in Mackenzie Basin, Waitaki Valley and Aoraki/Mt Cook National Park Twizel/Te Manahuna Area Office, DOC* 22 August 2008>
- x Hudson S. *Cost of Aerial 1080 based on AHB data. Hokonui Aerial Costs* 2004
- xi Murphy E.C. Clapperton B.K. Bradfield P.M. Speed HJ. *Effects of rat-poisoning operations on abundance and diet of mustelids in New Zealand podocarp forests New Zealand J of Zoology* 25:315-328 1998>
- xii Ruscoe W. Sweetapple P. Yockney I. Pech R. Barron M. Cave S. Ramsey D. *Interactions of mammalian pest populations (rats) following control Kararehe Kino Vertebrate Pest Research* 13, 4-6, December 2008>
- xiii Meads M. *Effect of sodium monofluoroacetate (1080) on non-target invertebrates of Whitecliffs Conservation Area, Taranaki Unpublished; Landcare Research Contract Report: LC9394/126* 1994>

Appendix IV

Stopping the Runaway AHB Gravy Train Upper Coromandel Landcare Association opinion piece *Farmers Weekly* 18 January 2010...

Farmers facing uncertain returns, increased regulation and cost-loading by regional councils, and the mounting complexities of stock management shouldn't be asked to support a futile "war without end" declared by self-serving industry bureaucrats. The problem for farmers is the Animal Health Board (AHB) itself and its impossible to achieve, total eradication programme for bovine Tb in some wild animals, notably possums. The problem is AHB's mission creep and its hopeless plan to poison its way to a Tb-free New Zealand with ever more tonnage of 1080 supertoxin spread throughout the country. To be sure, every farmer takes the threat of bovine Tb seriously. But what every farmer knows is that the steep increases in Tb-infected herd numbers result from movement of infected stock into Tb-free areas, not possums deep in the bush. Rather than funding unrealistic AHB eradication policies, many farmers would appreciate rigid control of herd movements instead, a 100% accurate skin test, and a vaccine to halt spread of the disease. Out of a total AHB budget of \$82 million this year, less than 1% goes to vaccine research. And by the way, where is the 100% accurate skin test research budget? It's easy for farmers to forget that the original plan upon formation of the Animal Health Board was for AHB to be a temporary organisation with a specifically limited lifespan. That's right. The plan was to phase out AHB by a 2013 deadline, when the operation would die a natural death. But instead of working toward acceptable and achievable goals, this so-called "registered charitable organisation" has been conjuring new ways to grow their budget instead. And what bunch of bureaucrats wouldn't do the same? Just look at the AHB gravy train. Its CEO enjoys a whopping corporate-style salary of \$370,000. Its administration budget including travel expense tops \$6 million each year, with 12 staff earning more than \$110,000—pretty rich for a so-called "charity". So it's naïve to think that the smart folks

at AHB would want to wind up affairs and put themselves out to pasture. What's in it for AHB to resolve the bTb problem with herd controls, strict testing and vaccines? When you're a business, your job is to grow the business. And therein lies the problem for farmers, who together with taxpayers and ratepayers, will be fleeced by the fantasyland eradication programme and swamped by an AHB propaganda machine in league with the so-called Department of Conservation, regional councils and Forest & Bird. The mantra of "1080 Is a Necessary Evil" is good for budget growth and job security at AHB. Rule of thumb residual trap catch targets for possums are currently based on zero rigorous science. They are completely unproven and unsubstantiated. Good hunting and trapping on farm margins could virtually eliminate the bTb threat from wildlife vectors – and at a tremendous cost savings. But if you reduce your costs you shrink the bureaucracy. And what red-blooded AHB bureaucrat wants to do that?

AHB's support among farmers is increasingly shaky because their strategy simply has not worked. At the same time, trying to wipe out Tb using 1080 is causing massive collateral damage to native species and endangering our tourist and export sectors as well. Now on the back foot, AHB through its front lobby group "Tb-Free NZ" is trying to artificially drum up support in the farming community. Farmers have been told to get "more vocal" in their support for 1080 poison for possum control. Meanwhile, AHB is tapping new revenue sources never before dreamed of. In the Waikato, the country's most aggressive policy expanding regional council, Environment Waikato, is now ripping off small-scale (4ha and up) landowners, including many who live hours from the nearest infected herd, to pay for AHB's executive bloat. EW has started siphoning more than \$650,000 annually from the wallets of vegetable growers, orchardists and owners of modest sections to "help" AHB reach their impossible goal.

It's getting high time that AHB and Federated Farmers heed concerns expressed by Farmers Against Ten Eighty (FATE) who advocate an end to the broad-scale, indiscriminate and failed policy of dumping toxin 1080 into our wilderness. FATE farmers are aware that trapping spares massive numbers of native species, avoids the boom and bust ecological damage of aerial 1080, and as confirmed by DOC itself, is the most successful and least expensive possum control strategy. They are also aware that farmers pay the

price of AHB's policy failures. That's the problem. But there is an easy solution. It's time for AHB to be dissolved as was originally intended. It's time for AHB to hang up their Red Bands and transition all their responsibilities and activities to the appropriate respective government agencies. Costly, redundant and misplaced activities need to grind to a halt. Overpaid bureaucrats need to be put to pasture. Bovine Tb funds should be spent for a decent vaccine, a 100% accurate skin test and rigorous monitoring of herd movements. It's time for AHB to declare victory and go home. Nobody would have a beef with that."

Appendix V

Andrea Eng, ERMA General Manager Hazardous Substances letter of 16 March 2007 dismissing the request for recusal.

“As you will appreciate, there is a relatively limited pool of ecologists in New Zealand who have the requisite background and knowledge...A check was made with Dr Sadleir about any potential conflicts of interest and the Authority is fully confident that he will apply his scientific training in a balanced consideration of all aspects of the application.”

Pat and Quinn Whiting-O’Keefe’s second letter, on March 22 to the ERMA members, the ERMA Ethics Advisory Board, the members of the proposed 1080 committee and Rob Forlong. “While Sadleir was director of scientific research at DOC, his organisation suppressed the publication of at least one study that would have jeopardised DOC’s aerial 1080 programme had the results become publicly known. It was entitled Effect of sodium monofluoroacetate (1080) on non-target invertebrates of Whitecliffs Conservation Area, Taranaki. M. Meads submitted for publication in 1992. We have analysed this paper in our submission as well as the counter paper by Spurr that DOC immediately commissioned after the Meads results were known. We urge you to review that chapter in our submission for a detailed account. However, a summary is as follows. DOC’s claim (under Sadleir’s control) was that the Meads paper was “scientifically flawed”, so much so that even though it was of enormous potential importance it should not see the light of day. We have read the original internal peer reviews of the paper which are detailed, exhaustive and, indeed, seemingly excessive. In no case do any of the reviewers challenge the basic conclusion of the paper that massive numbers of invertebrates were killed when compared to the not-poisoned area, nor do any of the reviewers suggest that the study should not be published. Yet DOC Research refused to allow it to be published. In dramatic contrast DOC Research seized upon the Spurr study which, though using a similar methodology (taught to Spurr by Meads), failed to detect a difference between poisoned and not-poisoned areas.

Spurr then went on to conclude erroneously that there was no difference despite admitting that he had little chance of detecting a less than 50% death rate. The Spurr paper is so badly analyzed and misinterpreted that we requested the raw data so that it could be properly analysed, but Spurr is "unable to locate it". To refuse to publish the Meads paper while extolling the dubious negative finding of the Spurr paper as the definitive answer to the question of the effect of aerial 1080 on invertebrates is simply outrageous. One only needs to read the two papers to determine this for oneself. Yet Sadleir appeared on the investigative television programme "60 Minutes" in 1997, two years after leaving DOC, and stated that the Meads paper was not published because it was "not scientifically valid". He went on to accuse Meads of being "unethical" though he failed to state in exactly what way Mr. Meads had been unethical..."

Appendix VI

The Guardian Weekly 30 December 2011 *Experiment shows that rats have feelings too*

“Neurobiologist Peggy Mason together with graduate student Inbal Ben-Ami Bartal and researcher Jean Decety from the University of Chicago found rats quickly learn to free a trapped cage-mate, even when they get nothing in return, or when there’s a tasty chocolate distraction around. They surmised, therefore, rats conduct their prison breaks because they empathise with one another. This ability to understand and share the feelings of another individual is found in humans, apes, dogs, elephants, dolphins and other intelligent animals... but psychologists have wondered whether the rats stopped pressing the levers out of concern for their fellows, or for fear their own floors would be electrified. Bartal needed a new experiment. She kept her rats in pairs for two weeks, and then placed one of them in a cage. The trapped rats were clearly stressed – Bartal used a bat detector to show that they were occasionally making high-pitched alarm calls. Their partners could free them by pushing against a restraining door and tipping it over. That’s what they did, although most took a week to learn how. Bartal found the rats spent more time exploring the cage and were more likely to open the door when there was another rat inside. It didn’t matter if the liberated rat got nothing in return. When Bartal changed the set-up so the only exit from the cage led to a different arena, the free rat still opened the door for its colleague, who promptly scurried away. Even when the rats were faced with a second cage containing delicious chocolate chips, they freed their cage-mate as often as they went for the food. They even shared their chocolate bounty with their liberated pals. ‘Empathy is a truly powerful motivator, on a par with the desire for chocolates!’ says de Waal. Stephanie Preston, who works on animal emotions, says that Bartal has strengthened the case made by the studies from the 50s and 60s. ‘As shown previously, the rodents were not only empathically aroused by the emotion of [another rat] they took direct action to help. This is the definition

of empathy,' she says. There are alternative explanations, but none of them are strong."

NZ Listener April 30, 2011 Review of TC Boyle's latest novel *When the Killing's Done*

"Alma wants to eradicate invasive predators so the native fauna on an island can flourish: this entails killing the predators. Cave is a hippie businessman who hates killing. Both see themselves as environmentalists, and both want to save animals—but different ones. Do rats have the right to life if their lives entail the killing of birds? If you want to save birds, why do you give them more rights than rats or pigs? And who has the right to decide? It's not a trivial question."

Mason G. and Littin K.E. *Humaneness of rodent control* 2003

"Rodent control: a welfare anomaly? From the evidence in this paper, we can see that rodents are routinely subject to cruelty. This highlights an interesting paradox in the way we treat different classes of animal. Animals killed for food, research or their fur are never legally permitted to suffer for hours, let alone for days. Indeed in laboratories, slaughterhouses and veterinary practices, acceptable killing methods usually have to act in seconds (eg Broom 1999). The situation for rodent pests is thus very anomalous. Furthermore, if pets or research animals are lethally poisoned with calciferol or anticoagulants, they are often euthanased rather than being left to die (eg Hatch & Laflamme 1989; Talcott et al 1991; Johnson & Prescott 1994; Rumbeiha et al 1999), even if they are wild rodents (eg Gill et al 1994; PSD 1997). Thus in some circumstances the inhumaneness of these rodenticides, including to rodents themselves, is acknowledged—and yet in control situations it is largely ignored. Such issues are particularly important because of the enormous scale of rodent control. Even thirty years ago, Scott (1969) lamented "the atrocities ... inflicted on many millions of animals", and little has changed today: annually, millions of rodents are killed using inhumane methods."

Endnotes

Whatungarongaro te tangata toitū te whenua

As man disappears from sight, the land remains

- ¹ Stenersen, Jorgen *Chemical Pesticides Mode of Action and Toxicology* CRC Press 2004

“Paracelsus regarded Nature as a living organism and an expression of the One Life, and man as a microcosm of Nature and the Universe. He believed that health arose from the harmony between the microcosm (man) and the macrocosm (Nature).”

Paracelsus. (2015, March 23). *New World Encyclopedia* Retrieved 15:08, October 4, 2016 from <http://www.newworldencyclopedia.org/p/index.php?title=Paracelsus&oldid=987005>.

- ² McLeod L. Saunders G. *Pesticides used in the Management of Vertebrate Pests in Australia* NSW Department of Primary Industries 2013 (Marais 1944) (Rammell E.G. Fleming P.A. 1978, Aigueperse et al. 2005) Briggs, Shirley and the staff of the Rachel Carson Foundation *Basic Guide to Pesticides—Their characteristics and hazards* 1992 “Extremely toxic to warm-blooded animals.”

- ³ Twigg L.E. King D.R. *The impact of fluoroacetate-bearing vegetation on native Australian fauna: a review* 1991

Kalmbach E R “Ten eighty,” *a war-produced rodenticide* Science 1945

Sodium monofluoroacetate was patented as an insecticide in 1927 (Twigg and King 1991), and can act as a systemic and contact insecticide (David 1950)

Eisler R. *Sodium Monofluoroacetate (1080) Hazards to Fish, Wildlife and Invertebrates: A Synoptic Review* 1995

- ⁴ <http://anpsa.org.au/APOL7/sep97-4.html>

https://en.m.wikipedia.org/wiki/Sodium_fluoroacetate

- ⁵ <http://safe.org.nz/Campaigns/Ban-1080/>

Registered for use in Australia, Canada, US, Israel and South Africa *Farmers Weekly* 6 November 2006

- ⁶ Weaver, Sean *Policy Implications of 1080 Toxicology in NZ* *Journal of Rural and Remote Environmental Health* 2003

- ⁷ In April 2016 the National Government proposed changes to the Resource Management Act taking authority from regional councils to central government “to make the system easier and cheaper” according to Environment Minister Nick Smith. The new regime began in April 2017.

- ⁸ <http://www.scoop.co.nz/stories/SC1503/S00046/peta-on-the-1080-threat.htm>

<http://www.farmweekly.com.au/news/agriculture/agribusiness/general-news/report-finds-1080-an-inhumane-poison/56570.aspx>

http://wlpa.org/1080_poison.htm

"The poisoning itself can be viewed as un-humane and cruel by some people. Poisoning suggests that these pests die a painful death. Being poisoned must be an extremely painful feeling and suffering for humans or animals is not a fair concept, thus 1080 is a cruel activity for the abolition of pests." https://geog397.wiki.otago.ac.nz/index.php/Against_1080

A film clip showing the gruesome deaths of Paul Anderson's dogs where he had no firearm to end the horror. https://www.youtube.com/watch?v=_fki_cg0F4k&feature=youtu.be

How Humane are our pest control tools? (09-11326) MAF Biosecurity New Zealand Technical Paper No: 2011/01 Landcare Research 2010 Key staff listed: Penny Fisher and Bruce Warburton, Ngaio Beausoleil and David Mellor. They inevitably advocate the "need (for) more research on 1080" and recommend replacing 'humaneness' with the less emotive 'animal welfare impact'. The excerpt below makes sober reading and documents some toxic effects on possums.

"Lack of coordination began 3 hrs 37 min ($\pm$ 32 min) after dosing, then possums spent most of the time until death lying, showing spasms and tremors. Five showed seizures while lying prostrate.... Yockney and Anderson (2009): In a field experiment, time to death in possums after poisoning varied considerably between 5.2 hrs and a maximum recorded 93.9 hrs (mean 30 ± 4.8 hrs)." and

1990 data on Forest Research Institute letterhead lists two potent anti-emetics, (acepromazine and prochlorperazine) were used to halt 1080-induced vomiting in pigs.

Cowan, Phil & Brown, Sam *A Review of Best Practice Management for Humane and Effective Vertebrate Pest Control* June 2012 Technical paper No 2012/28 Landcare Research for MPI "The Animal Welfare Act 1999 (with its various amendments and orders) applies to acts of cruelty or ill-treatment committed against pests, wild animals, and animals in a wild state, but does not apply to hunting or killing of these animals. It also does not apply to the use of registered pesticides ("Vertebrate Toxic Agents") under the Agricultural Compounds and Veterinary Medicines Act."

- ⁹ WHO Data Sheet on Pesticides #16, 1975. Read in full at http://kaka1080.co.nz/1080_toxicity_who.html. 1080 interrupts the "Krebs cycle by the formation of fluorocitric acid that inhibits aconitase and results in the accumulation of citric acid. The fluorocitric acid is itself very highly toxic, and therefore sodium fluoroacetate can cause secondary poisoning, i.e. poisoning in an organism which has consumed a part of an organism already poisoned...Containers must either be burned or crushed and buried below topsoil. Care must be taken to avoid subsequent contamination of water sources..."

http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0007/486187/Pesticides-used-in-the-management-of-vertebrate-pests-in-australia-a-review.pdf

<http://www.scoop.co.nz/stories/SC1409/S00058/mt-pirongia-poison-drop-breaches-1080-warning-label.htm> "The New Zealand manufacturer's (owned by NZ Govt) 1080 poison label includes the following warnings - "Ecotoxic", "Toxic to terrestrial vertebrates." "Take measures to reduce non-target animals being exposed to the toxin either through eating the baits or by scavenging the carcasses of poisoned animals." "Harmful to aquatic organisms." <http://www.pestoff.co.nz/assets/LabelV2189.pdf>

<http://www.pestoff.co.nz/assets/LabelV3785.pdf>

<http://www.pestoff.co.nz/assets/LabelV2538.pdf>

1080 poison is subject to the Hazardous Substances and New Organisms Act 1996 (HSNO), Agricultural Compounds and Veterinary Medicines Act 1997 (ACVM), Health and Safety in Employment Act 1992 (HSE), Land Transport Act 1998 (LTA), Civil Aviation Act 1990 (CAA) and Resource Management Act 1991 (RMA).

- ¹⁰ *pers comm.* to J. Veysey—"the only way that 1080 breaks down in water is via bacterial action. Thus if there are few or no bacteria, there is slow or no breakdown and it is (potentially) stable. Secondly, if a large animal such as a deer, a dog or a steer receives a large dose, is killed and its carcass ends up in a stream, then because all the microbes that breakdown the carcass are poisoned by 1080, the carcass lasts a long time and can be leaching 1080 to the water the whole time. If the stream is fast running and has reasonable volume, this may not be an issue, but if not, then there could be a risk involved with drinking the water (or feeding on the carcass) for a long period of time."

<http://www.tbfree.org.nz/Portals/0/NIWA%27s%20Suren%20report%20into%201080%20leaching%20into%20soil%20and%20water%20.pdf>

Jarman, Margaret "*The Salt and Vinegar Story* was originally written by this chemist, at the behest of Graham Sperry for inclusion with the first DVD done by the Graf brothers ... and at the time of the buildup to the ERMA 1080 Review, as part of the Environmentally Safe Pest Control (ESPC) submission. "Some claim that adding water, as in rain spontaneously causes the dissociation of the fluorine and acetate part of the 1080 molecule. This in turn has led to the 'myth' that 1080 breaks down into harmless by-products, namely "salt and vinegar". Salt (or common table salt) is sodium chloride (NaCl). Vinegar (or acetic acid) is CH_3COOH . Sodium monofluoroacetate cannot "break down" into salt and vinegar. It does not contain the element Chlorine (Cl) so cannot form table salt. Vinegar cannot be a product of the degradation of sodium monofluoroacetate. ...When water is added to sodium monofluoroacetate it "dissolves" but does not lose its integrity. It is diluted, but the molecules are still sodium monofluoroacetate molecules. When you add coffee powder or granules to water they dissolve, but you are still drinking coffee. Conclusion: The information given to the public, about the break down of 1080 into harmless products is incomplete and incorrect. This needs to be acknowledged by

- the agency responsible, namely Forest & Bird..." Her full report can be read at <http://1080science.co.nz/1080-chemistry/>
- ¹¹ Axbey, Bill *NZ Outdoors* 2006
- ¹² Robertson H.A. Colbourne R.M. Graham P.J. Miller P.J. Pierce R.J. *Survival of brown kiwi (apteryx mantelli) exposed to brodifacoum poison in Northland New Zealand* NJJE 1999
- ¹³ Lyver P.O. Ataria J. Trought K. Fisher P. *Sodium fluoroacetate (1080) residues in long-fin eels Anguilla dieffenbachii, following exposure to contaminated water and food* New Zealand Journal of Marine and Freshwater Research 39: 1234–1252 2005 <http://www.radionz.co.nz/audio/player/20151607>
http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11336612
Suren A. Bonnett M. *Consumption of baits containing sodium fluoroacetate (1080) by the NZ freshwater crayfish* New Zealand Journal of Marine and Freshwater Research 2006
- ¹⁴ Ataria et al (2000) studied the sub-lethal effects of 1080 on adult male mallard ducks (*Anas platyrhynchos*), and found skeletal muscle suffered 1080 damage. Quote from Weaver S. *A Review of Toxicological Research on Sodium Monofluoroacetate (1080) and its Policy Implications* 2003
McLeod, L. Saunders, G. *NSW Department of Primary Industries Pesticides used in the Management of Vertebrate Pests in Australia* 2013
- ^{14a} Pollard, Jo *1080 poison: science and facts* May 24 2011
- ¹⁵ <http://www.stuff.co.nz/the-press/news/9364781/Trampers-1080-poison-landed-on-us> November 2013 and September 2014:
http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11329410
- ¹⁶ Coleman J.D. Pech R.P. Warburton B. Forsyth D.M. *Review of Research into Alternatives to the use of 1080 for Management of Browsing Damage by Mammals in Tasmania* Rylah Institute for Environmental Research Department of Sustainability and Environment 2006
http://www.wildlifeadvocate.com/pdf/1080_Submission.pdf
- ¹⁷ "95-98% find the poisoning of deer and pigs unacceptable...95% prefer to see some commercial use made of animals...88% felt that control methods should conform to some minimum standards for humaneness." Fraser, Landcare Research "females objected to the use of poisons more than males." Sandborn and Schmidt. "73% find the poisoning of possums with aerial 1080 unacceptable." Wilkinson, R. and Fitzgerald, G. Landcare Research
- ¹⁸ Crawley M.C. *Wildlife Conservation in New Zealand* 1982 NZJE
- ¹⁹ Clark, Professor Walter Sept 11, 2010 *NZ Listener* and <http://www.parliament.nz/resource/0000189178>
- ²⁰ *ibid.*

- 21 Sperry, Graham & Ann (Wildlands Biodiversity and Game Management advocates) *A brief background to the introduction of 1080 poison into the forests New Zealand* 2006
- 22 Atkinson I.A.E. Campbell D.J. Fitzgerald B.M. Flux J.E.C. Meads M.J. *Possums and possum control; effects on lowland forest ecosystems A Literature Review with specific reference to the use of 1080*. 1995 Atkinson I.A.E. Campbell D.J. Fitzgerald B.M. Flux J.E.C. Meads M.J.
- 23 *Rural News* June 26, 2007
- 24 Sperry G. & Sperry A. *A brief background to the introduction of 1080 poison into the forests New Zealand*
- 24a Philp, Matt *A Toxic Debate* (March 2009) *North & South magazine*
- 25 Manktelow D. Stevens P. Walker J. Gurnsey S. Park N. Zabkiewicz J. Teulon D. Rahman A. *Trends in Pesticide Use in New Zealand 2004 Report to the Ministry for the Environment*, Project SMF4193 November 2005 <http://dioxinnz.com/Spray-NZ-Hist/PDF/nz-pesticide-trends.pdf>
<http://dioxinnz.blogspot.com.au/2014/03/trends-in-pesticide-use-in-new-zealand.html>
Tomlin C. *The Pesticide Manual A World Compendium* 2009
Watts M. *Proposal for a Pesticide Risk Reduction Policy for New Zealand* 1997
“NZ is one of the few OECD countries to have no pesticide risk reduction policy.” http://www.nzpps.org/journal/50/nzpp_504980.pdf
Guardian Weekly 25 October 2013, notes wild bird numbers continue to decline in UK. Since 2003 a 13% decline in farmland birds and over 40 years the population has halved. Woodland birds are down by 17%. The article mentions how pesticides leave birds with less prey.
- 25a *NZ Listener* April 13, 2013 Mike Joy quoted in the *International Herald Tribune*
Agar, Jeremy CAFCA September 2017 review *Polluted Inheritance* Mike Joy BWB 2015
- 25b http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0007/486187/Pesticides-used-in-the-management-of-vertebrate-pests-in-australia-a-review.pdf Laboratory studies have shown rats (*Rattus norvegicus*) are capable of developing genetic resistance to 1080 and some strains are quite resistant to 1080 (Kalmbach 1945, Chenoweth and Gilman 1946, Ward and Spencer 1947, Foss 1948, Howard et al. 1973). It is not known how much inherited resistance has been produced in wild populations.
- 25c Cowan P. Gleeson D. *Rats and resistance to anticoagulants—a problem in New Zealand?* Protect 2011 NZ Biosecurity Institute newsletter
- 26 *Radio New Zealand* 17th September 2016
- 27 *Insects at Risk in Forest & Bird magazine* November 1999
- 28 *ibid.*
- 29 Clayton R. Cowan P. *Management of animal and plant pests in New Zealand—patterns of control and monitoring by regional agencies* 2009

- 30 Linklater W. quote on Facebook's *Stop Poisoning my Whenua*
Parkes J. Nugent G. Forsyth D.M. Byrom A.E. Pech R.P. Warburton B. Choquenot D. *Past, present and two potential futures for managing New Zealand's mammalian pests* 2016 The Abstract concludes, "The national scale pest-or predator-free aspiration is not currently (and may never be) feasible and risks diverting resources from more optimal solutions, as occurred with the 'last rabbit' and 'last deer' programmes promoted last century"
- 31 Lloyd B. McQueen S. *Measuring mortality in short-tailed bats (Mystacina tuberculata) as they return from foraging after an aerial 1080 possum control operation* NZJE 26:53-59. 2002
- 32 <http://www.stuff.co.nz/the-press/news/9070628/Kea-killed-in-1080-operation>
<http://greystar.co.nz/content/more-kea-poisoned-1080-drop>
- 32a Pietak, Alexis Mari A *Critical Look at Aerial-Dropped, Poison-Laced Food in New Zealand's forest Ecosystems* 2010 Creative Commons
- 33 *Proceedings of a Workshop on Possums as Conservation Pests. Possum and Bovine Tb control* NSS Committee 29-30 November 1994 John Parkes: *Relative Pestiness—Species Priorities and Interactions. Are possums the problem?*
- 34 New Zealand Export Beef Trend Beef Shipments to USA, NZ Economic Service Statistics NZ 2013
- 35 <http://www.doc.govt.nz/about-us/our-role/our-history/a-short-history-of-doc/the-early-1990s/> "Field centres around the country joined the lolly scramble to inject more cash into their programmes."
- 36 *The Dominion Post* 12 January 2017
- 37 *Organic NZ* Jan/Feb 2015 New Zealand baby food has 800 times more pesticides than in European baby food—"some pesticides found are carcinogens and endocrine disruptors, for which no safe level has been scientifically established." Meriel Watts of Pesticide Action Network Aotearoa explained, "Extremely low doses which may not have an immediate effect on adults can critically interfere with children's ongoing developmental processes. One of the key outcomes of exposure to even tiny amounts of pesticides like chlorpyrifos is lowered IQ and delayed development."
- 38 Innes J. Barker G. *Ecological consequences of toxin use for mammalian pest control in New Zealand - an overview* *New Zealand Journal of Ecology* 1999
- 39 Fraser A. *Public Attitudes to pest control: A literature review* DOC Research and Development Series 227 2006
Fraser A. *Introduced Wildlife in New Zealand, A survey of general public views* Landcare Research Science series No 23 2001
Wilkinson R. and Fitzgerald G. *Public Attitudes towards possum fertility control and genetic engineering in New Zealand* 2006 Landcare Research Science series No 29
- 40 http://seecnz.blogspot.com/2011/02/1080-facts_01.html

- ^{40a} Pure 1080 is used in laboratory animal experiments as disclosed during the 2015-16 police campaign to find the perpetrator of what was originally categorised as an act of eco-terrorism. <http://www.radionz.co.nz/news/national/299697/1080-blackmail-'despicable-behaviour'>

Operation Concord exposed innocent families to hours of police interrogation and highly respected members of rural communities were subject to visits and interviews by police.

- ⁴¹ Memo 16 September 1991 signed by CEO of the National Council of the New Zealand Local Government Association Inc. (NZLGA) Mr. B C McLay

⁴² *ibid.*

⁴³ *ibid.*

⁴⁴ *ibid.*

⁴⁵ *ibid.*

- ⁴⁶ Reeves, Jay AP News, 13 December 2004

- ⁴⁷ *Straight Furrow* 11 May 1998 report by Terry Brosnahan

⁴⁸ *ibid.*

⁴⁹ *ibid.*

- ⁵⁰ Emrys, Geraint Chief Advisor, Occupational Health 7 September 2007 letter to UCLA

- ⁵¹ Eason C. Warburton B. Henderson R. in Montague T.L. *The Brushtail Possum. Biology, impact and management of an introduced marsupial* 2000

- ⁵² Beasley M. Fisher P. O'Connor C. Eason C. *Sodium fluoroacetate (1080): assessment of occupational exposures and selection of a provisional biological exposure index* NZMJ 4 September 2009

- ⁵³ *Rural News* 4 September 1995

- ^{53a} Fraser A. *Public attitudes to pest control: a literature review* 2006

- ⁵⁴ Fitzgerald, Gerard 2009 *Public attitudes to current and proposed forms of pest animal control A summary and review of the Australasian and selected international research*

- ⁵⁵ Orman, Tony *About Deer and Deer Stalking* 2002

⁵⁶ *ibid.*

- ⁵⁷ *ibid.* (Sadly we learned Thane Riney passed away in August 2012 in Perth.)

- ⁵⁸ According to the *Te Ara* website the "Nature Conservation Council of independent members expert in the field of conservation was established by legislation in 1962 to coordinate scientific and technical information on nature conservation, to inquire into the effect of proposed public works on any aspect of nature conservation and to act as an advisory body to Government on matters affecting nature conservation."

- ⁵⁹ Huser, Beat *Animal Pest Control: Toxicity and Environmental Fate of 1080* Waikato Regional Council's Technical Report No 90/23 1990

⁶⁰ *ibid.*

⁶¹ <http://www.doc.govt.nz/about-doc/role/vision-role-overview-and-statutory-mandate/a-short-history-of-doc/the-early-1990s/>

⁶² *Summary of Findings Possum Management in New Zealand* PCE May 1994

⁶³ *ibid.*

⁶⁴ Jamie Steer Radio NZ interview with Kim Hill 17 September 2016

⁶⁵ Fraser, Anthony, *Public Attitudes to pest control: A literature review* 2006
<http://www.doc.govt.nz/documents/science-and-technical/drds227.pdf>

⁶⁶ Eason C.T. is one of the co-authors *Acute Toxicity of Sodium Monofluoroacetate (1080) Baits to Feral Cats* 1991 *Wildlife Research* Weaver S. A *Review of Toxicological Research on Sodium Monofluoroacetate (1080) and its Policy Implications* 2003 (Eason et al. 1994)

The Guardian Weekly 25 April 2008 *Why must they die for Botox?*

“Animal protection groups consider ‘lethal dose 50’, as the test is known, to be ‘everything that’s wrong with animal testing’, said Martin Stephens, vice-president for animal research issue at the Humane Society of the United States. ‘It’s as bad as it gets. Poisoning animals to death’

“For more than half a century, companies have tested chemicals, drugs and cosmetics on animals to prove that their products are safe. Poisons are fed to rats and mice to determine what dose may be harmful to humans. Chemical compounds are dripped on the skin and eyes of rabbits to check for irritation.”

⁶⁷ *Acute Toxicity of 1080 to wallabies* Ministry of Forestry, Forest Research Institute, Forest and Wildland Ecosystems Division, 1990 fax to DOC Auckland attn Anne Stewart from C.T. Eason. (Collection of John Fowler)

⁶⁸ *ibid.*

⁶⁹ Website for Save Animals from Exploitation (SAFE)
<http://safe.org.nz/about-1080-poison>

The World League for Protection of Animals wlpa.org/1080_poison.htm

⁷⁰ McLeod L. Saunders G. *Pesticides used in the Management of Vertebrate Pests in Australia* NSW Department of Primary Industries 2013 (Chenoweth and Gilman 1946, Foss 1948, Eason and Frampton 1991, Collichio-Zuanaze et al. 2006 McIlroy 1983)

⁷¹ Beausoleil N.J. Fisher P. Warburton B. Mellor D.J. Campion M. and Booth, L. *How Humane are our pest control tools?* MAF Biosecurity NZ Landcare Research 2010 Available at: www.biosecurity.govt.nz/files/publications/technical-papers/2011-01-how-humane-are-our-pest-control-tools-final.pdf

⁷² *Straight Furrow* 5 December 2006

⁷³ *Hauraki Herald* 11 May 2007

⁷⁴ *NZ Hunting and Wildlife* 2008

- ⁷⁵ *Hauraki Herald* 24 September 2010
- ⁷⁶ Sherley M. *Is sodium fluoroacetate (1080) a humane poison?* RSPCA Australia "Sodium fluoroacetate (1080) is widely used for the control of vertebrate pests in Australia. While the ecological impact of 1080 baiting on non-target species has been the subject of ongoing research, the animal welfare implications of this practice have received little attention. Literature relevant to the humaneness of 1080 as a vertebrate pest control agent is reviewed in this paper...Using available data an attempt is made to reassess the humaneness of 1080 using the following criteria: speed and mode of action, appearance and behaviour of affected animals, experiences of human victims, long-term effect on survivors, and welfare risk to non-target animals. It is concluded that sodium fluoroacetate should not be considered a humane poison, and there is an urgent need for research into improving the humaneness of vertebrate control methods in Australia." Quote from report in *Rural News* December 4, 2007
- ⁷⁷ No long spring traps over 1½. All double coil leg-hold traps of over 1½ and all hard jaw of 1½ banned. No leg-hold traps within 150m of a dwelling.
- ⁷⁸ *Rural News* 4 December 2007
- ⁷⁹ Innes J. Barker G. *Ecological consequences of toxin use for mammalian pest control in New Zealand—an overview* 1999 NZ Ecological Society
- ⁸⁰ Fox A. *Waikato Times* 29 November 1996
- ⁸¹ *Dominion Post* 27 June 2007 'We want a full inquiry'
- ⁸² Weaver, Sean *Policy Implications of 1080 Toxicology in NZ Journal of Rural and Remote Environmental Health* 2003
- ⁸³ *ibid.*
- ⁸⁴ ERMA 1080 *Decision Application for the Reassessment of a Hazardous Substance under Section 63 of the Hazardous Substances and New Organisms Act 1996* August 2007 Amended August 2008
- ⁸⁵ Weaver S. *Policy Implications of 1080 Toxicology in NZ Journal of Rural and Remote Environmental Health* 2003
- ^{85a} <https://bsa.govt.nz/decisions/3871-hill-knowlton-nz-ltd-and-television-new-zealand-ltd-2001-027> Quote from website: "Nicky Hagar, [sic] a political activist, was interviewed on *Havoc and Newsboy's Sell Out Tour* 2 broadcast on TV2 on 15 August 2000, beginning at 9.30pm. He claimed that any time there was a controversial issue, there would be a public relations company behind it. By way of illustration, he identified Hill + Knowlton, which he said was the second largest public relations company in the world, and claimed the company was influential in the American Congress's decision to engage in the Gulf War."
- ⁸⁶ Powlesland R. Knegtmans J. Marshall I. *Evaluating the impacts of 1080 possum control operations on North Island robins, North Island tomtits and moreporks at Pureora— preliminary results.* Science for Conservation 1998
- ⁸⁷ Bait shyness through 'neophobia' (avoidance of new objects in the environment); Bell and Williams, 1981 and Fraser, 1985, 1080 shyness; D.

Ross, M: Williams, P. Nelson, pers. comm., 1991 Wheeler and Hart 1979, cited in Hickling, in press; Howard, Marsh and Palmateer, 1973 summary data on genetic resistance presented in Appendix A (Table A. 15); Twigg and King, 1991. Cited in PCE 1994 *Possum Management in New Zealand*

McLeod L. Saunders G. *Pesticides used in the Management of Vertebrate Pests in Australia* 2013 "Laboratory studies have shown rats (*Rattus norvegicus*) are capable of developing genetic resistance to 1080 and some strains are quite resistant to 1080 (Kalmbach 1945, Chenoweth and Gilman 1946, Ward and Spencer 1947, Foss 1948, Howard et al. 1973). It is not known how much inherited resistance has been produced in wild populations."

⁸⁸ McBreen K.S. *Kamahi Decline in Tongariro National Park*, 1999

⁸⁹ *Chicago Tribune* 9 July 2202 "Proceedings of the National Academy of Sciences, Penn State University biologist Joseph Kiesecker wrote that infection with trematode worms causes the deformities in wood frogs but that deformity rates were substantially higher in areas where infected frogs were exposed to pesticide runoff."

⁹⁰ Watts, Meriel *Organic NZ* August 2002

⁹¹ *The development of Operation Nest Egg as a tool in the conservation management of kiwi* 2005 Colbourne R. Bassett S. Billing T. McCormick H. McLennan J. Nelson A. Robertson H.

⁹² Kelton S. *Control Technology Application—what currently limits our effectiveness? Proceedings of a Workshop on Possums as Conservation Pests Possum and Bovine Tb Control NSS Committee* 29 – 30 November 1994

^{92a} Bidwell, Susan *Talking about 1080: risk, trust and protecting our place* Thesis submitted Master of Public Health 2011

⁹³ Gottlieb, Roger reviews of *A Re-enchanted World: The Quest for a New Kinship with Nature* by James William Gibson, Holt 2009 and *Conservation Refugees: The Hundred Year Conflict Between Global Conservation and Native Peoples* by Mark Dowie, MIT Press 2009 in *Tikkun* (September 2010) Dowie calls it "fortress conservation," whose patron saint is John Muir. He talks of ecotourism as often both environmentally destructive (requiring jet travel, hotels and food etc) and a disaster to natives—whether in Brazil, Tanzania, Jordan or Thailand, who are forcibly displaced to make room for foreigners hungry for a little natural enchantment. "With the export of the American model of exclusionary conservation to the rest of the world, the pattern has been repeated countless times, typically with the co-operation or even the management of the big, international NGO's such as Conservation International, World Wildlife Fund for Nature or the Nature Conservancy.

"Dowie's story is a familiar one of Western and white wealth, arrogance, control and domination, often aided by complicit local governments and large corporations. The latter benefit from the publicity they get by supporting conservation in one place while destroying ecosystems in others, and find it easier to gain access to 'parks' when natives who might resist the poisoning of land and water have been removed. Conservation biologists, enamoured of endangered species and ignorant or contemptuous of 'untutored natives', add their voices as well...The

most vulnerable are being asked to pay the price of the damage caused by those with the most political, economic and military power.”

^{93a} Accessed June 12, 2017 http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11874204

⁹⁴ Ataria, James *The 1080 Reassessment Consultation Hui—An Independent Assessment of Oral Submissions and Process* December 2004, P15

⁹⁵ Kent, Greg Senior Advisor 1080 Coordination Hazardous Substances ERMA letter of 23 March 2010 “We estimate that the total cost of the reassessment of 1080 to date has been approximately \$1,638,000. This includes actual costs up to 30 June 2009 and estimates for the current financial year, up until the end of February 2010. The costs include: All costs associated with the reassessment; Production of two annual reports; Development of a database and website for tracking aerial 1080 operations; and Development and production of a communication guideline for aerial 1080 operations.” and earlier a letter of 7 February, 2008 from Andrea Eng, General Manager, Hazardous Substances states “An application fee which did not result in full cost recovery was subsequently negotiated. It is also worthwhile noting that our current pricing policy does not include the recovery of the full costs of any of our applications.” This means taxpayers are paying the bill that should be assigned to chemical companies that sell their poison products here.

⁹⁶ *Straight Furrow* 19 May 2009 features the Tb-Free Chair from Hawkes Bay concerned that opponents of 1080 are “winning the hearts and minds of the public by a campaign that was based on a huge amount of misinformation.” 119 infected herds in 2009

⁹⁷ Horn, Chrys and Kilvington, Margaret *Māori and 1080* 2002 Landcare Research

⁹⁸ Monin, Paul *This is My Place Hauraki Contested 1769-1865* BWB 2001

^{98a} Jones C. Barron M. Warburton B. Coleman M. Lyver P.O.B. Nugent G. *Serving two masters: Reconciling economic and biodiversity outcomes of brushtail possum (Trichosurus vulpecula) for fur harvest in an indigenous New Zealand Forest* 2012

⁹⁹ <http://www.odt.co.nz/news/national/79092/research-clears-puha-after-1080-drops> <http://www.scoop.co.nz/stories/CU0910/S00387.htm>

¹⁰⁰ *An Independent Assessment of Oral Submissions and Process for the Ngā Kaihautū Tikanga Taiao-Māori Advisory Group at ERMA*.P 15

¹⁰¹ P 2 *ibid.*

¹⁰² P 13 *ibid.*

EPA record from <http://www.epa.govt.nz/search-databases/HSNO%20Application%20Register%20Documents/HSR09058%20Application%20Form.pdf> Connovation company’s new toxin PAPP registration application: “Tuhoe do not favour any poison use. Preference is for trapping, but Tuhoe are cautiously considering the merits of PAPP if it will enable greater areas of land to be protected from stoats impacts on kiwi.”

- ¹⁰³ *An Independent Assessment of Oral Submissions and Process for the Ngā Kaihautū Tikanga Taiao-Māori Advisory Group at ERMA* P 15
- ¹⁰⁴ P 18 *ibid.*
- ¹⁰⁵ P 19 *ibid.*
- ¹⁰⁶ P 24 *ibid.*
- ¹⁰⁷ *ibid.*
- ¹⁰⁸ P 5 *ibid.*
- ¹⁰⁹ *Forest & Bird* August 2004
- ¹¹⁰ Reddiex B. et al. 2003 *AHB possum control operations on public conservation lands: habitats treated and resulting possum abundance* Landcare Research DOC R&D series 277, showed the difficulty “of assessing conservation benefits that may accrue from control based on RTCIs [given] that the relationship between possum density and their impacts is neither linear (Nugent et al. 2001) nor consistent for many native species and communities (e.g. Bellingham et al., Norton 2000, Payton 2000, Veltman 2000)...For example the RTCI required for protection has been shown to range from as low as 3% for mistletoe at Hauhungaroa (Sweetapple et al. 2002), <7–9% for northern rata forest canopy at Waipoua (Payton et al. 1997), <10% for kohekohe at Motatau, and <25% for common broadleaf species at Matamateanga (Nugent et al. 2001)”.
- ¹¹¹ Bellingham P. Wiser S. Hall G. Alley J. Allen R. Suisted P. *Impacts of possum browsing on the long-term maintenance of forest biodiversity* DOC 103, 1999
- ¹¹² Dench, Murray 7 October, 2014 *pers comm.* “Alan Tennyson and Paul Martinson’s book *Extinct Birds of New Zealand* is a base reference but they disagree in many cases with the conclusions of other authors so it is a bit of a lottery really. Our records are certainly not necessarily accurate or complete...an important point to remember with cats is the possible ecological benefits they can provide. They get bad press, but there is a fair body of science out there that shows they eat very few native species. An excellent example of the cat’s protective ability is the extinction of the Norfolk Island triller. The triller was abundant in 1941, but cat distemper occurred in 1951 that reduced the cat population, allowing the rat population to explode and by 1968, the bird was rare and disappearing. The last sighting was in 1976. After the cats had gone it was not possible to grow vegetables on the Island as the rats ate the vegetables. Cats in this case were a benefit to this bird population and could have saved the species if they had been reintroduced after the distemper epidemic, but who would be brave enough to suggest.”
- ¹¹³ Benfield W.F. *At War with Nature Corporate Conservation and the Industry of Extinction* Tross 2015 He notes a 2009 study by Najera-Hillman that found rats were less likely to affect Hochstetter frogs, than subtle environmental changes, such as stream silting. Sub-lethal effects of poison 1080 leave insect-eating lizards “vulnerable to other pathogens or reproductive damage and may in the long run be just as harmful to the population...starvation is a very real risk.”

PCE *Possum Management in New Zealand* 1994 "Predatory insects, spiders, and lizards, including skinks and geckos, are also likely to eat ants. Birds died after eating ants that fed on brodifacoum baits Godfrey, 1985. A North American study indicated that ants killed by exposure to 1080 may have caused secondary poisoning in birds Hegdal, et al, 1986."

- ¹¹⁴ From http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0007/486187/Pesticides-used-in-the-management-of-vertebrate-pests-in-australia-a-review.pdf Laboratory studies have shown rats (*Rattus norvegicus*) are capable of developing genetic resistance to 1080 and some strains are quite resistant to 1080 (Kalmbach 1945, Chenoweth and Gilman 1946, Ward and Spencer 1947, Foss 1948, Howard et al. 1973). It is not known how much inherited resistance has been produced in wild populations.

Cowan, Phil et al. *Rats and resistance to anticoagulants – a problem in New Zealand?* Landcare Research EcoGene

- ^{115a} Murphy E. Bradfield P. *Change in diet of stoats following poisoning of rats in a New Zealand forest* NZJE 1992

- ^{115b} Robertson H, Craig E. Gardiner C. Graham P.J. *Short pulse of 1080 improves the survival of brown kiwi chicks in an area subjected to long-term stoat trapping* NZJE 2016 suggests the prevalence of "untrappable stoats" and concludes "The key message from our work is that conservation managers should periodically vary their pest control methods to reduce the possibility that they are selecting for individuals that are not able to be trapped or directly poisoned because they are disinterested in the lures or baits, or are actively avoiding lures, baits or traps. The worst scenario would be if active avoidance by stoats has a genetic component, meaning that control activities may be inadvertently selecting for 'super pests' that are behaviourally resistant to trapping and/or primary poisoning. Another important message is that wildlife managers need to monitor their pest control programmes at least periodically to ensure that they are still achieving the same conservation outcomes they may have achieved initially."

- ¹¹⁶ *Tongariro Forest Kiwi Sanctuary Annual Report 2005/6*

- ¹¹⁷ *The New Zealand Biodiversity Strategy Our chance to turn the tide Whakakohukihukitia Te Tai Roroku Ki Te Tai Oranga* 2000 Department of Conservation and Ministry for the Environment, Wellington

- ¹¹⁸ *Straight Furrow* 8 December 2009

- ¹¹⁹ The *Robinson Report* on the topic was published in *Hamilton News* and also in volume IV *Rural Revolt: Voices of the Coromandel: Poison Peninsula*.

Straight Furrow published Bud Jones' letter on 30 July 2013. Jones is a long-time conservationist based at Pokai Parera Farms, Eketahuna. Awarded the Queen's Service Medal for his "outstanding achievements in arboretum and wetland creation, environmental protection and wildlife conservation, as well as service to professional music performance, secondary and tertiary music education."

http://www.du.edu/ahss/media/documents/archived_stories/oct14alumni.pdf Further info at <http://www.nzsm.ac.nz/news/news-from-2013/queens-birthday-congratulations>

- ¹²⁰ Fitzgerald G. Fitzgerald N. Wilkinson R. *Social acceptability of stoats and stoat control methods* 2005
- ¹²¹ Byrom A. et al. *Assessing Movements of Brushtail Possums (Trichosurus vulpecula) in Relation to Depopulated Buffer Zones for the Management of Wildlife Tuberculosis in New Zealand* 2015
- ¹²² http://podcast.radionz.co.nz/clife/clife-20130531-2125-natures_support_possum_back_belt-048.mp3 Pers. comm. 1 August 2017
- “Sir Peter arranged with Wool Board scientists to make some wool/fur products. When we learned of the hollow fibre and the high heat retention from the Japanese scientist who had previously been working with polar bears in Greenland, I made the suggestion that maybe we should be concentrating more on straight possum fur, however Peter felt loyalty to the wool industry, which I felt was understandable at the time. It was only after Sir Peter died in 2003 that I felt comfortable enough to take the matter further. I have since found that possum fur has remarkable health qualities.”
- ¹²³ May 2011 *Forest & Bird* magazine quotes Kevin Hackwell on his soapbox—“we either support the use of 1080 as the only practical way of saving our unique wildlife in isolated bush areas or give up these forests and their native inhabitants to the pests. Not only will the birds disappear but the forests themselves could eventually collapse.”
- Peninsula Post* 26 July 2013
- ¹²⁴ *New Zealand Geographic* March-April 2007 issue 84 Derek Grzelewski quotes Rob Wilson of Wild Animal Management Ltd
- ¹²⁵ <http://www.stop1080poison.com/>
- ¹²⁶ *Peninsula Press* 12 April 2012 review of *The Third Wave —Poisoning the Land* by Bill Benfield is available from Tross Publishing trosspublishing@hotmail.co.nz
- ^{126a} <https://www.psychologytoday.com/blog/animal-emotions/201707/scapegoating-possums-science-psychology-and-words-war>
- ¹²⁷ http://www.radionz.co.nz/audio/player?audio_id=20172638 The list included this ‘leading’ query: “Tell me, would you support someone contaminating baby formula using 1080 as a protest against its use?”
- <http://www.business.govt.nz/companies/app/ui/pages/companies/1210151/12140053/entityFilingRequirement?backurl=%2Fcompanies%2Fapp%2Fui%2Fpages%2Fcompanies%2F1210151%2Fdocument%3Fbackurl%3D%252Fcompanies%252Fapp%252Fui%252Fpages%252Fcompanies%252Fsearch%253Fmode%253Dstandard%2526type%253Dentities%2526q%253Dconnovation%252520limited>
- ¹²⁸ *Organic NZ* March/April 2013 www.organicnz.org.nz. Reprinted with kind permission of Rebecca Reider and *Organic NZ*. Reider is an organic project

manager and co-editor of *Harvests*, the magazine of the Bio Dynamic Farming and Gardening Association in New Zealand.

- ¹²⁹ *Guardian Weekly* 7 February 2014 Mentions an app called ORA where “you’ll be charged with taking care of a plot of NZ forest and protecting it from ravenous Australian brushtail possums. Set traps, create sanctuaries or fly aerial operations to sow toxic bait to save your pixilated forest. Researchers will then take the best strategies and apply them in real NZ forests, where native plants and animals are under threat from these invading possums.”

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District Health Boards Respond to 1080-Poisoned Families Concerns - <https://youtu.be/TMSqAp2ET54>

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1080 Poison dropped Directly into Auckland Water Supplies - <https://youtu.be/YKB1q5JDvY>

Coromandel Water Supplies Poisoned - <https://youtu.be/QbAeUa5ueRg>

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Photo Essay - 1080 Poison Use in New Zealand -<https://youtu.be/oT7J98cuQXc>

Is Deer Repellent Effective? -<https://youtu.be/KwiDBs46K7Q>

Operation Nest Egg - Accelerating Kiwi Demise? -<https://youtu.be/1gR674m7a00>

Department of Conservation Targets Rats -<https://youtu.be/ZMvdXIFsbRY>

Trout Mass-poisoned in New Zealand -<https://youtu.be/0Uf2wBprSw0>

Mt Pirongia Poison Drop Breaches Manufacturers' Label -<https://youtu.be/rkgyXF56Uvo>

1080 Poison Safe in Water - EPA -<https://youtu.be/J4pe-Ma4L-o>

1080 Poison Cover-ups - Farmers Speak Out -https://youtu.be/K7vtWj_5Utg

Cattle Die After 1080 Drop in Waikato -<https://youtu.be/7ub9fRFk8iA>

Taihape Deer Mass-poisoned - Farmer Speaks Out -<https://youtu.be/u7RFiz4lShA>

New Zealand Rivers - the Fight to Keep them Poison-free -<https://youtu.be/nKL7KllorWw>

Poisoning Stewart Island - Is it Ecocide? -<https://youtu.be/zDxxaM2TkuM>

Is it Okay to Kill Deer Like This New Zealand? -<https://youtu.be/qHmSxkJ1-o>

Poisoning Paradise -<https://youtu.be/yQRuOj96CRs>

An Ode to 1080

*No morepork calls
No harrier soars
No falcon stoops to kill
The deadly rain has fallen
The birds no longer trill
Look what we've done
The risks are almost nil?
A dead one here a dead one there
The rest could just be ill.
But never mind, the money's fair
We have a job for life
So dump it on them from the air
It's worth a little strife*

Bill Axbey

*Heartfelt thanks to my friend Geoffrey Robinson whose
navigation, anchoring and love has helped this series see
the light of day...Arohanui ki a koe e hoa ma.*

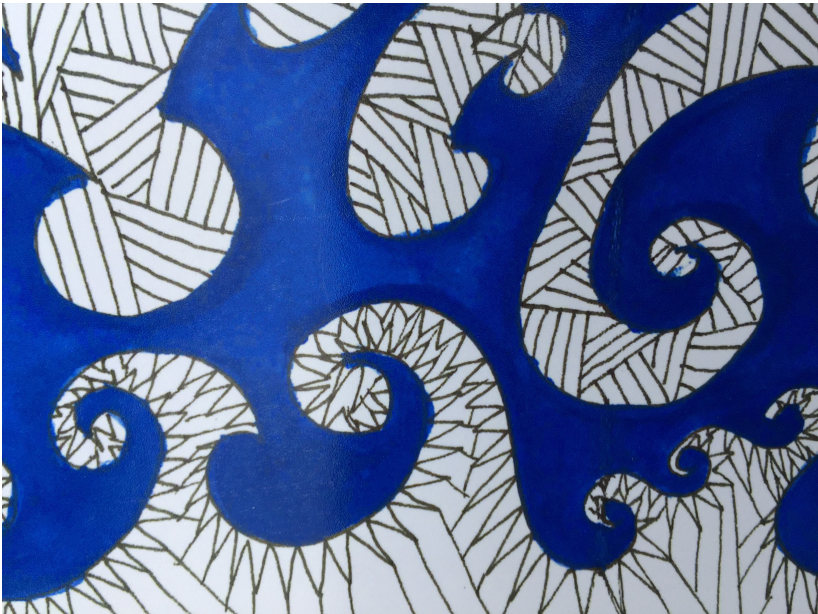


Illustration by Noa Noa von Bassewitz