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Attachments: Submission-form-for-HSNO-applications.docx
Fish and Game submission on EPA Reassessment of Diazinon.pdf

Good afternoon,

Please find attached the Fish and Game New Zealand submission on APP204199- Reassessment of diazinon, fenamiphos and methamidophos. Our submission is summarised in the submission document, with full details of our input appended in the accompanying PDF attached to this email.

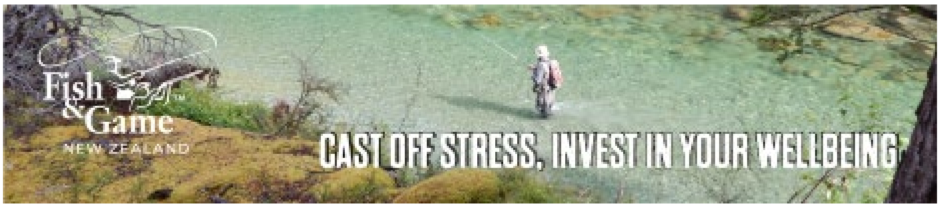
If you have any queries or would like to discuss our submission points, please feel free to contact me directly.

Cheers,

[redacted]

[redacted]
New Zealand Fish and Game Council

Level 2, Dominion Building, 78 Victoria Street, Wellington 6011 | PO Box 25-055, Wellington 6140
M: [redacted]
E: [redacted]@fishandgame.org.nz | **W:** www.fishandgame.org.nz



8 November 2021

Submission on application number APP204199 f*or Hazardous Substances and New Organism applications*

This written submission is provided to the Environmental Protection Authority by Fish & Game New Zealand (referred to subsequently as **Fish and Game**), which is comprised of the 12 Regional Councils and the national New Zealand Fish and Game Council.

Submitter Details

Submitter: Fish & Game New Zealand

Contact person	[redacted]
Council	New Zealand Fish and Game Council
Email address	[redacted]@fishandgame.co.nz
Office phone	[redacted]
Postal address	Level 2, Dominion Building, 78 Victoria Street, Wellington 6011

Preliminary

1. This submission by Fish & Game is structured in the following manner:

   a. a summary of Fish and Game's submission on the application number APP204199 f*or Hazardous Substances and New Organism application*;

   b. the specific submission context and points on application number APP204199, including associated environmental impacts and risks;

   c. the global risk assessment context of this submission from Fish and Game,

   d. Consideration of the implications to Te Mana o te Wai

   e. background material, including Fish and Game's role.

Summary - Fish and Game does not support the extension of the phase-out period for organophosphate insecticides Diazinon, Fenamiphos, and Methamidophos

2. Fish and Game does not support the extension of the current date of expiry for the time limited approvals for substances containing diazinon, fenamiphos, and methamidophos. The adverse effects of organophosphate pesticides including diazinon on waterfowl, aquatic habitat and aquatic species are well recognised in

scientific literature (Botha et al., 2015; Brasel et al., 2007; Dębski et al., 2007; Goldstein et al., 1999; Kumar & Singh, 2012; Lawrence, 2020; Mineau and Whiteside, 2013; Mitra Anindita and Chatterjee, 2021; Osten et al., 2005; Woo et al., 2010).

3. Fish and Game supports retaining the current phase-out date for diazinon and other organophosphates as a minimum action. Reassessment of the phase-out dates to reduce the date for Diazinon to 2023 (in alignment with the other two compounds) is recommended.

4. The addition of risk mitigation guidelines and restrictions being established by EPA for users of organophosphate pesticides until their phase-out date is highly recommended. These application guidelines would enable better understanding of the impacts changing climate and regional weather patterns can have on risks of waterfowl (and other avian species) poisoning, and subsequent mortality, following organophosphate pesticide applications.

5. Use of diazinon and other organophosphate insecticides within agricultural lands that have freshwater habitat receiving environments, or are within likely resting or feeding sites for waterfowl, creates a high risk of exposure to non-target species and a higher risk of wider environmental contamination and impacts.

Context of this submission - Contribution to the Adverse Affects assessment

6. This document is the submission from Fish and Game to the recent application to reassess diazinon, fenamiphos and methamidophos (reference number APP204199). It is understood that the EPA has been requested by the Vegetable Research and Innovation Board to change the current date of expiry for the time limited approvals for pesticides containing diazinon, fenamiphos, and methamidophos by extending this date for a further 10 years.

7. Fish and Game do not support the basis for this request from the Vegetable Research and Innovation Board that the risk assessment components supporting the use of these substances has not changed since the reassessment conducted by the EPA in 2013.

8. Numerous investigations into the risk and impacts of organophosphate insecticides have documented that the risks of using these substances to waterfowl, predatory birds, non-target insects (including bees) and aquatic ecosystem health are significant and far reaching. Extending the use period for diazinon, fenamiphos and methamidos containing pesticides would be disregarding this evidence that these substances pose a significant risk to avian species, valuable bee populations and aquatic ecosystem health. These risks need to be updated and considered during the reassessment process.

Organophosphate pesticide risks to avian species

9. The broad-spectrum nature of organophosphate pesticides makes birds more liable to exposure when they are present in the area at the time of pesticide application, or if they come in contact with pesticide contaminated prey (such as dying Grass Grubb). Diazinon, an organophosphate insecticide, is a potent blocker of acetyl-cholinesterase (AChE) in the blood and in tissues (Dębski et al., 2007).

10. Following exposure to Diazinon, intoxication causes the inhibition of acetyl cholinesterase in the bird's brain, resulting in an accumulation of acetylcholine at synaptic junctions following subsequent activation of cholinergic receptors which leads to respiratory function shutdown and death (Dębski et al., 2007; Mitra Anindita and Chatterjee, 2021).

11. Species of different shore, grassland, farmland, and migratory birds can also be directly exposed to lethal doses of these pesticides or through secondary poisoning. Carbofuran, a carbamate, and diazinon, an organophosphate, are among the most commonly implicated cholinesterase inhibitors in episodes of accidental avian toxicity and mortality (Brasel et al., 2007)

12. Exposures to organophosphates pose major risks to different avian species with even a sublethal concentration exposure on birds resulting in health impacts including; malformed embryos, smaller broods, decreased parental diligence, reduced territorial defence, anorexia and weight loss, subdued immune response, lethargic behaviour, greater susceptibility to predation, interference in thermoregulation, endocrine disruption, and inefficiency to orient in the proper direction for migration. (Mitra Anindita and Chatterjee, 2021).

13. Although organophosphate containing pesticides do not have the long-lived and bioaccumulation capacity of their predecessors (such as DDT), they do have the capacity to persist in the environment after application and risk contamination of receiving environments such as groundwater and freshwater ecosystems. Withholding periods after application of diazinon, fenamiphos, and methamidophos containing pesticide applications have been established with the aknowledgment of their toxicity to birds and other organisms, however these are very difficult to enforce at the paddock scale with birds.

14. Diazinon can be transported in air via atmospheric processes such as direct air movement and wet deposition in snow and rain. In the environment, diazinon undergoes degradation by several processes, the most important of which is microbial degradation in soils. The rate of diazinon degradation is affected by pH, soil type, organic amendments, soil moisture, and the concentration of diazinon in the soil, with soil pH being a major influencing factor in diazinon degradation rate (Aggarwal et al., 2013). These factors are not likely to be able to be measured or considered across all land types and by all those using diazinon.

15. The rate of diazinon decomposition depends on physical properties of the environment (Dębski et al., 2007). Especially sensitive to diazinon are insects, aquatic organisms and birds. The continued permitted use of these substances risks ongoing unintended consequences of significant collateral damage to avian, insect and aquatic ecosystems.

Observations of organophosphate poisoning of waterfowl in New Zealand

16. Avian species, including waterfowl, are important components of the New Zealand ecosystems and, their plenitude and sensitivity to direct and indirect effects of an environment, makes them excellent indicators and early warnings of any environmental problems and threats. Many bird species are in decline and within both Europe and in North American settings, evidence suggests that for some

species the direct and indirect effects of pesticides play a role in this decline (Mineau and Whiteside, 2013). Evidence is emerging here in NZ to suggest similar impacts.

17. Fish and Game sustainably manage gamebird populations in New Zealand by monitoring the population, then setting appropriate bag limits for gamebird huntings. Monitoring of gamebird species is conducted at least annually, with additional region and species-specific population research undertaken intermittently. Data on population trends for key waterfowl species reflects potential impacts of diazinon based pesticides, leading to significant regional population declines for some waterfowl species.

18. Application of Diazinon to control porina and Grass Grub generally occurs during the annual gamebird (Paradise Shelduck) moult from late Decxember to early March where flocks of up 3000 birds are concentrated in farm ponds or nearby paddocks with ready access to pasture or winter crops. After the moult these birds feed heavily on protein rich pasture close to the local moult site to restore fat reserves. Due to this behaviour, a region-wide population of gamebird species can be devastated from one single poorly applied application of a diazinon product.

19. Despite Fish and Game's annual counting of good numbers of birds at these moult sites, there is a continuing trend from hunter harvest surveys of less birds making it through to the gamebird season. Fish and Game's opinion is that poisoning is occurring on a scale large enough to be having an adverse effect on overall population levels. Fish and Game is concerned that the loss of adult breeding birds as well as juveniles is leading to population declines through lack of recruitment.

20. This population decline trend has been observed for Paradise Shelduck within the Waimarino and Whanganui hill country (Figures 1 and 2 below), where there has been a continuing decline in population size since 1992, compared to counts around the Taranaki ringplain (Figure 3 below) where diazinon is not routinely used by farmers.

Figure 1. Mean density of Paradise Shelduck per pond per year in the Waimarino area compared to the density calculated by removing any site once three consecutive counts of less than 20 birds were recorded

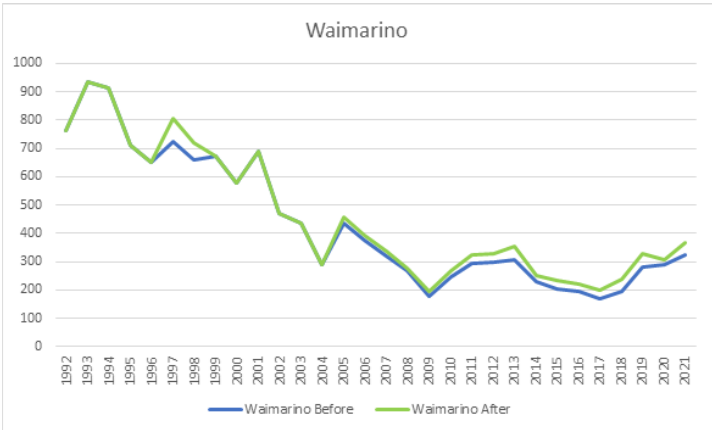


Figure 2. Mean density of Paradise Shelduck per pond per year in the Whanganui area compared to the density calculated by removing any site once three consecutive counts of less than 20 birds were recorded

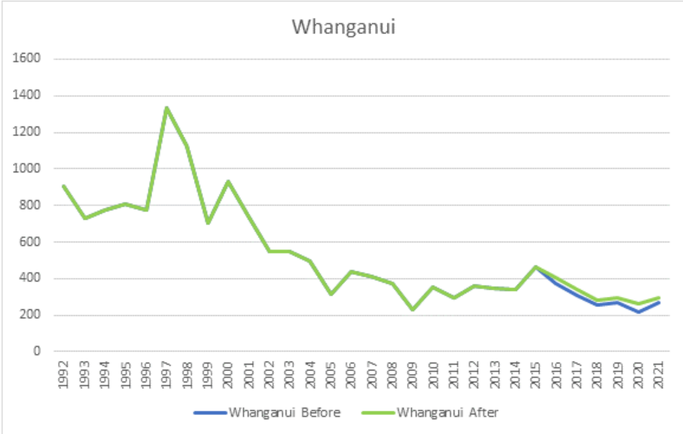
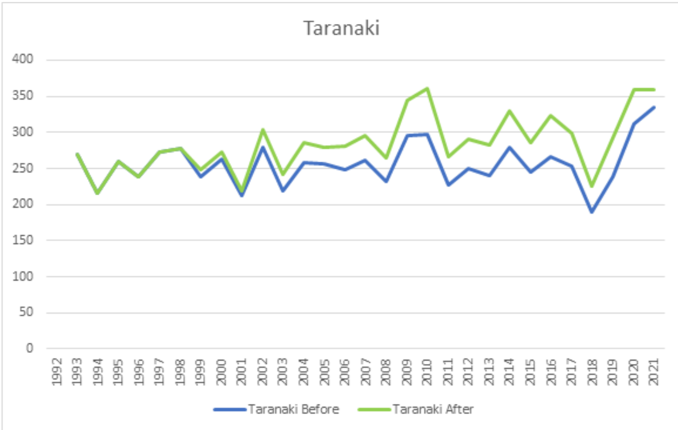


Figure 3. Mean density of Paradise Shelduck per pond per year around the Taranaki ring-plain compared to the density calculated by removing any site once three consecutive counts of less than 20 birds were recorded



21. Fish and Game have had numerous reports of waterfowl deaths following diazinon (Dew600) application on crops over the past decade. A previous submission to the EPA (response to APP201045 – Organophosphate and carbamate plant protection insecticides, 2013) recounted the deaths of Paradise Shelducks near Westport in 2011 and the adjacent treatment of Landcorp farmland with Dew600. The submission then recommended the discontinuation of the use of diazinon containing insecticides due to the toxicity and subsequent mortality on waterfowl.

22. Fish and Game investigated a Styx Basin cull involving the use of Diazinon in the upper Taieri in 2015. A farmer admitted he had loaned his digger to a property owner who had poisoned a large number (full ute and trailer load) of Paradise Shelduck and other waterfowl, and was trying to bury them. Anglers also reported seeing dead birds along the river edge nearby. Despite Fish and Game's communication with MPI and request to investigate, it wasn't considered a priority for them at the time. Our confidential witnesses didn't want to take the matter further, so it suffered from a lack of evidence and no charges or penalties for this intentional poisoning of waterfowl with diazinon were issued. It was suspected that this was an annual poisoning event that had been ongoing for at least 5 years.

23. Waihola Swan Poisoning: Between 30 August and 1 September 2020 diazinon was applied to a property in Waihola by the property owner resulting in the deaths of birds and the reporting of the incident to the Otago Fish and Game office. DOC workers were called to the scene and arrived together with the Fish & Game Officers. They counted 187 dead Swans, 8 dead Paradise Shelducks, 7 dead Canada Geese and a

dead Pukeko. The case was considered by legal expertise and while it was determined that the property owners probably did commit an offense against the Wildlife Act, they could not be prosecuted. The fact remains however that the application of the diazinon pesticide resulted in 202 dead waterfowl from organophosphate poisoning.

24. Anecdotal evidence from multiple landowners to Fish and Game employees over recent years have indicated that the use of diazinon pesticide is a widely known means for disposing of unwanted birds on their properties. Fish and Game have even been provided with a 'recipe' for killing unwanted wild ducks by lacing grain with diazinon-based pesticide and throwing it out over the paddocks where the ducks reside.

25. Reducing the risk of pesticide exposure to non-target organisms requires applicators to incorporate crop scouting and integrated pest management (IPM) with knowledge of wildlife cycle and habitat in developing a farm pesticide applicator plan (Kumar & Singh, 2012). It is highly unlikely the majority of users of pesticides are conducting these IPM processes currently.

26. Alternatives to diazinon are limited, however "Dimilin" is an alternative that doesn't have the same potential effects on waterfowl. This product has a slightly different timeline for application however is effective on Grass Grub which should make the request for the extension for the use of diazinon pesticides due to a stated lack of alternatives unsupportable by the EPA. https://nufarm.com/nz/product/dimilin-2l/

Global perspective – Impacts of the use of organophosphates on freshwater ecosystems, avian fauna.

27. Climate change affects endpoints relevant to ecological risk assessment directly or indirectly on broad temporal and spatial scales, resulting in previously over-looked impacts of changing climate on the risks of pesticide applications. In recent decades there has been a call for more research on interactions between climate change caused stressors and chemical stressors, and the incorporation of those effects into ecological risk assessment (Lawrence, 2020).

28. Cases of waterfowl mortality following organophosphate insecticide applications are widely documented in scientific literature (Aggarwal et al., 2013; Bishop, 1998; Bishop et al., 2018; Botha et al., 2015; Brasel et al., 2007; Dębski et al., 2007; Goldstein et al., 1999; Kumar & Singh, 2012; Mineau and Whiteside, 2013; Mitra Anindita and Chatterjee, 2021; Osten et al., 2005; Palacios et al., 2020) with examples of mass deaths of waterfowl noted globally where seed crops have been treated within areas of waterfowl aggregation. Investigations of the waterfowl die-offs leading to observations of the adverse impacts on waterfowl populations from toxic chemical use in important waterfowl seasonal resting areas.

29. The risks associated with organophosphate pesticides can also influence disease occurrence and epidemiology. In South Korea diazinon containing pesticide contamination was linked to increased replication of *C. botulinum*, contributing to the release of botulinum toxins (Botulism) into the waterfowl food chain and pupulations (Woo et al., 2010).

30. During a six-year period (from January 2009 to December 2014), specimens collected from 344 cases of suspected organophosphate and carbamate pesticide

poisonings in wildlife, including birds, were sampled in South Africa. The species included higher trophic species; Cape vultures (*Gyps coprotheres*) and African White-backed Vultures (*Gyps africanus*) and Bateleur Eagles (*Terathopius ecaudatus*). In one incident 49 vultures were killed when a farmer intentionally applied organophosphate pesticides to baited carcasses within their feilds (Botha et al., 2015).

31. Impacts within non-target insect and associated avian species have been observed in both North and South America with diazinon detected in Bumble Bees and Hummingbirds in Canada (Bishop et al., 2018). While Grasshopper control in Argentina by organophosphate and monocrotophos exterminated nearly 5000 migratory Grasshopper/Swainson's Hawk (*Buteo swainsoni*) during the arid summer of 1995–1996 (Goldstein et al., 1999).

32. Use of diazinon and other organophosphate insecticides within agricultural lands that have freshwater habitat receiving environments, or are within likely resting sites for waterfowl, creates a high risk of exposure and a higher risk of wider environmental contamination and impacts. These risks have been widely studied and documented in recent decades with the negative repercussions on long term population numbers for some species being recognised. The risks of organophosphate insecticides outweigh the benefits of their continued use.

Giving effect to Te Mana o te Wai

33. The National Policy Statement for Freshwater Management (NPSFM 2020) provides detail for the concept of Te Mana o te Wai at section 1.3. Here it is stated that: "*Te Mana o te Wai is relevant to all freshwater management and not just to the specific aspects of freshwater management referred to in [the] National Policy Statement.*" While the use of organophosphates in agricultural pest control activities is not an inclusion in the NPSFM, the risks and impacts of these pesticide are relevant to water quality and freshwater ecosystem policy and management.

34. To give effect to Te Mana o te Wai is to put the health and well-being of water bodies and freshwater ecosystems at the centre of discussions – as a priority. The Environment Court has discussed this as a positive obligation on all decision makers and users of water to provide for the health of the water body, the health of the environment and the health of the people. This is a significant shift in the way decisions are to be considered. The Court noted that: *"the usual RMA focus on the scale and significance of effects of resource use [is redirected] onto the mauri or lifeforce of water and the enquiry becomes how do users of resources protect the water's mauri and health?".*

35. However, in order to enact this shift, it is critical that the concept of Te Mana o te Wai, and specifically its prioritisation, is embedded in all environmental planning legislation and regulations. This necessarily includes the permit and use of organophosphate insecticides such as diazinon and the prompt disuse (not extension of use period) of these chemicals within New Zealand.

About Fish and Game

36. Fish and Game is the statutory manager for sports fish and game, with functions conveyed under the Conservation Act 1987. The organisation is an affiliation of 13 separate Fish and Game Councils – 12 regional Councils and one national Council. Together, these organisations represent roughly 140,000 anglers and hunters.

37. The sports fish and game resource managed by Fish and Game is defined and protected under the Conservation Act and the Wildlife Act 1953. The species within include introduced sports fish and a mix of native and introduced waterfowl and upland gamebirds.

38. Fish and Game is entirely funded by licence holder fees and private contributions, meaning the delegated function of managing the species for the public good is funded entirely by the users. It is a democratic 'user pays, user says' organisation. Using this system, the organisation funds public good research to ensure fisheries and game populations are managed sustainably; undertakes compliance with the licencing system; and contributes to public planning processes.

39. In relation to planning, the Councils share a similar function to advocate on behalf of anglers and hunters and to advocate in the Councils' interest, including their interest in habitat. Overwhelmingly, the advocacy sought by anglers, hunters and their elected Council representatives has been to seek environmental protection and restoration of degraded ecosystems. This makes sense as anglers typically have a great deal of lived experience on water bodies and therefore are highly attuned to changes, which to date have overall been for the worse.

40. At the direction of its licence holders, Fish and Game has become one of the nation's best-known advocates for freshwater ecosystems.

41. To achieve this, Fish and Game staff includes planning and policy specialists. The local-facing structure of the organisation combined with generally low turn-over rates and a focus on freshwater means that these staff are experts in freshwater policy and its implementation.

42. This submission has been developed using the combined expertise and experience of Fish and Game's planning and policy staff.

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