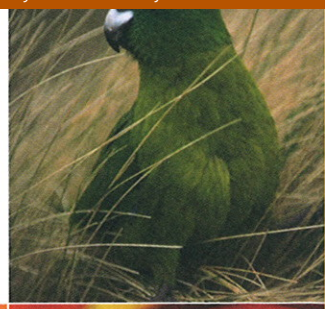
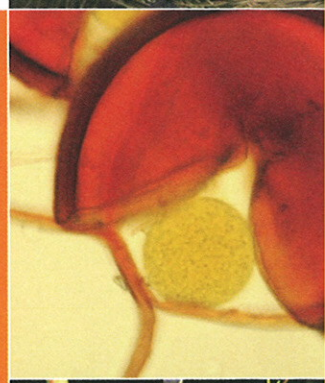
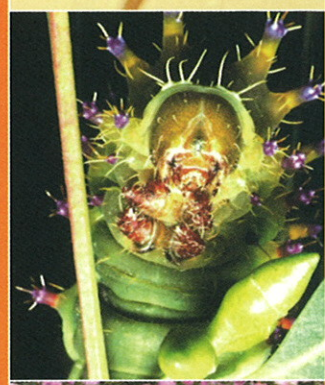


Bio-Protection & Ecology Division



# Overcoming Barriers to Maori Inclusion in the Appropriate use of 1080



by

S.C. Ogilvie

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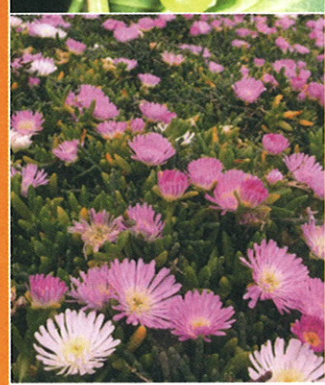
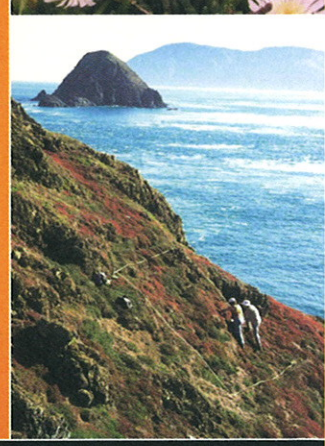
J. Waiwai

J. Doherty





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# Overcoming barriers to Maori inclusion in the appropriate use of 1080

## Final Report

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# Executive Summary

## 1.1 Project and client

Research was undertaken for the Animal Health Board under Contract R-80667 "Overcoming barriers to Maori inclusion in the appropriate use of 1080" to Lincoln University. The research was aimed at producing a readily-accessible and user-friendly database of 1080 impacts on non-target species, identified as important by Maori. The research reported here was carried out between August 2005 and May 2006, and was undertaken by a collaborative team of researchers from Lincoln University, Landcare Research, Lake Waikaremoana Hapu Restoration Trust, and Tuhoe Tuawhenua Trust.

## 1.2 Objectives

- To undertake an independent review of existing 1080 environmental data focussing on an issue of national significance to Maori
- To engage members of the Lake Waikaremoana Hapu Restoration Trust (Ngai Tuhoe), and Tuawhenua Trust (Ngai Tuhoe) in a process of disseminating these findings to the wider Maori community, and document community feedback on the research
- To complete a written report on the findings of this research by 31 May 2006

## 1.3 Methods

- A review of the scientific literature relating to 1080 impacts on non-target species of importance to Maori was undertaken
- The research team deliberated on the most effective way to display and make this information available to Maori communities
- The literature was collated into a foodweb-based database using Microsoft Power Point and navigation through the information was facilitated via hyperlinking
- At four different meetings, the database was presented to Maori resource managers and community members, and a questionnaire was used to record their feedback

## 1.4 Results

- A total of 130 scientific literature items were sourced and reviewed
- The concept of presenting the information on a foodweb was deemed appropriate because it allowed the incorporation and presentation of complex information about 1080 in an holistic and pictorial fashion
- Using PowerPoint as the medium, the literature was collated into a foodweb-based database
- Maori community feedback was positive with most considering that the database was:
    - an excellent idea
    - that it was something they would find useful
    - that the pictorial foodweb-based approach was a good approach to summarising available 1080 information
- There was an overwhelming consensus among hui participants that the database should be made generally available to Maori communities free of charge

## 1.5 Conclusions

- Pictorial foodwebs offer an effective approach to organising complex information on 1080 into a format that can be easily understood and readily accessed by community end-users, especially Maori

- Scientific literature can be easily entered into the foodweb database to provide an holistic overview of the current state of knowledge on the non-target impacts of 1080 on species of importance to Maori
- This database received strong support from Maori communities that were provided with a demonstration, and is therefore likely to be an effective approach for the wider Maori audience
- Once the database becomes available to Maori communities, it is likely to play a key role in informing and empowering these communities to have a greater role in the appropriate use of 1080

### 1.6 Recommendations

- In an extension to the present research project, the following actions should be taken:
- The database should be launched on a website to make it readily available to Maori communities and other interested end-users at no charge
- Authorisation should be secured to allow photographs and PDF files to be used on the website
- The database should be peer-reviewed by an independent 1080 researcher, to confirm that the review information is scientifically robust
- A series of hui should be undertaken throughout the country to introduce a wide range of Maori communities to the database
- The database be acknowledged as a living document that is regularly updated with new information as appropriate

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## Introduction

Sodium monofluoroacetate (Compound 1080) is used in New Zealand for the control of introduced pests, including possums and rabbits. Methods of deployment include aerial application of 1080 cereal or carrot baits, a cost-effective means of reducing vertebrate pest populations in areas where these pests are compromising agricultural and/or conservation values (Livingstone 1994, Eason, 2002).

However, 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). Horn and Kilvington (2002) cite the minimal input or control that Maori have over determining strategies for pest control and research priorities as underlying factors behind their opposition to aerial control operations and distrust of available research data.

Prior to undertaking the present research, the authors of this report were involved in a total of 14 hui (meetings) on 1080 with Maori organisations all over New Zealand. Most of these meetings were carried out as part of the Maori consultation obligations of the DOC/AHB application to ERMA for the reassessment of 1080. At many hui, a recurring theme that was being voiced by Maori was that "the forests are dead after aerial 1080 operations". "There are no birds singing and all the life has been removed, we therefore oppose the use of 1080" was often cited. Both statements reflect the strong opposition amongst some sectors of the Maori community about the impacts of aerial 1080 operations on non-target species. As researchers, one of our responses was to talk about existing data that shows while populations of some bird species can reduce significantly in number, in the long-term the benefits of reducing predator and competitor numbers can outweigh this loss. However, some hui participants were unwilling to accept existing 1080 environmental data because "that research was done by the same people that are dropping 1080…we can't trust it". Furthermore, the absence of Maori involvement in developing research priorities and monitoring the efficacy and impacts of 1080 operations continues to frustrate Maori, often leading to criticism of existing research data. These examples serve to illustrate that Maori are not able to access and/or uptake the raft of research information that is available, or in some instances, they regard existing information as 'untrustworthy'. Therefore, the aim of the research presented here was to create a tool where high-quality literature on the subject could be made readily available and easily understood by these communities.

This is the final report of a research programme aimed at empowering Maori to access research information on the impacts of 1080 on non-target species, ultimately allowing Maori to have a greater role in the appropriate use of 1080. The research reported here was undertaken between August 2005 and May 2006.

## Objectives

1. To undertake an independent review of existing 1080 environmental data focussing on an issue of national importance to Maori;
2. To engage members of the Lake Waikaremoana Hapu Restoration Trust (Ngai Tuhoe), and Tuawhenua Trust (Ngai Tuhoe) in a process of disseminating these findings to the wider Maori community and documenting their feedback to the research;

3. To complete a written report on the findings of this research by 31 May 2006 (this document is that written report)

## Methods

### Objective 1: Undertaking an independent review

At the onset of this objective the authors were aware of at least a hundred scientific literature items relevant to the impact of 1080 on non-target species. Therefore, discussions at hui (meetings) from September to November 2005, focussed on formulating an approach/method to store and present this collection of data in a form appropriate to and readily accessible by Maori communities. Arising from these discussions, an innovative approach was adopted for the review process. Central to this idea was the comment that many Maori relate easily to complex information presented in a holistic manner, ideally in a pictorial format. With this in mind we decided to structure the review based on an ecological foodweb.

Foodwebs have a number of inherent advantages for the collation of complex information, as described by Innes & Barker (1999). Firstly, they can be used to integrate disparate and complex information on many unrelated species. Secondly they can potentially be used to trace toxin movement (in this case 1080) through ecosystems. Thirdly, they can serve as a conceptual focus for research, allowing studies on individual processes to be placed into a framework that links them with more general and parallel processes. Fourthly, and perhaps most importantly for the present study, they offer a starting point for all organisations and communities interested in pest control in New Zealand to find common ground.

We therefore created a database of the relevant literature based on a pictorial foodweb representation of a podocarp-broadleaved forest, modified from that of Innes & Barker (1999), as presented in Figure 1.

It was decided that Microsoft PowerPoint would be used as the interface for the foodweb database because it is widespread, increasing the likelihood that our potential end-users have access to, and operational knowledge of this software system.

Our approach was therefore to collate all available literature on 1080 non-target impacts, to review this literature, and then to place this literature, and review material, within the context of the foodweb, using hyperlinks from the relevant ecological compartments (Figure 1).

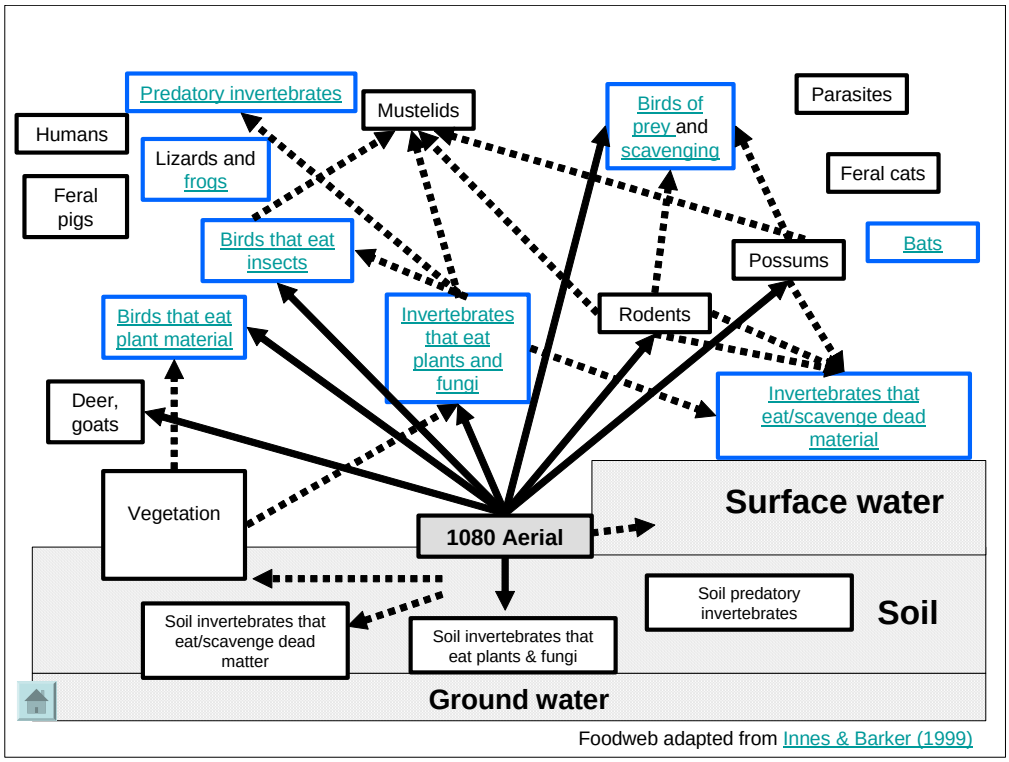



**Fig. 1.** Foodweb representation of aerially-applied 1080 in a forest ecosystem. This foodweb forms the conceptual starting point of the database of 1080 non-target information, by allowing users to click on hyperlinks within ecosystem compartments to access further information.

## Objective 2. Disseminating the database to Maori communities

As a means of assessing the 1080 non-target database created in Objective 1, hui with Maori communities were undertaken as follows:

- February 8th, 2006. At Te Kuha Pa, Tuai, with representatives from the local Maori community, the Department of Conservation, and Hawkes Bay Regional Council.

- April 2nd, 2006. At Papueru Marae, Ruatahuna, with representatives from the local Maori community.

- April 26th, 2006. At Te Waipounamu House, Christchurch, with representatives from Ngai Tahu, the Animal Health Board, Environment Canterbury, and other interested organisations.

In addition to the above 3 hui, the database was presented at a meeting organised by the Environmental Risk Management Authority (ERMA) at Rehua Marae, Christchurch, on 20th April 2006. This meeting was on hazardous substances. There were 65 participants, all from Maori organisations, from throughout New Zealand.

At each of the hui the research team began with a general presentation giving background information about 1080, and a summary of previous 1080 research on done by the team. We then presented the 1080 non-target impact database, and allowed participants to have a go at

using it, by exploring key questions that they had about 1080. This was followed by open discussion, which allowed participants to give feedback on the database, and also ask any general questions about 1080.

Each hui was concluded with a questionnaire (see Appendix 1) being handed out to each participant, allowing them to give written feedback on the database.

## Results

### Objective 1: Database

A total of 130 literature items were utilised during the production of the database. Only included was literature from well-known and reliable sources, and that had been appropriately peer-reviewed.

The database is designed around the concept of arranging the information in a series of interconnected layers that the user can navigate through to source information. The uppermost layer contains the title page and introductory information about the database. The layer below holds the foodweb and this represents the 'central station' of the database. The foodweb page employs a range of ecological compartments that align to the research question. One of the key successes of this database is that each compartment is specific enough to store scientific data, but collectively the foodweb creates an ecosystem summary of knowledge on 1080 impacts. Navigating through the ecological compartment of interest the user is directed to a list of species related to that ecological compartment. By selecting one of the species the user is connected to the layer below where a summary statement of available 1080-related literature on that species is held. Accompanying this summary is an assessment of risk and the abbreviated references that were used to generate the summary. At this point the user has the option of ascending back to any of the previous layers (list of species, foodweb, or introductory pages) to initiate a new query. Alternatively they can following the reference link to the bibliography layer where the complete citation is held. In some instances a PDF copy of the actual article is available and the user can choose to link to this and read or download it.

A copy of the database can be found on the CD in Appendix 3 at the back of this report.

While the best way to understand the database in action is to use it directly, the following is a detailed step-by-step account to how the database works. The first step on the CD is to open the PowerPoint file named "1_Header file.ppt". This is the only file that needs to be opened, and will begin the database session, as shown in Figure 2 below.

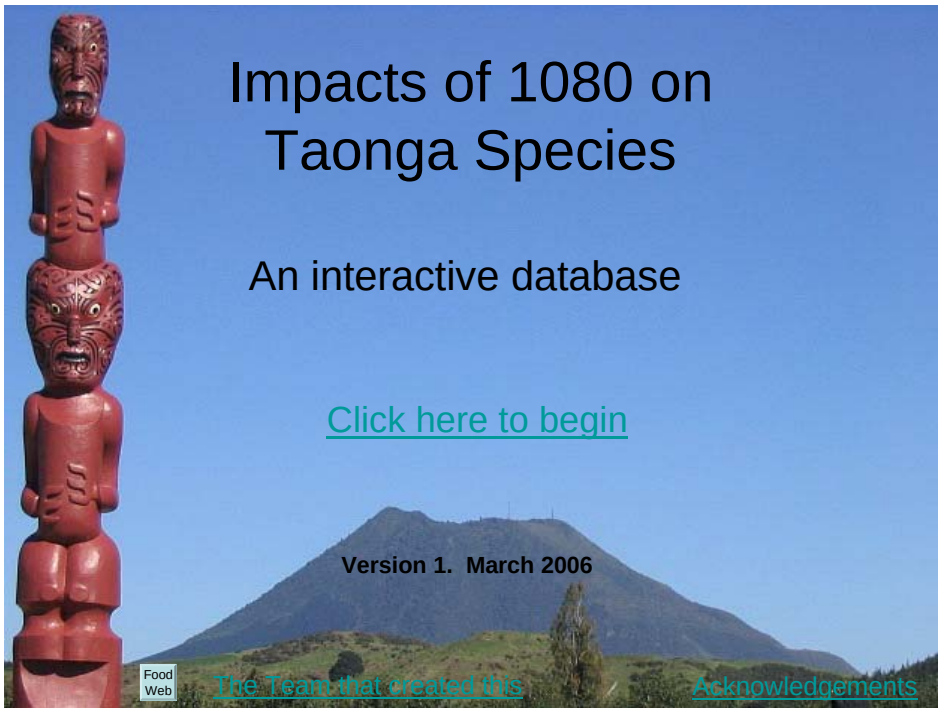



**Fig. 2.** Starting page of the database. From here users click on hyperlinks to begin accessing 1080 non-target information. For example if they click on the "Food Web" button on the bottom-left-hand corner, they are taken to the foodweb seen in Figure 1 above.

By clicking on the "Click here to begin" hypertext in the centre of Figure 2, users are taken to an introductory page, giving a background about how the database was created (Figure 3).

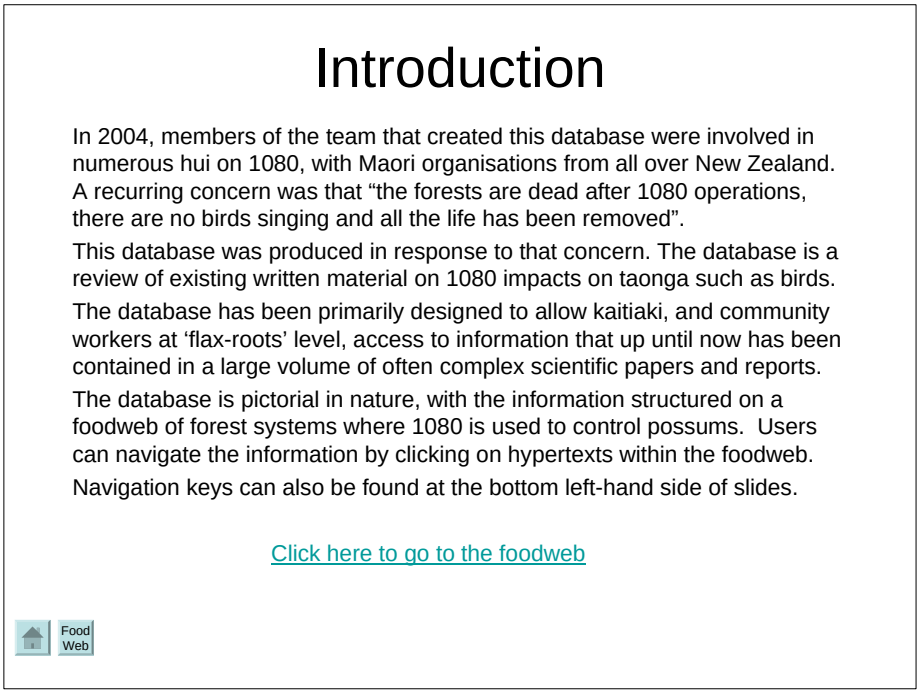



**Fig. 3.** Introduction page, giving background information on how the database came to be made.

From here users that click on the "Click here to go to the food-web" hypertext at the bottom will be taken to the food-web shown in Figure 1. From there, by way of example, if a user is particularly interested in the impact of aerially-applied 1080 on birds that eat insects, they click on the hypertext "Birds that eat insects" which will take them to the page given in Figure 4 below.

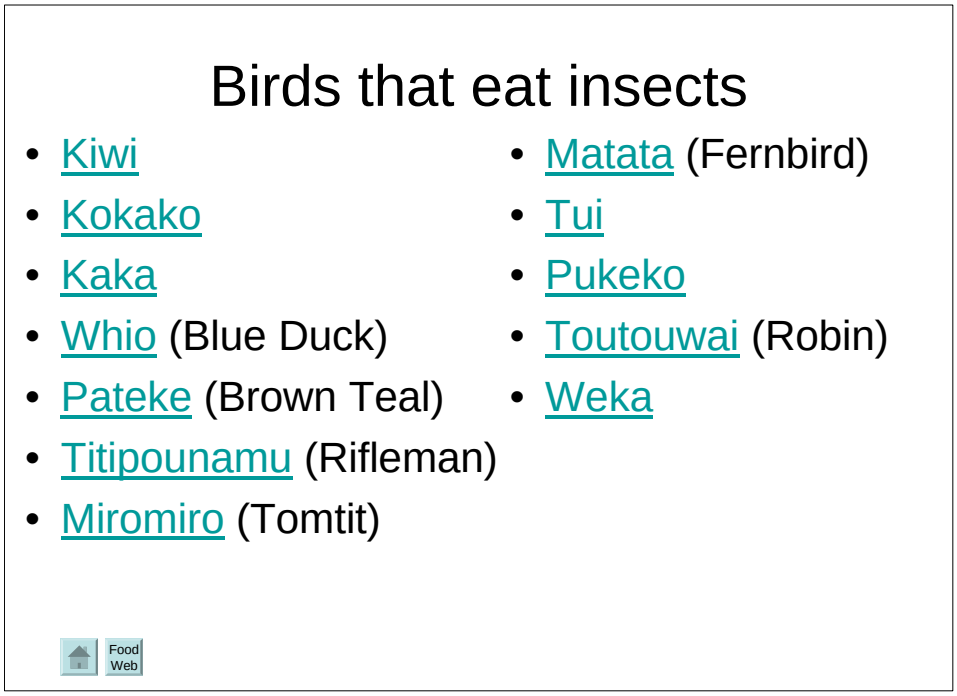



**Fig. 4.** Outline page of information available on birds that eat insects. From here users can click on hyperlinks to each of the bird species listed.

If the user is then interested in information on the potential impact of 1080 on kokako, they can click on the hypertext "Kokako", which will take them to the page shown in Figure 5 below.

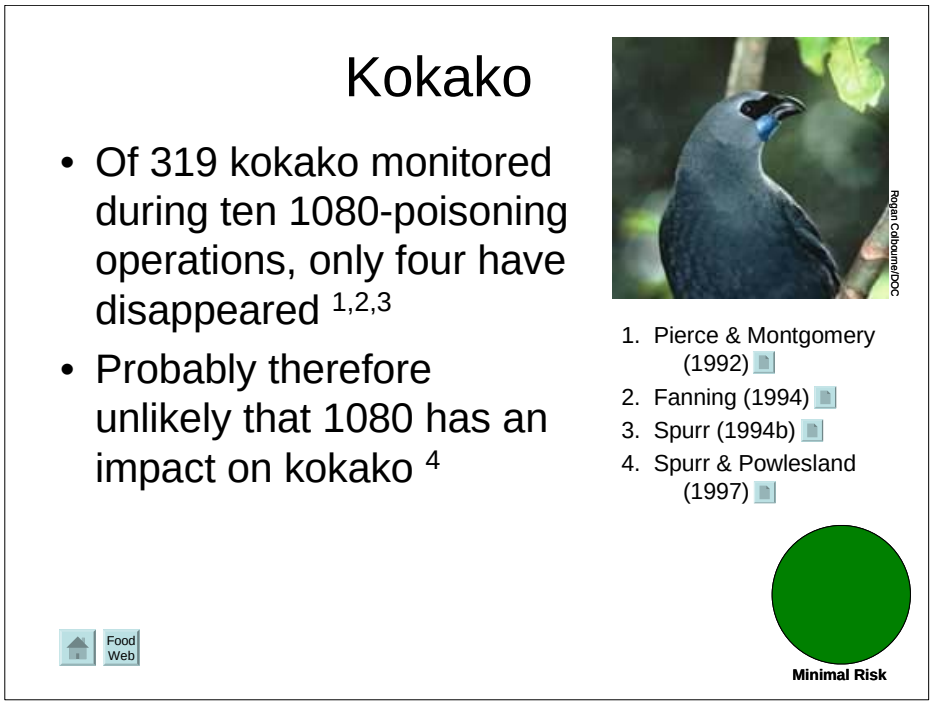



**Fig. 5.** Review page of information on 1080 impacts on kokako.

A key feature of the database that can be seen in Figure 5 is the risk diagram in the bottom-right-hand corner. This diagram allows users to get a quick idea of the risk of 1080 to each of the species that is represented in the database. We based the risk on the proportion of individuals of a population that have been shown to be killed by 1080 during aerial operations.

Another feature of the database that can be seen in Figure 5 is the hyperlink buttons after each of the literature references. These buttons will take the user to the reference list, to get full information on the publication where this information was obtained. And from there, where available, they can access an Adobe Acrobat PDF file of the actual literature article. Users can therefore potentially go to the source information if they desire.

## Objective 2. Disseminating the database to Maori communities

A total of 47 Maori community representatives attended three hui to disseminate the database (Table 1). Of these, 35 (74%) gave written feedback on the database. While this information is detailed in Appendix 2, there were a number of key points that arose from the survey:

A total of 91% of the respondents thought that the database was a **good** or a **very good** idea (see Question 5 in Appendix 2). Eighty-two percent of the respondents **agreed** or **strongly agreed** that the database was something that they would find useful (Question 2). Eighty-eight percent thought that the database was a good way to summarise current information on 1080 impacts in the forest (Question 6), and 89% supported the idea of using a visual database to represent all of the information available on 1080 (Question 7) remembering that the present database focused on 1080 non-target impacts.

**Table 1.** Number of attendees at each of three hui, and number of Survey Questionnaires returned.

| Hui Location | Number attending | Questionnaires Returned |
|---|---|---|
| Tuai (Lake Waikaremoana) | 13 | 11 |
| Ruatahuna | 19 | 16 |
| Christchurch | 15 | 8 |
| TOTAL | 47 | 35 |

Seventy-seven percent of the respondents reported that they had confidence in the findings on the database, because it had been created by an independent research team consisting of Ngai Tuhoe representatives and Maori scientists (Question 8 in Appendix 2).

When asked if they thought the database gave a balanced view of the available knowledge on 1080 impacts, 85% of respondents gave either a **neutral**, **balanced** or **very balanced** response (Question 3). Eighty percent **agreed** or **strongly agreed** with the idea that the research team did a good job of explaining how the database works (Question 1).

In terms of moving forward with the database, 82% of the respondents thought that the database should be shown to other iwi and interested Maori organisations (Question 9), and 78% thought that there was other specific information that should be included in the database (Question 4). This information is summarised as follows:

"*Pictures of the poison 1080 baits; circles instead of squares; colour code surveys (written) reports for (green) and against (red); and also show the credibility of the report to show that the information read has followed a process that everyone agrees to be a correct one*"

"*In the intro - audio voice over of the intro; pictures of 1080 - and page dedicated to info on 1080; Food web - use pictures instead of boxes*"

"*For the information to be live so it can be up-dated as necessary e.g. studies to be done in our specific area during a 1080 drop*"

"*Explanation of terms used; Maori translation/version; identify peer reviewed papers vs other reports*"

"*I guess a lot of the research to date has been driven by the technology that's available (ie) radio tracking devices. Here are some of the small birds that I did not see on your list: Pepe – Koparapara – Rearea – Kakariki – Porete, Miromiro – Pihipihi, Horirerire – Tirairaka – (introduced) Blackbird, Sparrow, Finch, Yellow Hammer, Thrush and Quails. Over the years the numbers have declined dramatically, especially the Pihipihi. In my early childhood it was harvested in great numbers in season using a special method. As for the introduced species the numbers seem to rise and fall, I'm not sure why. Until we have peer reviewed data on these, our question of silence will remain unanswered.*"

In addition to the feedback obtained from the above three hui, feedback was obtained from 65 participants at an ERMA hui on hazardous substances, at Rehua Marae, Christchurch , on 20th April 2006. At this hui there were a number of speakers that presented information on a number of different subjects. The following are survey questions created by ERMA staff,

with the particular responses that were made about a presentation given by Shaun Ogilvie and Jamie Ataria on the 1080 non-target impacts database:

**Did you find the level of the presentations appropriate? Please explain why.**
"*More time for Shaun and Jamie would have been good*"

**Did the speakers help clarify the area of hazardous substances and ERMA New Zealand's role for you?**
"*Yes very much e.g. changed my perspective on 1080 from absolutely 'No' to 'Want to know more'*"

**Please comment on what sections of the wananga you found most useful/interesting and why?**
"*Jamie and Shaun – real data on an up-coming issue*"

"*1080 debate, congratulations to Jamie and Shaun for informative and useful debate*"

"*The 1080 korero, was great to see Maori values as an integral part of science, there doesn't have to be a gap between Western science and Maori values. Some of the participants gave the impression that there is a huge gap between science and culture, I think we need to close this gap.*"

**Any other comments?**
"*It is a great privilege to participate. To me the 1080 work is a great example of how Maori input can be included at a high level in helping decide/formulate the research questions*"

We also fielded requests to repeat the presentation at Takahanga Marae (Kaikoura), and in Northland.

These comments provide a basis to assess the database in its present form (see Discussion section below), and to improve the database and make it readily available to end-users, in the next phase of this research.

## Discussion

### Assessment of the database in its present form

The database was produced primarily to allow Maori community groups to gain access to published literature on 1080 impacts on taonga non-target species. Considerable thought was given to develop an approach that could be used to make this information available. The creation of a database founded on the pictorial representation of a foodweb was eventually chosen. In practice, as described in the results section above, it was clear that such an approach would have a number of key advantages:

- The foodweb concept is well aligned with Maori conceptualisation of natural systems, by giving an holistic picture of 1080 in the environment.
- The interactive database model allowed easy access around the information, by using hyperlinks to move through layers of information.

- Users are able to gain a level of understanding suitable to their requirements, as they can gather simple information from the review material, or go as far as the source information, where PDF files are available.

Positive feedback was given by the Maori participants that were shown the database. A large majority of the participants thought the database was a good idea, that it was something that they would find useful, and that the pictorial database was a good approach to summarising available 1080 information. Furthermore, the majority of participants thought the database should be made available to Maori communities at no charge.

In summary, the database concept, as developed during this research project, is a tool that is likely to be adopted by Maori and the wider community, and so further work should be undertaken to make the database available to those communities.

## Where to from here for the database?

The following key steps should be taken to make the database generally available to Maori and the wider community:

- It is suggested the database be made available on a website, this could be hosted by the Animal Health Board, or by Lincoln University. Hosting the database on a website is preferable because new information can be added easily and existing information can be updated. The internet is also used widely by Maori therefore connecting with the target audience. Further work will be required to convert the existing PowerPoint file into an internet-ready format.

- On the suggestion of some hui participants, a precursor section should be added to the database that gives a basic description of 1080, potentially including its properties, natural occurrence, mode of use in New Zealand, how use patterns have changed over the years, toxicity to different species, advantages and disadvantages, and comparison to other available toxicants.

- Permissions will need to be gained to use the illustrations within the database. The majority of illustrations are sourced from the Department of Conservation and from the Landcare Research Arthropod Collection, and we therefore do not perceive major problems with getting these permissions.

- Permissions will need to be obtained for use of the PDF files of source information. This could be done in a gradual process, with PDF files added to the website as permissions become available.

- It would be prudent to have the database peer-reviewed by an independent 1080 researcher, therefore making it scientifically robust in the same manner that the peer-reviewed literature chosen for the database is robust.

Once these processes are completed, we will have a database that is readily available to Maori and the wider community, that covers basic concepts about 1080, that has all necessary permissions for use of potentially copyright material, and that has been peer-reviewed.

A strategy to release the database should be developed in order to maximise the uptake and use of this database. This would include kanohi kit e kanohi (face to face) meetings with other Maori organisations throughout New Zealand, to present the database, explain the website and where they can access it, give them an overview about 1080 and the process behind the production of the database, and answer any questions about the database.

## Conclusions

- Pictorial foodwebs offer a useful approach to organising complex information on 1080 into a format that can be readily accessed by community end-users, especially Maori
- Scientific literature on the non-target impacts of 1080 on species of importance to Maori was able to be put into the form of a foodweb database
- Such a database was given strong support by a test group of Maori communities, and is therefore likely to be an effective approach for the wider Maori audience
- Once the database is generally available to Maori communities, it is likely to play a key role in informing these communities about 1080, subsequently allowing their informed and appropriate inclusion in the appropriate use of 1080

## Recommendations

- In an extension of the present research project, the following actions should be taken:
- The database should be put on a website to make it readily available to Maori communities and other interested end-users
- Relevant permissions should be sought to allow photographs and PDF files to be used on the website
- The database should be peer-reviewed by an independent 1080 researcher, to ensure that the review information is scientifically robust
- A series of hui should be undertaken throughout the country to introduce a wide range of Maori communities to the database

## Acknowledgements

The authors would like to acknowledge Zack Bishara, Maraea Faulkner and Peter Jackson for their help collecting and collating responses from participants at the ERMA hazardous substances hui.

## References

Innes,J., Barker,G., 1999. Ecological consequences of toxin use for mammalian pest control in New Zealand -An overview. New Zealand Journal of Ecology 23, 111-127.

## Appendix 1. Questionnaire About the Interactive Database

*Please indicate your choice with a tick (✓) in the box that most fits your answer*

1. Did you feel that the research team responsible for creating this database did a good job of explaining how this database works?

| Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ |

2. Is this database something you would find useful?

| Very useful | Useful | Neutral | Difficult | Very Difficult |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ |

3. Do you feel that this database gives a balanced view of the available knowledge on 1080 impacts?

| Very balanced | Balanced | Neutral | Biased | Very biased |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ |

4. Are there other things that you feel should have been included in this database?

Yes ☐ No ☐ (if yes please comment on the issues that you would like to see in the presentation)

_____

_____

_____

_____

5. Do you think that this interactive database is a good idea?

| Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ |

6. Do you think that this database is a good way to summarise current information on 1080 impacts on the forest?

| Yes | No |
|---|---|
| ☐ | ☐ |

7. Would you support using this idea of a visual database to represent all of the information about 1080?

| Yes | No |
|---|---|
| ☐ | ☐ |

8. Does the fact that this research has been carried out by an independent research team consisting of Ngāi Tūhoe representatives and Māori scientists give you confidence in the findings about the effects of 1080 on the ngahere?

| Yes | No |
|---|---|
| ☐ | ☐ |

9. Do you think that this database should be shown to other iwi and interested Māori organisations?

| Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ |

10. If so are there changes or alterations that you would suggest?

_____
_____
_____

11. Any other comments?

_____
_____
_____
_____

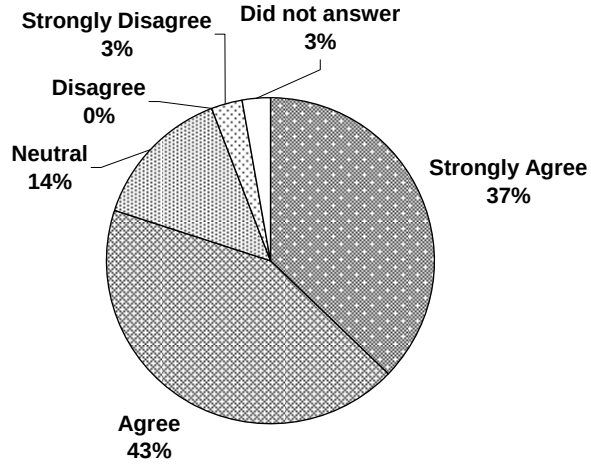
Kāti rā, he mihi nui tēnei ki a koe mō ōu whakaaro. Ka noho ōu whakautu i runga ake nei hei āwhina, hei tohutohu i tēnei mahi rangahau. Kia mutu tēnei hui, ka wehewehea ngā pepa uiui, kātahi ka whakahoki kōrero ki te Animal health Board. Mā rātou te whakataunga whakamutunga, mena ka whaia tēnei huarahi, kāore rānei.

Thank you for taking the time to answer this survey. Your responses above will assist and guide this research project. At this end of this meeting all the responses will be collated and sent through to the Animal Health Board. The Animal Health Board will make the final decision whether to, or whether not to, pursue this database.

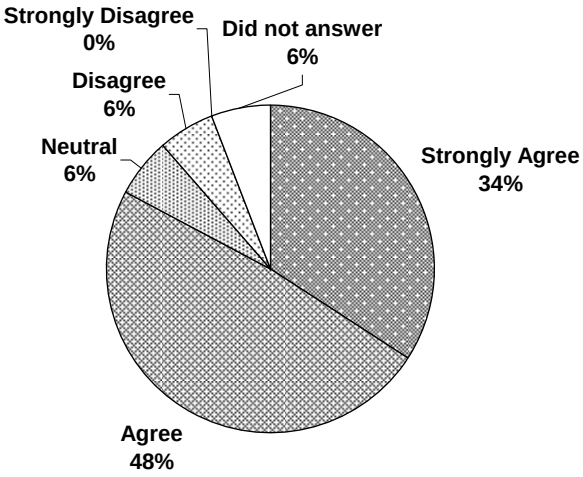
Noho ora mai rā i runga i ngā manaakitanga katoa, nā
Te hunga rangahau

# Appendix 2. Summary of Questionnaire Responses

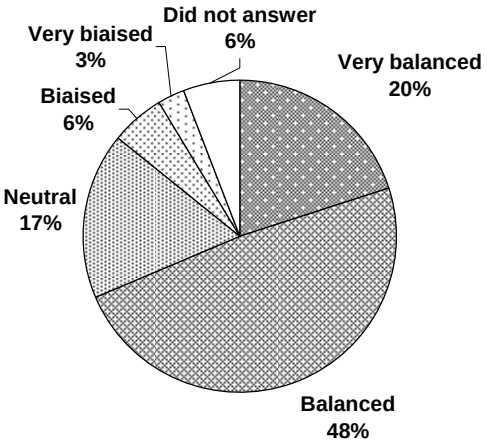
**Question 1:** Did you feel that the research team responsible for creating this database did a good job of explaining how this database works?



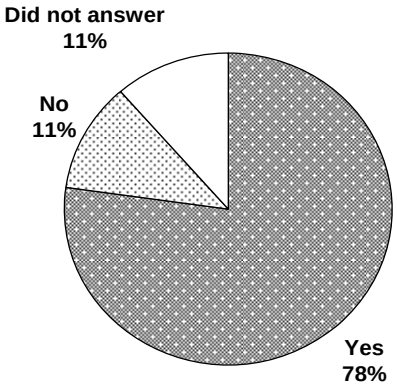

**Question 2:** Is this database something you would find useful?



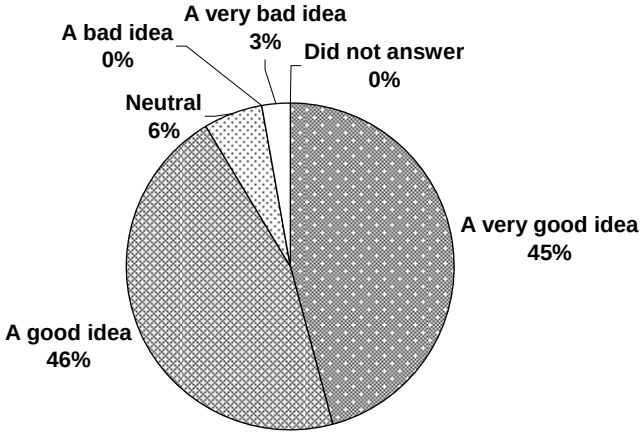

**Question 3:** Do you feel that this database gives a balanced view of the available knowledge on 1080 impacts?



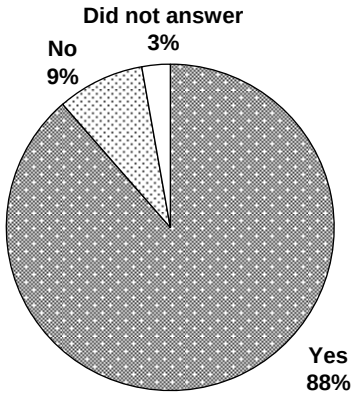
**Question 4:** Are there other things that you feel should have been included in this database?



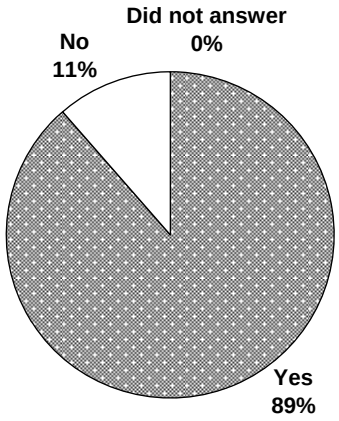

**Question 5:** Do you think that this interactive database is a good idea?



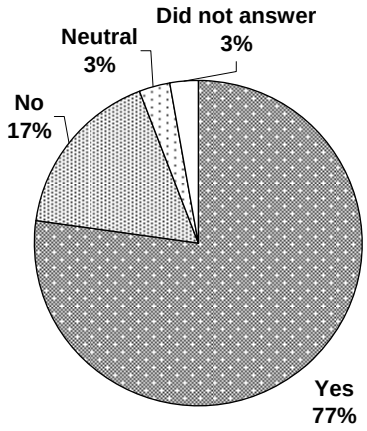

**Question 6:** Do you think that this database is a good way to summarise current information on 1080 impacts on the forest?



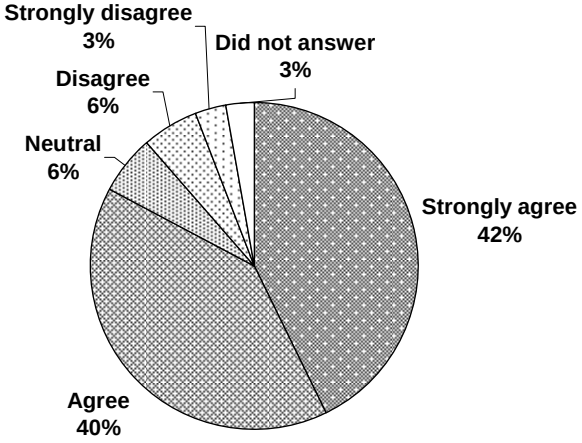
**Question 7:** Would you support using this idea of a visual database to represent all of the information about 1080?




**Question 8:** Does the fact that this research has been carried out by an independent research team consisting of Ngai Tuhoe representatives and Maori scientists give you confidence in the findings about the effects of 1080 on the ngahere (forest)?




**Question 9:** Do you think that this database should be shown to other iwi and interested Maori organisations?



## Appendix 3. CD of 1080 Non-target Impacts Database