# Hawke's Bay Fish & Game 5 Year Strategic Waterfowl Habitat Plan

# (Dabbling Ducks)

## Part I. Introduction

### Dabbling Ducks Introduction

Dabbling ducks are ducks that use shallow water habitat for feeding primarily on the surface or tipping headfirst into the water to graze on aquatic plants. Dabbling ducks in New Zealand include the mallard (*Anas platyrhynchos*), grey duck (*Anas superciliosa*), Australasian shoveler (*Anas rhynochotia*), grey teal (*Anas gracillis*), and brown teal (*Anas chlorotis*). Of the dabbling ducks, three are on the game bird list which includes mallard, grey duck, and Australasian shoveler. These 3 species are managed by Fish & Game New Zealand.

The mallard and grey duck are highly hybridized and are treated as a single species for management purposes. The mallard/grey duck are the most targeted species of game bird hunters and the focus of this management plan. Although the focus is mainly on mallard/grey ducks, the habitat needs for Australasian shoveler have strong overlap with the mallard/grey duck and work to improve habitat for mallard/grey ducks will positively impact Australasian shoveler populations.

### Habitat Requirements for New Zealand Dabbling Ducks

New Zealand dabbling ducks usually feed on the seeds or tubers of aquatic plants in shallow water. Food found in 7 to 30 cm of water is easily used by dabbling ducks. The best habitat for ducks is natural wetlands with a healthy mix of emergent and submerged vegetation. Wetlands that are important to dabbling ducks include permanent, temporary,

and seasonal wetlands. Areas that are dry enough to grow vegetation, produce seed, and then become flooded, can be excellent feeding habitat for puddle ducks. The ideal duck habitat is an irregular mixture of 50 percent open water to 50 percent emergent vegetation. In larger wetlands the mixture could include 50 percent open water, 40 percent emergent vegetation and 10 percent islands. The ideal water depth for dabbling ducks in wetlands ranges from 5 to 25 cm deep.

**Nesting Habitat**

Typical nesting habitat is in the drier uplands just next to wetlands. Although ducks may nest over a kilometre from water, ideal nesting cover should be within about half a kilometre of brood-rearing habitat. To minimize nest predation, it is best to have large blocks of nesting habitat (Garrick 2015). As long as sufficient cover (around 75% canopy cover and 50 -75 cm in height) is provided, almost any species of vegetation will provide nesting habitat. Rank grass and native sedges provide nesting cover (Jennifer Shepherd, personal communication) for mallards and grey ducks in New Zealand. Shrubs can also provide nesting cover and could include Mingimingi (*Coprosma propinqua*), karamu (*Coprosma robusta*), and swamp coprosma (*Comprosma tenuicaulis*).

Habitat Suitability Index (Rasmussen and Wright 1990) for dabbling ducks identifies several important variables for breeding dabbling ducks including:

Distance between nest and water with emergent vegetation (<0.4 km)

Height of residual nesting cover (0.4m to 0.6m)

Percent canopy cover of nesting vegetation (> 75%).

Human Disturbance (none is ideal)

Ratio of vegetative cover to open water (40:60 – 60:40)

These five variables provide a guideline for restoring or creating waterfowl breeding habitat.

**Brood Habitat**

Ideal brood habitat for all dabbling ducks consists of irregularly shaped ponds with ample shoreline and emergent vegetation for hiding. During the first six weeks of life, young ducks primarily feed on insects and other invertebrates. They generally have no difficulty finding this food source in wetlands. Normally, 75 to 100 percent of the duckling's diet is composed of invertebrate foods, such as shrimp, clams and similar invertebrates. Dabbling duck broods usually prefer dense, emergent vegetation for escape cover.

**Fall and Winter Habitat**

During winter, ducks congregate on rivers, reservoirs, sloughs and other wetlands that offer open water. In addition to aquatic invertebrates and vegetation, grains can provide a high-energy food that dominates the winter diet of many dabbling ducks. Wetlands with high amount of emergent vegetation or near crops provide good habitat for wintering waterfowl.

**Long and short-term Factors Influencing Dabbling Duck Populations**

Long-term factors leading to the decline of waterfowl in Hawke's Bay include the loss and degradation of wetland and waterfowl habitat. Over 98% of Hawke's Bay's wetlands have been lost due to drainage and development. Most of the remaining wetlands through the developed portions of Hawke's Bay are not functioning properly due to altered hydrology (drainage and irrigation), increased nutrient loads, and grazing practices.

Loss of nesting habitat has also had an impact on dabbling duck populations throughout the agricultural portion of Hawke's Bay. Although, there is movement in the agricultural areas to fence livestock from wetlands there is very little effort to fence a dry

buffer around the wetlands to provide nesting habitat for waterfowl. Also, absent from much to the developed Hawke's Bay region are native bush patches that could also provide some nesting habitat.

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## Part II. Creating and Restoring Wetlands

With 98% of Hawke's Bay wetlands lost due to drainage, the remaining wetlands have been either altered or disconnected from other wetlands in the region. The isolation of the remaining wetlands limits their potential productivity. Waterfowl research have identified that wetland complexes across the landscape are important for waterfowl conservation. In general, waterfowl use wetlands that are > 1ha in size, located within complexes of > 5 wetlands within a 1 km radius and have abundant emergent and submersed vegetation (McKinstry and Anderson 2002).

Improving existing wetlands or creating new wetlands are two of the best options to enhance habitat for dabbling ducks. An irregular pattern of open water and marsh provides the most benefits to waterfowl. Water depths greater than 1m is necessary to prevent emergent vegetation from choking out open water areas. Research has indicated that a complex of wetlands in close proximity is ideal for waterfowl habitat. Throughout Hawke's Bay, the wetlands that remain are usually isolated from other wetlands. The creation of new wetlands or restoration of drained wetlands should focus on areas surrounding the remaining wetlands to create a complex of wetlands of different sizes in the area therefore enhancing the productivity of the area.

### Project Goals

1. Restore degraded wetlands to provide habitat for breeding dabbling ducks
2. Establish connectivity between larger isolated wetlands and shallow lakes
3. Develop techniques for establishing wetland vegetation

**Objective 1:** Restore and/or create 3 or more waterfowl breeding wetlands per year that enhance the connectivity of established wetlands and shallow lakes.

The restoration and/or creation of wetlands should focus on areas with an existing wetland or lake to create a complex of wetlands and enhance connectivity in the area. Recent focus for wetland work by Hawke's Bay Fish & Game (HBF&G) in Central Hawke's Bay have focused on creating a complex of wetlands around Lake Whatuma, Wanstead Lagoon, Lake Purimu, Lake Poukawa, and Horseshoe Lake. There is a need to identify important wetlands and lakes in Northern Hawke's Bay and the Heretaunga Plains but will include the estuaries (Waitangi, Ahuriri, Tukituki) and shallow lakes (Runanga, Rotokare, Oingo).

**Objective 2:** Visit and provide advice on the management of 10 privately owned wetlands per year.

Since most of the Hawke's Bay Region is in private ownership, HBF&G need to work with private landowners to restore and create wetlands on their properties. Hawke's Bay Fish & Game staff will provide advice on land management, game management and assist with acquiring funding to do wetland work on private land. There will be a need to develop strong working relationships with the Hawke's Bay Regional Council (HBRC) Land Management team and QEII staff to identify potential wetland creation and restoration sites on private land.

**Objective 3:** Provide plants for the enhancement of private wetlands for waterfowl to 3 properties per year.

Hawke's Bay Fish & Game will provide plants to landowners wanting to enhance their wetlands for waterfowl. We will work with HBRC to fund some of the projects. There will be a need to seek funding to expand the program.

**Objective 4:** Develop a monitoring protocol that will provide feedback on the success and identify issues for improvement.

Developing a monitoring program will be hard on a landscape basis, but monitoring the success of restoration projects will provide feedback to make future management decisions. We work with willing landowners to develop a simple monitoring system that will provide landowners and HBFG with data to determine the success of a project.

**Objective 5:** Create up to 2 media releases a year to encourage private landowners to restore wetlands on their properties.

Media releases should focus on successful projects that encourage landowners to restore wetlands on their properties. Efforts should also be made to submit articles to the rural papers with information on wetland and waterfowl management on private lands.

**Funding**

Hawke's Bay Fish & Game staff will apply for money to the Game Bird Habitat Trust to assist us in the restoration and/or creation of wetland habitats. There is funding available through the HBRC for planting which staff will assist landowners in applying. Staff will explore opportunities to partner on the creation and restoration of wetlands in the HBRC. Potential partnership with the HBRC would include wetland development and enhancement around Waitangi wetland including the area leased by HBF&G, around the wetlands created

by the Catchment Board (Golf Course Ponds, Addis Ponds, and Pukeora Pond), and other areas along the rivers where the land is managed by the HBRC. There are also opportunities to forge a partnership with the Game Bird Habitat Trust (GBHT) which has access to more funding sources due to it being a registered charitable trust. Hawke's Bay Fish & Game staff would identify funding opportunities and work with the GBHT to apply for funding through the trust.

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### Part III. Enhancing Waterfowl Habitat on Farm Ponds

Most stock watering ponds have over-grazed margins and are too deep to provide adequate habitat for waterfowl reproduction. However, with strategic fencing to allow for vegetation to establish and the creation of shallow water habitat in these stock ponds, they can provide waterfowl habitat. Rumble and Flake (1983) identified pond size, shallow water areas with submersed vegetation, number of wetlands within 1.6 km and emergent vegetation were associated with increased use of ponds by total broods. Garrick (2015) recommended the creation of shallow areas, planting vegetation for shelter from prevailing winds and overhead cover and ponds should be fenced. Svingen and Anderson (1998) also suggested that ponds be fenced from livestock to improve clarity which encourages the growth of macrophytes which were important to macroinvertebrate diversity.

Pond size plays an important role in the use of waterfowl with ponds > 1 acre having a higher use of waterfowl broods. Shallow ponds over > 1 acre encourage the maximum waterfowl production although smaller ponds can contribute to yearly productivity. Although size of the pond is important, Garrick (2015) found 3 of the 5 highest use ponds were shallow (<43cm) for the whole whereas the 5 lowest use ponds had very little shallow water habitat.

Hawke's Bay Regional Council mapping has identified 7,159 wetlands in Hawkes Bay Region, of which 40% are likely to be farm ponds. With 98% of Hawke's Bay wetlands lost due to drainage and the large number of farm ponds created to provide stock drinking water there is a potential to modify these ponds to provide both waterfowl habitat and clean stock drinking water.

Research in livestock weight gains shows that good quality water can result in weight gain in livestock; therefore farmers have an incentive to provide clean water to improve growth rates. By fencing an adequate buffer around the pond and limiting stock access there can be a net financial benefit to the landowner and a benefit to game bird breeding by creating habitat.

There can be some significant habitat gains by strategically identifying and enhancing farm ponds across the Hawke's Bay landscape. Fencing a buffer around most of the pond would enhance waterfowl habitat, but strategic plantings of emergent, submerged and marginal vegetation would greatly increase the success of breeding waterfowl on these ponds.

The creation of protection of shallow water is important for waterfowl broods. Some of the ponds in the Hawke's Bay region have shallow margins which dry over summer which only need to be protected from overgrazing. Other ponds will need to be modified to create this shallow water habitat.

**Project Goals**

1. To improve livestock drinking water quality
2. Provide wetland habitat for waterfowl
3. Provide a series of demonstration ponds
4. Develop techniques for establishing wetland vegetation in farm ponds

**Objective 1:** Convert up to 15 ha of farm ponds into productive wetlands over the next 5 years

Over the next 5 years, HBF&G will work with landowners to provide 15 ha of waterfowl habitat on stock drinking ponds. The first ponds will be used to run trials to

1. Develop techniques to establish both emergent and marginal vegetation.
2. Establishing nesting habitat and buffer width (size, plant species, ect.)
3. Methodology for providing stock access to drinking water (i.e. partial fencing, reticulation, water troughs).

**Objective 2:** Create 3 pond demonstration sites to be used for promotion

Demonstration ponds will be located on farms that have easy access for HBF&G to have open days to show the public, landowners, and waterfowl hunters how to improve farm ponds to provide both clean livestock drinking water and waterfowl habitat. Ideally, at least one pond should be visible from the road to allow for signage to improve visibility of the project. Hawke's Bay Fish & Game staff will work with landowners, HBRC, Beef & Lamb, and other interested parties to develop these demonstration sites. There is also potential to create a demonstration wetland/pond at the HBFG headquarters.

**Objective 3:** Develop a series best management practices in improving farm ponds for water quality and waterfowl habitat

Use strategic fencing, plantings, and logs to improve farm pond/wetlands for waterfowl. To develop best management practices, we will have to do a series of trials and experiments to determine:

- Buffer widths for water quality and nesting habitat
- Best substrate for nesting (rank grass vs sedges)
- Establishing emergent and marginal vegetation
- Trap arrangement for predator control

**Objective 4:** Develop a monitoring protocol for a select sample of farm ponds that will provide feedback on the success and identify issues for improvement.

Monitoring the success of creating waterfowl habitat on farm ponds will provide feedback to make future management decisions. We will set up a monitoring program for selected farm ponds that will provide HBFG feedback on best management practices and will provide the information for Objective 3. These ponds will be in a relatively small and easily accessed area. Monitoring protocol for these ponds can be found in Appendix A & B. In 10 – 20 remote ponds, we will monitor waterfowl use through the use of time-lapse cameras (Appendix C).

**Objective 5:** Provide a series of videos and workshops that highlight best management practices and successes.

To locate landowners who are willing to participate, we will promote the project through social media, local newspaper, rural magazine, HBF&G newsletters. For those farmers that are not targeted through these avenues, we will work with organizations including Beef & Lamb, HBRC, and QEII Trust. Primarily we will target those farmers who have an interest in waterfowl management and hunt waterfowl. As projects are completed, we will have open days to demonstrate our successes to the community. These open days will be advertised in local media and through partnerships that we develop through this partnership.

We will develop informative videos that showcase these successes and also provide a series of "How To" videos to provide landowners with the tools needed to convert their farm pond into productive waterfowl habitat.

**Funding**

Initial funding can be through the Game Bird Habitat Trust; however they do not regularly fund fencing and planting projects. Hawke's Bay Regional Council does provide some funding, but it is usually reserved for natural features. There is an opportunity to work with several organizations to fund this work including Bees for Trees and Beef & Lamb. There are also a number of funding opportunities for planting natives through various groups and companies. For example, the Honda Tree Fund provides funding for the planting of native trees.

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### Part IV. Enhancing Waterfowl Habitat in Drainage Ditches

With the loss of 98% of Hawke's Bay wetlands, drainage ditches are now serving as pseudo wetlands in which waterfowl are breeding. Throughout much of the Heretaunga Plains the only areas for breeding waterfowl are the drains. Currently, Eastern Fish & Game are analysing data on waterfowl and brood usage of drains and identifying habitat features that are important to waterfowl reproduction in drains (McDougall, Personal communications).

Drainage ditches if managed properly can provide aquatic insects (important food items for ducklings), overhead cover from predators, and travel corridors to large wetlands with higher habitat values without altering the primary function of the drains. Although our understanding of drains and their role as waterfowl habitat is limited, trials with different management techniques and good monitoring will enhance our knowledge and allow us to improve waterfowl breeding in these areas.

**Project Goals**

1. Enhance drains to provide quality habitat for waterfowl while still providing its function as a drain
2. Develop "best practices" for enhancing waterfowl habitat in drains

**Objective 1:** Work with HBRC to identify methods to enhance drains for waterfowl habitat and still maintain function of the drains.

To encourage invertebrates (main food source for waterfowl broods) and protective cover for waterfowl broods, there is a need to plant cover along drains that shade about 70% of the drain. In smaller drains, *Carex secta* plantings will provide

adequate cover without any modification of the drain. Larger drains will have to be planted with shrubs and trees to provide shade necessary for invertebrate production.

There is an opportunity to attempt practices that are established in other parts of the world that have been successful at providing invertebrate habitat and reducing nutrient levels in the drains such as the two-stage ditch design. This drain modification will allow not only for the enhancement of invertebrate communities (thus waterfowl brood food source), but will also create nesting habitat and increase cover that will protect broods from predators.

Drain can also act as linkages between nesting habitat and wetlands with brood-rearing cover. Due to their linear nature, drains act as corridors for predators to move, but the linking of drains to suitable wetland habitat may reduce the amount of time that a waterfowl brood spends in this linear habitat, but the planting of cover will help assist reducing the predation of waterfowl broods using these drains to move between wetlands.

**Objective 2:** Provide HBRC with assistance on enhancing 1 - 3 km of drain a year to provide waterfowl habitat.

Since, drain management for wildlife values is a new idea to the management of drains in New Zealand, we need to start with some showcase examples that will demonstrate that drains can provide habitat. After establishing a few plantings of drains, HBRC will monitor the impacts on water quality and invertebrate abundance. Hawke's Bay Fish & Game can monitor waterfowl brood use of these areas. There will be a need to set up a protocol, but Eastern Fish & Game have been doing some monitoring work and their protocol could be used here in Hawke's Bay.

**Objective 3:** Develop a monitoring protocol that will provide feedback on the success and identify issues for improvement.

Good monitoring that will allow us to evaluate the impact of various management options to breeding waterfowl is critical to improving our management of drains for waterfowl habitat. Monitoring will include brood counts (Appendix A) in select sections of drains to assess the productivity of drain management regimes.

**Objective 4:** Write 2 press releases with the HBRC on the successes of planting the drains in the region.

It is important to keep the public informed on both the working relationship between HBRC and HBF&G, but to also show that we can manage drains for the benefit of wildlife while the drain still is keeping agricultural land dry. As the project progresses, HBRC & HBF&G will work on writing articles for the rural magazines and newspapers that show how landowners can better manage their drains for wildlife values.

**Funding:**

Due to most of the drains being managed by the HBRC, the council has a budget for improvement work on the drains. Outside of this budget, HBF&G can assist in providing funding for plants through their annual budget or look for other sources of funding for plants. There may be options with the Ministry for Primary Industry and their Sustainable Farming Fund to assist with drain improvements for waterfowl management.

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### Part V. Enhancing Waterfowl Habitat on River Berm lands

Hawke's Bay has very little "public" land that can be used to enhance game bird habitat. The largest area of public land is the river berm land. These areas are managed by the HBRC for flood control. In the past, the HBRC and HBF&G have done some game bird enhancement projects in the river berm land with good success. Currently, the management of the river berms are under review by HBRC. They are considering various options including removal of grazing from the berm areas. The timing is good to work with HBRC to improve game bird habitat along the river berms.

**Project Goals:**

1. Create waterfowl production area using strategic plantings of sedges and rushes and establishment of ephemeral wetlands in the river berm land areas

2. Work with HBRC to identify areas that can

**Objective 1:** Establish an example "Waterfowl Production Area" within the berm land

Establishing an area of mixed ephemeral wetlands and sedge/rush land in the river berm would create good waterfowl breeding habitat. These shallow ephemeral wetlands provide good foraging areas for waterfowl during breeding part of the year.

**Objective 2:** Identify 3 sites along the berm land that could potentially be developed into "Waterfowl Production Areas"

Areas of high waterfowl production are large with good nesting cover and in close relationship with wetlands. Sites for "Waterfowl Production Areas" should be large

in area, have some existing wetlands or areas to create wetlands, and minimal disturbance from humans during the breeding season. These criteria are important to a successful "Waterfowl Production Area". Efforts should be to identify potential sites, assess their value and prioritize sites to establish "Waterfowl Production Areas".

**Objective 3:** Develop a list of vegetation species to use to create a "Waterfowl Production Area"

There will be a need to develop a list of plant species that can handle wet conditions during winter and spring and dry conditions during summer and also provide nesting habitat.

**Objective 4:** Develop a monitoring protocol that will provide feedback on the success and identify issues for improvement.

Monitoring protocols need to address the use of the sedge/rush land habitat for nesting which can be done through locating and monitoring nest. Nest can be located through the use of a drag chain. Also, the use of the ephemeral wetlands by waterfowl broods can provide useful feedback on the success of establishing a "Waterfowl Production Area".

**Funding:** Hawkes' Bay Fish & Game Staff will submit an application for the first "Waterfowl Production Area" to the Game Bird Habitat Trust. After the initial project, HBF&G will work with HBRC to fund similar "Waterfowl Production Areas" along the river berm lands.

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## Part VI. Predator Control

There is a lot of speculation about predators and what role they play in the productivity of waterfowl in New Zealand. Studies throughout the worlds have shown that intensive predator control can enhance the productivity of waterfowl in some areas but not others. Research has indicated that the best areas to establish predator control are your high waterfowl breeding areas. Prior to predator control it is important to identify these high value waterfowl breeding areas to do more targeted predator control and have a greater impact on populations.

The long-term way of reducing predation is physically concealing waterfowl from predators by simply leaving extensive areas of rank sedges and grasses next to waterbodies to provide cover. A lack of quality nesting cover is a significant issue in the Hawke's Bay region and until there is sufficient nesting habitat some type of predator control will be required to improve nest success. Predators which formerly had to search through large areas of cover to find nests can now much more effectively search the much smaller cover areas.

Lethal control of predators involves using either poison or traps and can be time consuming and costly. A recent study conducted in the North America found that the cost of producing one extra fledged mallard duck through utilising lethal control alone equated to $74.29 (USD). It is likely that different predator/prey dynamics exist in New Zealand but the same bottom line principles apply. Hawke's Bay Regional Council Staff estimate that the first 3 years of intensive predator control would cost between $10 and $40/ha/annum (Leckie, personal communication). Due to the high cost it is imperative to work with other organizations to establish good predator control methods and reduce costs. Although creating adequate nesting cover is seen as a priority, predator control can be an effective means of

boosting population numbers over the short-term or until new technologies are developed to eradicate mammalian predator populations.

**Project Goals:**

1. Align with other agencies and organisations to develop best practice guidelines to ensure predator control in wetlands is conducted using appropriate and proven methods.
2. Actively assist in setting up predator control programmes in strategic waterfowl breeding locations.
3. Assist other agencies in researching more effective techniques to control predators on large wetlands

**Objective 1:** Identify the important breeding locations for waterfowl where predator control will have a positive impact on Hawke's Bay's waterfowl population and set up a monitoring program to assess the impacts on the population.

It is critical to have an understanding of the areas within Hawke's Bay that are contributing the most to the population. It is these areas that we will be able to make significant impacts on the population. Efforts should be made to develop a methodology to identify important areas for waterfowl reproduction in the areas.

**Objective 2:** Work with clubs to develop predator control on areas that they hunt

The Whatuma Shooters Association and Pekapeka Shooters Association already have a predator control program in place. Hawke's Bay Fish & Game can assist them through providing advice, training and assisting with grant applications. The Waitangi Shooters Association currently does not have a predator control program and could use assistance and encouragement from Hawke's Bay Fish & Game.

**Objective 3:** Develop educational programs in conjunction with other organization to educate clubs and landowners on predator control methods

Most of Hawke's Bays wetlands and lakes are on private land and there is a need to encourage them to develop a predator control program by providing advice and education. To do this HBF&G need to work in Cooperation with the HBRC, Department of Conservation, and other conservation organizations to develop workshops that provide information on best practices for predator control.

**Funding:** Hawkes' Bay Fish & Game Staff will work with HBRC and DOC to develop workshops. There should be funds available within HBRC, DOC, and HBF&G to run these workshops. There is some potential to work in with the Cape to City project and also tap into funding through Predator Free NZ.

## Appendix A

## Protocol for Waterfowl Brood Surveys

### Section 1 - Introduction

### 1.1 Aim of this document

This document provides the methodologies developed by Hawke's Bay Fish & Game staff for surveying waterfowl brood use on ponds, wetlands and drains during the breeding season. It provides the basic instructions on how these surveys are to be conducted to provide the best data possible and reduce. It contains the information needed to conduct these surveys.

### 1.2 Background

The overall aim of this project is to determine what pond features provide good breeding habitat for waterfowl and to encourage waterfowl hunters and landowners to participate in the management of ponds for waterfowl. Results from this study will be used to direct Hawke's Bay Fish & Game employees in providing information to private landowners on the proper management of their ponds to increase breeding of waterfowl species.

### 1.3 Key Waterfowl Species

The main focus of this study is mallard and grey ducks, however N.Z. Fish and Game is focusing on all waterfowl species (both native and non-native) that use these ponds. These species include:

| | N.Z. Fish and Game Priority | New Zealand Classification |
|---|---|---|
| Mallard | High | Game Bird |
| Grey Duck | High | Game Bird |
| Australian Shoveler | Moderate | Game Bird |
| Grey Teal | Low* | Protected |
| Brown Teal | Low* | Endangered |
| Paradise Shelduck | Moderate | Game Bird |
| Black Swan | Moderate | Game Bird |
| Canada Goose | Low | Not Protected |
| NZ Scaup | Low* | Protected |
| Cape Barren Goose | Low | Vagrant |

*Low priority due to not being under Fish & Game mandate

### 1.5 Other Wildlife Species

To better understand how farm pond managed for waterfowl benefit other wildlife species, Hawke's Bay Fish & Game is asking observers to record other wildlife species observed during the survey. Data from this will allow Hawke's Bay Fish &

Game to collect data on the benefits of waterfowl management on non-game wildlife species.

## Section 2 - Duck Counts

Duck counts are conducted during the peak of waterfowl breeding to provide Hawke's Bay Fish & Game with the best possible data to determine waterfowl usage of wetlands, ponds and drains.

### 2.1 Dates of Visits

At a minimum, surveys should be conducted at least once a month during the breeding season. Surveys are to be conducted within the **first week of each month** with each visit being a month apart. Surveys will begin with the first week of September and finish on the first week of December. A total of 4 surveys conducted over this period. If surveys are not conducted during the first week, please conduct a survey as close to the first week as possible.

### 2.2 Timing of Survey

Surveys will be conducted in early morning **between sunrise and no later than 10:00** am.

### 2.3 Weather constraints

- Do not survey when visibility is poor, high winds, and heavy rains

### 2.4 Recommended Equipment

Binoculars

Clipboard

Data Sheets

Field Guide to New Zealand Birds

### 2.5 Surveyor and Pond Identification

Record the surveyor that is collecting the data. To reduce variation among observers, there should be one main observer. We encourage observers to make these surveys a family event; however there should be one adult who makes the final call on the data collected. Young children should be encouraged to help as this helps drive their enthusiasm for conservation and grows their knowledge of the outdoors.

A pond, wetland, or drain identification number will be issued for each monitoring area.

### 2.6 Basic Information

The data sheet requires some basic information prior to doing the actual survey. The observers should fill out his name, pond identification, date and time. The pond identification number will be given to you after you have registered your pond and the pond data sheet is filled. After this is entered, data on weather conditions at time of survey.

**Wind Direction:** Wind direction should be entered as general wind direction (i.e. N, N.E., E, S.E., S,S.W, W, N.W.).

**Wind Strength:** Wind strength will be recorded based on a 0 – 5 scale (0 – Calm 1 - Occasional & Very Light Breeze 2 - Light Breeze 3 - Rustling Leaves 4 - Branches Stirring 5 - Trees Swaying). This scale is at the end of the data sheet for the observer to reference while doing the survey.

**Cloud Cover:** Cloud cover should be estimated to the closest 10%.

**Rainfall:** Rainfall should be recorded using the 0-5 scale (0 - No Rain 1 - Misty or Fog 2 - Drizzle 3 - Light Rain Showers 4 - Heavy Rain 5 - Hail or Snow ) provided at the end of the data sheet.

It should be noted that surveys should not be conducted when the wind scale is above 4 and the rainfall is above 4.

### 2.7 Predator Control

Record if there is any predator control being conducted during the time of the survey. If there is predator control being conducted please specify whether it is trapping, shooting and/or poisoning. Also, record the species being targeted. If you are trapping, please indicate what type of traps are being used.

### 2.8 Waterfowl Surveys

When surveying your pond, get as close as possible without disturbing the waterfowl and use suitable vantage points to count all waterfowl present. If a hen with ducklings is present, it may take a little time to get an accurate count of all the ducklings. If possible attempt to identify the sex of each species (this is not possible with grey ducks, grey teal, and sometimes mallards).

Record the number of pairs, singles (and sexes of singles if identifiable) in each species. Since hybridization occurs in mallard and grey ducks record them as the same species unless there are good feather characteristics to determine species with reasonable accuracy.

Estimate brood age by recording the plumage class as seen on Table 1. This will allow for researchers to differentiate between broods from one survey to the next. For example if you see 2 mallard broods and class them as plumage class 1, and during the next survey you record a 2 mallard broods as plumage class 2 and a brood at plumage class 1, we can determine that there is at least one new brood on the pond

and the other 2 broods were from the previous survey. Granted there will be some errors, but this will be on the conservative side.

**Table I - Development of a Wild Duckling as Viewed Under Ideal Conditions**

| Plumage Class | Sub-Class | Description |
|---|---|---|
| I. Downy Young - No Feathers visible | a | "***Bright ball of fluff***". Down bright. Patterns distinct (except diving ducks). Body rounded; neck and tail are not prominent. |
| | b | "***Fading ball of fluff***". Down colour fading, patterns less distinct. Body still rounded; neck and tail are not yet prominent. |
| | c | "***Gawky-downy***". Down coloured and patterns faded. Neck and tail becomes prominent. Body itself becomes long and oval. |
| II. Partly Feathered - as viewed from the side | a | "***First feathers***". First feathers show on side under ideal field conditions. Stays in this class until side view shows one-half of side and flank feathered. |
| | b | "***Mostly feathered***". Side view shows one-half of side and flank feathered. Primaries break from sheaths. Stays in this class until side view shows down in one or two areas only (nape, back or upper rump). |
| | c | "***Last down***". Side view shows down in one or two areas only (nape, back or upper rump). Sheaths visible on erupted primaries through this class. Stays in this class until profile shows no down. |
| III. Fully Feathered - in profile | | "***Feathered-flightless***". No down visible. Primaries completely out of sheath but not fully developed. Stays in this class until capable of flight. |

### 2.9 List of other bird species observed

Make a list of other bird species observed in and around the pond. Remember thathis is a list and not a count so the numbers seen are not required. However, for your interest you may want to record the number of each species seen. This data allows Hawke's Bay Fish & Game to assess the benefit of ponds to other bird species.

### 2.10 Pond Condition Index

**Water depth**

Water depth data is taken as an indicator of the seasonal fluctuation the water levels and should be recorded as normal levels or higher than normal and lower than normal anything fluctuating greater than 50 cm should be listed as higher or lower than normal

**Water Appearance**

Water appearance should be labelled as either clear, light brown or dark brown. Remember this is the overall appearance. If the pond appears another colour, please do your best to describe the colour.

**Macro-invertebrates present**

To provide a good index of the invertebrate abundance, observers should walk the parameter of the pond for 2 minutes noting if invertebrates are Rare (1 – 2 Specimens observed), Frequent (3 -30 invertebrates observed), or Abundant (>30 Specimens Recovered)

**Pest fish present in pond?**

The presence of pest fish (include grass carp) should be recorded as not present, present but rare, or present and abundant.

**Photos taken**

If monitoring photos are taken, name the photos using the pond identification number and photo monitoring spot identification. Other photos taken should be labelled with the pond identification number as part of the file name. Be sure that your camera settings have the correct time and date, as that will be used to determine when photos were taken.

**Breeding Waterfowl Survey Field Form**

---

Surveyor _____ Pond ID_____

Date _____ Time_____

---

**Weather Conditions**

Wind Directions_____ Wind Strength_____ Cloud Cover_____ Rain_____

---

**Predator Control**: Yes/No

Predator Control Type: Trapping Shooting Poisoning
Other_____

Predator Species Targeted: Cats Mustelids Possums Hedgehogs Rats
Other_____

Trap Types (if used):_____

Waterfowl Nesting Structures Present? Type_____

---

**Waterfowl Data**

| | # Pairs | # Singles m/f | # hens with Broods | Comments |
|---|---|---|---|---|
| Mallard/ Grey Duck | | | | |
| Australian Shoveler | | | | |
| Grey Teal | | | | |
| Paradise Shelduck | | | | |
| Black Swan | | | | |
| Canada Goose | | | | |
| NZ Scaup | | | | |
| Cape Barren Goose | | | | |
| Pukeko | | | | |

**Brood Data:**

| | Species | Brood Size | Age Estimate | Comments |
|---|---|---|---|---|
| Brood 1 | | | | |
| Brood 2 | | | | |
| Brood 3 | | | | |
| Brood 4 | | | | |

**List of other wildlife observed**:

_____
_____
_____
_____
_____
_____
_____

**Pond Condition**

Water Depth: High Average Low

Water Appearance:

Clear Cloudy Muddy Milky Other _____

**Aquatic Flora: records the abundance and diversity of aquatic vegetation**

Low (little or no aquatic vegetation)

Moderate (some aquatic vegetation cover in form of floating and rooted vegetation)

High (Good diversity of aquatic vegetation with a range of rooted vegeration such as reeds, rushes and floating vegetation)

Macro-invertebrates present? No Yes, but rare Yes, Abundant

Fish Present in Pond? No Yes, but rare Yes, Abundant

_____

**Photos Taken**:

Photo 1 Photo2

Photo 3 Photo 4

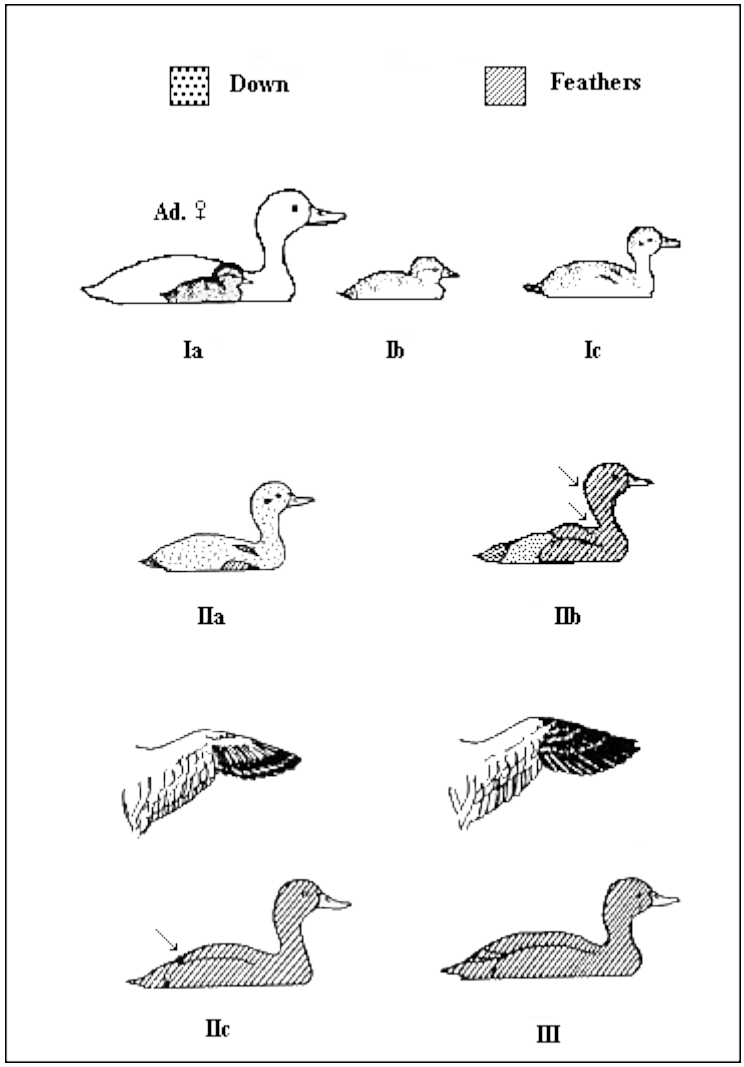
Photo 5 Photo 6

Photo 7 Photo 8

Comments_____

_____

**Figure I - Appearance of Young at Beginning Point of Each Plumage Subclass***




***Class I: Eyeline in dabblers only (except baldpate).**

**Rainfall Codes :**

0 - No Rain 1 - Misty or Fog 2 - Drizzle 3 - Light Rain Showers 4 - Heavy Rain 5 - Hail or Snow

**Wind Codes**

0 – Calm 1 - Occasional & Very Light Breeze 2 - Light Breeze 3 - Rustling Leaves 4 - Branches Stirring 5 - Trees Swaying

## Appendix B

## Protocol for Pond Characteristic Data Collection

### 1.4 Background

The overall aim of this project is to determine what pond features provide good breeding habitat for waterfowl and to encourage waterfowl hunters and landowners to participate in the management of ponds for waterfowl. This protocol is an extension of the Waterfowl Brood Surveys (Appendix A). Results from this study will be used to direct Hawke's Bay Fish & Game staff in providing information to private landowners on the proper management of their ponds to increase breeding of waterfowl species.

This project aims to establish a network of ponds across Hawke's Bay that will not only provide data to drive management decisions, but will give waterfowl hunters and landowners an opportunity to contribute to the management of waterfowl species.

### Section 2 - Pond Characteristics

The Pond Characteristics Data Sheet will be completed prior to starting the waterfowl surveys. Each will receive a unique Pond Identification Number. This number will be used when filling out any of the data sheets. The number also allows us to track the data easily.

### 2.1 Basic Information

The Pond Identification Number, Date, Observer and Pond location will be the first part of the data sheet that you will fill out. The Pond Identification Number will be provided to you when you register the pond. The observer is the person filling out the data sheet. If there are multiple people assisting the data entry, please list all of them. The date is the day you completed the data sheet. The pond location should include a written description of the pond along with GPS coordinate location if a GPS is available. If possible, a map of the area should be generated using a mapping program such as the Walking Access Mapping System (WAMS) at http://wams.org.nz.

### 2.2 Pond History

Effort should be made to provide the year that a pond was established. If unknown, please use local knowledge to provide a good estimate of when the pond was constructed. If you provide an estimate, make a note that it is an estimate on the data sheet.

Provide a brief history of the pond, such as the history of the pond, what the pond was used for, what it is currently being used for, any historic habitat work ect.

Provide a general sketch of the pond and immediate area including any fencing and buffers.

It is useful to know the history of the ponds drying events. If unknown, please give your best estimate. If data changes in the future let the study team know.

Water supply refers to how the water flows into the pond. Record whether the water supply comes from springs, a stream, sur face runoff or from pumped well.

**Livestock Access**.

The observer should record if there is livestock access to the pond. If livestock have access they should record if the pond is unfenced or partially fenced from livestock. Observers should record the type of livestock that have access to the pond (i.e. cattle, sheep, goat, ect).

**Pond Fencing**

Record whether the pond is fence, unfenced, or partially fenced from livestock. If the pond is partially unfenced, please record how much in meters of the pond shoreline that livestock have access.

**Islands**

If the pond has an island or islands record the number, size and general shape of the island.

**Buffer Strip**

The observer should record if there is a buffer strip around the pond. If there is a buffer strip, the type of vegetation should be recorded. Also the size of the buffer strip should be recorded.

## 2.3 Pond Measurement

**Surface Area of Pond**

The surface area of the pond can be easily calculated using Google Earth

**Pond Depth**

An average pond depth can be obtained by taking depth measurements along a transect across the pond

**Pond Edge Slope**

The slope of the pond edge can be described as gradual (<33º), moderate (34 -45 º) and steep (>45 º)

**Shoreline Distance**

The shoreline distance can be calculated using a GPS or if the pond is large enough through the WAMS. This is the distance around the pond edge at high water.

**Pond Depth**

Estimate to the nearest 10% the amount of the pond that is less than a meter deep, 2 -3 meters deep and > 3 meters deep

**Water Supply**

Record whether the water for the pond comes from springs, a stream, surface runoff or a pumped well.

## 2.4 Within Pond Habitat measurements

This section records the habitat characteristics within and directly next to the pond.

**Shoreline Characteristics**

Record the percentage (nearest 10%) of the shoreline (within 2 meters of high water level) that is covered in bare ground, herbaceous vegetation under 30 cm, herbaceous vegetation > 30 cm, and in bush.

**Overhanging Trees and Shrubs**

Record the percent (to nearest 10%) of the pond that has overhanging vegetation. Also record to the nearest the total margin that has overhung vegetation.

**Percent Open Water**

Record to the nearest 10% the amount of open water in the pond. This is the area that has no vegetation above the waterline. Areas of the pond that have submerged vegetation are included in this estimate, unless the vegetation is on or above the waterline.

**Vegetative Cover**

Record to the nearest 10% the amount of both emergent vegetation and submerged vegetation within the pond

**Presence of nuisance vegetation**

The presence of nuisance vegetation should be recorded along with the percent coverage of the pond area. If the nuisance vegetation is identified it should also be

recorded. For this study, we consider nuisance vegetation as listed a nouxious weeds by Biosecurity's National Pest Accord (http://www.biosecurity.govt.nz/pests/surv-mgmt/mgmt/prog/nppa/list). Also record the species of nuisance vegetation that is in the pond.

**Pest Fish**

Record if there are pest fish present in the pond. If present, record the species and whether they are rare or abundant.

## 2.5 Surrounding Landscape

**Catchment**

The size of catchment will be recorded on a scale of 1 through 5.

1 = Tiny <100m2

2 = Small<100m2

3 = Moderate about 10,000m2

4 = Large 10,000 – 100,000m2

5 = Very Large > 100,000m2

**Adjacent Water Bodies**

Record if there are any wetlands and/or waterbodies (i.e. streams, drainage ditches, ponds, ect) within 1 km distance from the pond. Also, record the straight line distance to the nearest waterbody/wetland.

**Immediate Surrounding Land Use.**

Estimate to the nearest 10% the amount of each land use describe within 5 m, 500 m and 1 km of the pond. If other land uses occur, please record and estimate the percentage of the area.

**Pond Information Data Sheet**

---

Pond ID: Date:

Observer:

**Pond Measurements**

Approximate surface area of the pond (if known) = m2

Approximate average depth of the pond = m

Pond Edge Slope: shallow moderate steep

Shoreline Distance

Pond depth: % less than 1m deep % 2-3 m deep %>3m deep

---

**Pond Habitat Characteristics: (Use Cover Class found at bottom of 2nd page)**

Shoreline Characteristics:

What percentage of the shoreline within 2 meters of the high water level is

Bare Herbaceous (under 30 cm)

Herbaceous (> 30 cm) Bush

Overhanging Vegetation:

Percentage Pond Overhung

Total Pond Margin Overhung

Percentage Open Water

Vegetative Cover: (Percentage)

Submerged (under water)Vegetation

Emergent (on or above the water surface) Vegetation .

Presence of nuisance vegetation: Yes No

Type

Percentage Cover.

**Surrounding Landscape Characteristics**

Adjacent Water Bodies (Check all that apply)

| Water Bodies | 0-5 m | 500 m | 1km |
|---|---|---|---|
| Wetlands | | | |
| Ponds and Lakes | | | |
| Streams | | | |
| Drainage Ditches | | | |

Immediate Surrounding land use (Use cover classes 1 through 6 see below)

| Habitat | 0-5 m | 500 m | 1km |
|---|---|---|---|
| Native Bush | | | |
| Forestry | | | |
| Unimproved Grassland | | | |
| Improved Grassland | | | |
| Rank Vegetation | | | |
| Crops | | | |
| Urban | | | |
| Wetland | | | |
| Other: | | | |

| Cover Class | Range of Coverage | | Midpoint of Range |
|---|---|---|---|
| 1 | 0 - 5% | 2.5% | |
| 2 | 5 - 25% | | 15.0% |
| 3 | 25 - 50% | | 37.5% |
| 4 | 50 - 75% | | 62.5% |
| 5 | 75 - 95% | | 85.0% |
| 6 | 95 - 100% | | 97.5% |

Comments

# Appendix C:

## Protocol For the Use of Time-Lapse Photography for Monitoring Waterfowl Use of Ponds, Wetlands, and Drains

### Introduction

Hawke's Bay Fish & Game and landowners need critical information on waterfowl habitat to properly manage waterfowl populations. The use of time-lapse photography to monitor habitat use has been used since the 1960's; however these types of studies were not done on grand scale due to cost. Currently with the advent of trail cameras and their use for camera trapping, this is not a big issue. Since most of these trail cameras have time-lapse functions there is little need to purchase expensive equipment to build time-lapse cameras.

### Why Time-Lapse instead of camera traps

The use time-lapse photography will standardize the sampling across ponds, wetlands and drains. Time-lapse cameras also reduce staff time to monitor wetlands, ponds and drains. Although the area that is monitored is relatively small, cameras can be used to subsample areas in large wetlands and ponds. Drains are ideal for time-lapse camera due to their small size.

### Setting Camera Settings

Installing game cameras involves minimal disturbance and requires less staff time. Game cameras were set up on waratahs along the shoreline (or within the water) facing south so the lens would not be aiming into the sun, at a distance that would allow broods to be identified. While we tried to maintain consistency, this distance varied between ponds based on habitat and sensible camera placement (water depth was a constraining factor on some ponds). Cameras should be set to take a photograph once every hour from 6:00 through to 21:00hrs which should result in 16 photographs/day. Ensure the camera lenses are clean.

Ringelman and Flake (1980) studied the visibility and activity of mallard broods and found that on average, activity bouts lasted: 51, 43 and 56 minutes for age classes I, II and III respectively. Ringelman and Flake (1980) also noted that brood activity was highest during the early morning (just after sunrise). Given these findings, it was imperative that the cameras took at least one photo every half hour and were set up to take photos during the morning period when broods were most active. In our study, to ensure mallard activity on ponds was sufficiently captured, cameras were set up to capture images every five minutes using the time-lapse function beginning at 0630 and finishing at 2100 NZ Standard Time. These times were used to capture images during the longer daylight hours later in the season.

**Remote Camera Installation Data Sheet –**

To be filled out in the field, during the camera install and/or check

Circle One: Install / Move to New Location

Name of General Camera Location:

_____

Name of More Specific Camera Location:

_____

(fill out a separate data sheet for each camera you check)

Date and Time of Site Visit:

_____

Latitude: N_____ degrees_____

Longitude: W _____degrees _____

If other, note units: _____

Elevation: _____

Model of Camera and Camera Number: _____

Directions to Camera Site (use space on back of sheet):