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Blue Duck sitting in Melvin Pike's aviary. Photo N. Hayes



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Cover Photo: Pateke Lagoons. Photo: Lloyd Homer.

MISSION STATEMENT

Ducks Unlimited (NZ) Incorporated is a private, charitable, non-profit conservation organisation dedicated to the preservation, restoration, creation and maintenance of wetland habitat in New Zealand, the propagation and conservation of the country's rare waterfowl, and the advocacy of wetlands as a valuable natural resource. This is achieved through six projects each with specific aims. These are: "Operation Pateke", the reduction of the threatened status of the New Zealand brown teal through the release of captive bred birds and wise habitat management; "Operation Gretel", to increase the number of grey teal in New Zealand through the provision of suitable nesting habitat; "Operation Whio", the conservation of blue duck through the release of captive bred birds to expand the species range; "Operation Branta", to establish the Canada goose in the North Island as a valuable recreational resource; "Operation Royal Swan", the conservation of Mute Swan through the establishment of a captive breeding population; and "Operation Wetlands", to preserve, create and manage wetland areas through direct funding, technical assistance and public education of wetland values. The scientific study of wetlands and waterfowl is also encouraged through direct funding.

The organisation was founded in May 1974 by a group of concerned conservationists and incorporated by them in June 1975 at Wellington, New Zealand. Membership, in four categories, is open to anyone who supports the organisation's objectives. Junior membership is \$11.00 per annum. Full membership is \$30 per annum. Trade membership is \$45 per annum. Sponsor membership is a minimum of \$60 per annum and Life membership is \$600.00. Membership carries a subscription to "Flight", the official quarterly publication of Ducks Unlimited which currently reaches 2000 members and friends concerned with waterfowl conservation. Letter, manuscripts and photographs should be addressed to the "Flight" Editor. To assure prompt delivery, members should send subscription renewals and changes of address to National Headquarters at PO Box 44-176, Lower Hutt. Any views expressed by contributors in "Flight" are their own and do not necessarily constitute those of Ducks Unlimited (NZ) Incorporated.

Presidents Report

One thing that DU members have done very successfully for many years is assisting our tourist industry by looking after large numbers of waterfowl people visiting NZ from overseas. Having good keen DU people in just about every corner of the country we are in the unique position of being able to "plan" itineraries for overseas "duckie" people. This is a facet of DU activities that does not often get mentioned, but it has always impressed me just how keen our members are to take care of kindred souls from overseas. Of course, it's very much a reciprocal activity and when our members are overseas they are well catered for when visiting wetlands. In this respect we hope to have a number of DU (NZ) members visiting the next DU (USA) annual conference - to be held in San Diego during the second week of May 1991. If any members are interested in attending this conference please let me know.

Another area where DU (NZ) excels is in liaising with, and assisting, NZ universities with waterfowl and wetlands research. As I mentioned in a recent FLIGHT, we have to date made significant contributions to blue duck research, brown teal research, scaup research, grey teal research, black swan research, etc. We have also assisted a number of students who were studying various aspects of wetlands. In each case the researchers have appreciated the support of Ducks Unlimited,

and we in turn have benefitted from the research. In some instances our contribution has been a modest few hundred dollars, but all support has been enthusiastically received.

Quite recently we have been invited to assist Massey University in a new waterfowl research programme. Initially NZ Grey ducks will be the main species used in the programme and the main aim of the research is to determine whether waterfowl can be encouraged to breed more often in captivity than they do at present. If successful the research findings will be applied to our rare waterfowl - brown teal, blue duck, Auckland Island teal, Campbell Island teal, etc., to boost captive breeding programmes.

Ducks Unlimited has agreed to supply Massey University with as many grey ducks as possible and the programme is already off to a good start with eleven grey's having been supplied by one of the top breeders. If any members have good grey's they would like to contribute to the programme please let me know.

Two PhD students, under the supervision of Dr John Cockrem, will be working on the project and grey ducks supplied by members will eventually be offered back to members, if they want them back, or they will be released into the wild. An excellent overview of the project will appear in a forthcoming issue of FLIGHT.

Members will be disappointed to hear that in the THC Hotel chain sale our good friend and long time DU supporter Keith Barnett has retired, after many years as Manager of THC Tokaanu. Keith, his wife Dulcie and daughter Shirley, have been ardent DU supporters since DU started in NZ and were undoubtedly the key factor in our six highly successful annual conferences held at THC Tokaanu. Where else in NZ would you see a large DU international flag flying all year round? We thank Keith Barnett and his family for many happy hours at Tokaanu and we wish Keith a long and happy retirement.

Neil Hayes
PRESIDENT



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Pateke Lagoons

The story of a wetland

By Brendan Coe

"Swamp" said the real estate agent, "you want to buy swamp"? "Yes" I replied, "the more the better".

I had seen the look on his face several times before in my enquiries up and down Wellington's Kapiti coast for a suitable property for wetland development and/or restoration and his reply was encouraging. "John Downer has a block down Te Hapua Road that might suit, why don't you go and see him"? So we went and discovered one of the best pieces of potential wetland habitat I had yet seen. The Downer property was originally farmed by one Henry Derham for nearly fifty years until it was sold to John Downer in 1980. The Wellington Acclimatisation Society had looked at buying it then and in those days it was nearly all water with dunes intersecting the lagoons. Comprising some 1000 acres it lay to the seaward side of State Highway One and the lagoons were formed by the water table runoff from the western side of the Tararua being held by the encroaching sand dunes from the coast. Such was the nature of nearly all that coast from Waikanae to Wanganui one hundred and fifty years ago and it was said that you could row a boat, with some portage, over the whole distance. The coast consists of the foredune which is still forming and moving inland and the rear dune which is 3000 years old and is

situated some half a kilometre back from the sea. Between these two landforms were the coastal lagoons, rich in food and waterfowl, an important food source for the Maori and home of the brown teal or pateke. European settlers used the coast as a route north from Wellington, travelling overland to Paekakariki and then along the beach to Wanganui and inland from there. It was dangerous territory with big rivers to cross and the fearsome Te Rauparaha to contend with. Such was the richness of the food source that the area was well populated by Maori and the land wars that ensued between the tribes for control of such areas as Lake Horowhenua and Kapiti Island were among the most fierce in New Zealand's history. European settlement came and with it the railway, main road, farms and drainage schemes. Slowly the land dried out and the water table lowered so that many of the lagoons dried out to become areas of flax swamp, that plant becoming dominant in the damp peat. This process has accelerated during the 1980's with the lower rainfall and warmer climate being experienced on Wellington's west coast. The vast podocarp forests, comprising mostly totara, have gone as have the huia, brown teal and the water. Left are sand dunes covered in coarse grass and areas of flax with the mean summer water table

level being a foot or so below the surface, rising to a foot above during winter rains. Such was the nature of the Te Hapua area at the time of our visit in February of 1987.

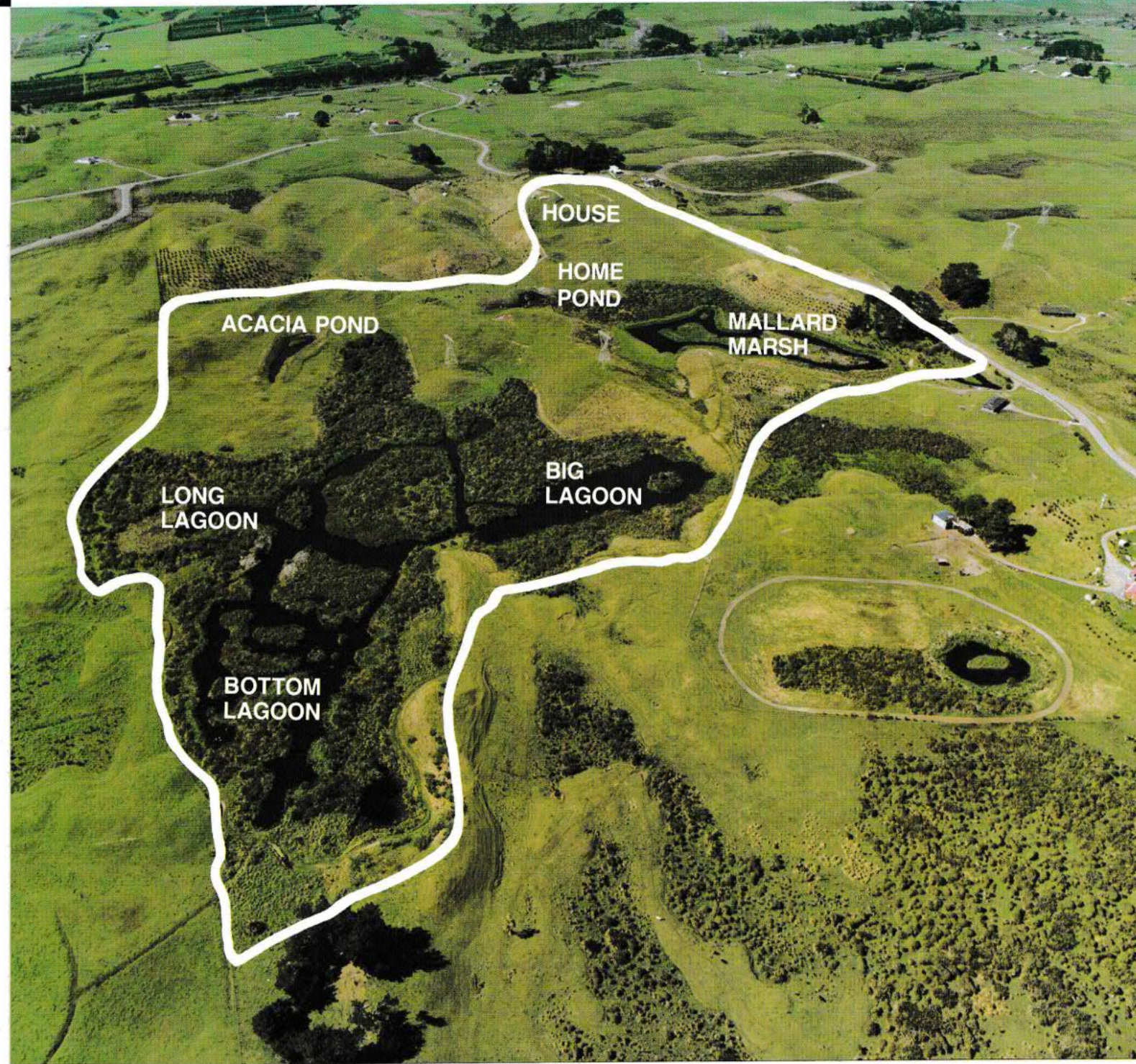
John Downer, who had subdivided the property, was pleased to see us and we negotiated to buy a block of some 70 acres off him which comprised 30 acres of flax swamp running back to the rear dune, the highest point of which gave commanding views over the proposed wetland, the sea, Kapiti Island, and much of the Kapiti coast. There was an area of open water that had some 30 mallards on it (now called Mallard Marsh) but the rest of the area was dry. The balance of the property was grassed. The deal done, plans were laid for the development of the area. Boyden Evans of Boffa Miskell Partners Ltd was engaged to advise on landscape planning and planting and he also had a soil report prepared by Des Cowie of the DSIR. The dune soils are Foxton black sand overlaying a yellowish-brown sand which grades down to an olive-grey loose sand with depth. Foxton black sand is very free draining and dries out badly in summer, it is moderately acid (PH 5.8) medium in phosphorus and low in potassium. The low lying areas range from Pukepuke black sand on the sand-plains to Omanuka peaty loam in the swamps, Des Cowie's report states that the addition of fertiliser for trees should not be necessary on these soils. Vegetation consists of Coprosma sp. Olearia sp. and Phormium tenax (flax). There are a few totara growing about the property, the tallest being approximately 7 metres. Prospects for a planting programme were daunting and we realised that many species would not survive the environment at Pateke Lagoons. The Nor'west gales picked up salt off the sea which burned off delicate species and the droughty soil on the dunes precluded planting trees that were not tolerant of dry conditions. To cap it off, the area is subject to heavy frosts at times and I have seen frost lying down to the water's edge at the sea. Boyden suggested various species and we settled on Coprosma repens (Taupata) Cordyline australis (cabbage tree) Cortaderia fulvida (toetoe) Dacrycarpus dacrydioides (Kahikatea) Podocarpus totara, Myoporum laetum

(Ngaio) Olearia traversii (Chatham Island Akeake) Corynocarpus laevigatus (Karaka) Dodonea viscosa (Akeake). For exotics we chose Eucalyptus botryoides which is the only Eucalypt that will tolerate salt wind. Acacia dealbata, Acacia sophorae, Acacia longifolia, Banksia integrifolia and Chamacetysis palmensis (tree lucerne). As well there were other plantings of both exotic and native species that are too numerous to mention. Boyden stressed the importance of not committing the sin of genetic pollution which is the planting of species not endemic to the area. The criteria in that environment has been however what will actually grow. Three years and seven thousand trees later the planting is finished. There have been many long and enjoyable days on the end of the spade, the handle of which is worn smooth.

Watching the trees grow is a source of considerable satisfaction. When I started planting, Jim Glover advised me that there would be many disappointments and the only solution was to keep planting. He was right. I lost most of the Ngaio to frost and the mysterious blight that is killing cabbage trees all over New Zealand has cost me over 200 trees, some 3 metres high. As well some species never grew, but I have kept replanting and the memory of the losses fades with time.

Boyden arranged to have aerial photographs taken and from these the lagoons were mapped out. Hydraulic excavators were used (diggers) and two firms were involved, Goodman Contractors of Waikanae and Alan Gibson Ltd of Levin. The project took two months to complete and most of the

work was done by Alan Gibson's chief operator Barry. There is nothing this man does not know about creating duck habitat and I only had to give him the outline that I wanted, number of islands and depth and he would do the rest. The idea was to scoop out the peat to a depth of one to one and a half metres that would expose the water table and the hard blue sand underneath which is a perfect seal. Barry expressed some doubt about setting off into the sea of flax with only a cut lunch, but as the work progressed, visibility improved. The spoil was placed around the sides and pushed with the bucket to try and spread it. On Mallard Marsh I had a dozer grade out the spoil as this area is the main one viewed from the house. It is sur-



Scaup on Big Lagoon. Photo G. Gurr.



Thus was created Big Lagoon, Bottom Lagoon and Long Lagoon.

prising how the heaps of soil settle down to half of their initial height and also how quickly they vegetate with flax, grass and inkweed. Growth is prolific and three or four months later the rawness is gone, and today the lagoons look something like they might have done in days gone by. Thus was created Big Lagoon, Long Lagoon and Bottom Lagoon, all interlinked, with islands for breeding, driveways here and there for the birds to get out and attractive scalloped edges with meandering shape. Later came Mallard Marsh, the Home Pond and the Acacia Pond. There was little big timber in the peat which was fortunate as some areas at Te Hapua are a mass of logs. Immovable stumps became islands and the water took up to a week to percolate through and fill the excavations. The diggers worked off pads all the time, which are big platforms made from lengths of 12" x 12" macrocarpa that are shifted with a hook slung off the bucket. Barry used three and sat on two while reaching behind to place the back one in front and then moving onto it to enable him to bring the next one round. This procedure was slow, but necessary in the soft peat. The actual water was stained from the peat and became almost stagnant during the height of summer with rainfall as the only water source, would it be attractive to birds?



The results exceeded my expectations. I was unprepared for the number and diversity of birds that came and I now believe that coastal wetlands are among the most productive in the country. There were mallards of course, in their hundreds at certain times of the year and the few pairs of grey duck that breed there are a

special delight. Dabchick have increased from an original pair to four pairs that all breed and I am expecting a further increase in numbers. Pukeko have slowly colonised the area from none seen in the first two years to around a dozen or so today. I discovered a nest with six eggs in it recently and although Pukeko are not



Big Lagoon.

popular with some waterfowl managers because of their habit of predating duck eggs, they will always be welcome at Pateke Lagoons. Hawks are another predator that can always be seen on their eternal patrol of the area and they too are welcome as they provide the spectacle of a bird on the wing and have attained their niche in the wetland ecosystem. One day three years ago I heard the unmistakable sound of wind whistling through wings and looked up to see 30 or so shoveler as specks in the sky and watched enthralled as they whiffled in. That year four pairs bred and they arrive every year now in September and depart in February although there have never been more than four breeding pairs. I am especially pleased about them as wetlands must be very natural and rich in food to attract this finicky and wide ranging duck. My biggest surprise was still to come however and when I saw the 33 dark birds on Big Lagoon last August I couldn't believe my eyes. They looked like scaup, but scaup on a shallow coastal lagoon sixty kilometres

north of Wellington? Surely not. Scaup they were and seven broods were raised totalling over thirty birds and they are back this year in the same numbers with the yellow eyed males congregating at the end of Long Lagoon. The females are engaging to observe with their broods; not for them the secretive progress through the tangled margins of the pond like the mallard, but a steady procession of mother and young straight up the middle of Big Lagoon, a characteristic of a duck found mostly on deepwater lakes. Paradise are few and far between on the Kapiti coast and none have bred at Pateke Lagoons yet. Black swan did two years ago and four cygnets were raised although none have bred since which may be because of the two pairs of mute swan now there. Mute swans need a lot of feeding and I doubt that they find well for themselves in the wild. I have lost two and now use a feeder that can take seven buckets of maize which is what my two pair eat in a week. Swans look good when they are preened, their tail is up and the necks

thick at the base with a honey "glow" to the lower neck and breast feathers. These are the signs of well fed and contented birds. The Canada goose does well at Pateke Lagoons with the population standing at nineteen and several females sitting at the moment. Only one wild pair of grey teal has been sighted although my pinioned birds should breed this year to help boost the population. I have been keeping a record of species sighted and the tally is now up to 32, not the least important being the pheasant. These birds are common up that coast and I rarely visit now without seeing one. Numbers are estimated at between three and four pairs on the property and the calls of the cock birds can be heard regularly during the day. I run a predator control programme and favour the use of the yellow plastic Timms trap made by KBL Springs of Palmerston North. When baited with fish this trap will account for all predators from weasel to wild cat and its common name of "the kill trap" is appropriate and suits my situation where I only visit the traps once a week. I have used Fenn traps a lot, but often find a ferret for example caught by the leg and needing despatching which is inconvenient from a practical point of view and also because of my weekly clearance timetable.

The story of Pateke Lagoons has now reached the present day. A Lockwood house is almost completed and the family hopes that we will be able to go there for our Christmas holidays. The bird population has increased over the years as more breed there and become used to the lagoons. Plans are afoot to build aviaries and I hope to fence and plant fertile areas of the grazing land. My inspiration for the project has come from viewing other wetland projects such as Nga Manu at Waikanae, Jim Campbell's in the Wairarapa, Peacock Springs in Christchurch and Dave Johnston's property at Reparoa to name a few. The finished result is a source of satisfaction and continuing interest that I think my bank manager now understands.

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The Shoveler lagoon on Ian Jensen's property at Te Hapua. Perfect waterfowl habitat. Photo I. Jensen.

Mallard Habitat Management

by Ian M Buchanan, Field Officer, Wellington Fish & Game Council

Introduction

The mallard is New Zealand's single most important game bird, both numerically and in hunter exploitation. In spite of this there has been no definitive study made of the biology and ecology of the species within New Zealand. As a consequence, the design of any short to medium term management strategy for mallards is reliant on general field experience and observation combined with research findings from overseas, particularly North America, where a number of intensive studies have been made. It is possible from this to define a number of general principles relevant to the birds' management as a game species and to design strategies based on these, while initiating a research programme directed toward refining these principles and strategies.

Historically

Following a long establishment phase from the late 1800s through to the 1960s, mallard numbers expanded rapidly through the 1970s to reach a peak in the early 1980s. At this later stage concern

was being expressed that further expansion of the population could lead to serious conflict with agricultural interests in many parts of the country, with resultant demands for population reduction by non-traditional means. Since 1984, however, there has been a decline in mallard numbers in many parts of the country and the population appears to have stabilised at this lower level. From now on we can expect regional populations to fluctuate annually in response to prevailing environmental conditions, with rainfall (or lack of it) playing a major role. The NZ mallard population thus appears to have followed a form typical for the introduction of a new species into a favourable ecological niche, i.e. a long establishment phase followed by rapid expansion that overshoots long term carrying capacity and then decline to a stable level reflecting that carrying capacity from year to year. Consequently management should be directed toward maintaining or improving habitat conditions that results in improved long term carrying capacity.

Factors Influencing Carrying Capacity

The mallard in New Zealand is a true generalist, able to use a wide variety of "habitats" ranging from urban parks and backyards to isolated pristine wetlands. It consumes a wide variety of foods, including agricultural grains and grasses as well as aquatic vegetation and seeds, a range of invertebrates and a variety of tree fruits and seeds. Similarly, nesting occurs in widely differing circumstances wherever suitable cover is largely confined to open water lakes and lagoons or the dense cover of permanent wetlands. The size of the population at the time of year of primary interest (autumn) is a product of the number of deaths occurring from both hunting and non-hunting causes and the number of juveniles recruited from the breeding season. Regional populations may also be influenced by immigration and emigration between regions.

Mortality

Hunting mortality and its influence on populations has been widely debated else-

where and will therefore not be further discussed here. Very little is known about factors influencing non-hunting mortality and when this occurs. Deaths from starvation, hazards, disease, predation, etc., are strongly influenced by environmental factors operating in both density dependent and density independent ways. Our ability to directly influence these is severely limited by the almost complete lack of understanding of how they operate on the population. Extensive long term research is required on the causes and timing of non-hunting mortality. In the absence of this, management needs to concentrate on the maintenance and improvement of all clearly identifiable permanent and semi-permanent wetlands that provide a range of habitat requirements for waterfowl. The current wetland inventory programme will provide a baseline for the status of the district's wetland resource. Long term protection and enhancement of individual wetlands is an ongoing requirement, with periodic (5-yearly) status monitoring probably by aerial photography. Specific research into non-hunting mortality needs to be initiated within the next five years, followed by the development of practical management programmes.

Productivity

Waterfowl, and in particular mallard, productivity is a little better understood from international research findings and local experience. While it is important that this aspect of the species' biology is investigated in NZ, it may be possible to immediately initiate long term projects aimed at increasing this availability of nesting and brood rearing habitat on a district-wide basis.

Some of the more pertinent facts to have emerged from research are:

1. Habitats exhibiting the greatest use by breeding mallards are ponds and lagoons of 0.5ha and larger, with up to 30% peripheral tree cover and some ungrazed margin.
2. Emergent and aquatic vegetation is important for adult and juvenile food, nesting, brooding and escape cover.
3. High nest success is experienced by individuals nesting in overwater vegetation, particularly raupo.
4. Mallard pairs often use more than one pond for their total requirements, e.g. male waiting, feeding, nesting, brood rearing, moulting.
5. Mallards frequently move broods between smaller water areas (ponds, drains, etc.) when larger brood rearing water is unavailable. Broods are highly susceptible to predation and natural hazards when this occurs.
6. Ponds choked with more than 70% emergent vegetation receive little use.
7. Broods use stock water ponds with peripheral escape cover more than any other wetland type.
8. Single ponds don't generally provide

- all requisites unless over 1.0ha.
9. Two or more pairs rarely utilize ponds less than 0.5ha.
10. Isolation and spacing are important for mallards and influence production. This may occur either when habitat availability is low during droughts or pair numbers are high. Mallard pairs under these conditions may interfere with successful utilization by other pairs.
11. Often nesting birds are forced away from brood rearing water by spacing mechanisms. Brood mortality increases with increasing distance of nests from brood water.
12. Mallards may nest in the vicinity of ephemeral sheet water and shallow ditches. If insufficient brood water is available to fledge ducklings when these areas dry, little contribution is made to production (referred to by some authors as "lethal brood areas").
13. Climate, particularly rainfall, acting as a density independent factor is paramount in supplying the water base for production habitat.
14. The removal of grazing from wetlands and the subsequent development of dense rank ground cover has a major positive benefit for production. In no instance has grazing been found to improve production.
15. Water permanence has a direct bearing on waterfowl production. Draw-down and reflooding nutrients, stimulates vegetation growth and increases invertebrate food supply.
16. Seasonal wetlands retaining water through spring and early summer are very important, although their value is reduced during dry years.
17. Semi-permanent and permanent wetlands increase in importance during dry years.

18. Use of temporary (ephemeral) wetlands for production is low. May provide important spring food source for adults, but rapid drying reduces value.

Management

The principal aim of managing any game population is to provide sufficient numbers of animals going into the annual season to satisfy the demands generated by the hunting public. In many cases this requires little active management as the availability of game far exceeds the demand for these species by hunters, e.g. pukeko, Canada goose. In other cases, as with our main species (mallard), the demand is always likely to exceed supply. In other words, hunter will continue to take mallards during the season as long as there are sufficient birds available to make the effort worthwhile. Thus any increase in mallard numbers will provide greater hunting opportunity, both on any particular day and over a longer period of time.

The desirable long term objective is therefore to increase the numbers of mallards available to hunters. This can only be achieved by increasing the capacity of habitats to produce and sustain mallards in greater numbers than at present. In practical terms this can only be done by both creating new wetlands and enhancing existing ones. Initial emphasis needs to be placed on creating and enhancing permanent wetlands, as it is these areas that maintain base production levels during critical dry years.

Productivity Gains and Costs

Mallard harvest in the Wellington region is in the order of 50,000 birds annually. Banding information suggests that this harvest represents at least one third of the total autumn population. This indicates a regional autumn population of



around 150,000 mallards during the past three to four years. To have an appreciable effect the principal objective would have to be to have an increase of 5 to 10% in mallards available to hunters as a result of direct habitat enhancement. This requires an additional 10 to 15,000 birds in the autumn population.

For each hectare of permanent wetland created or significantly enhanced a combination of extra nest sites, additional brood rearing area, increased food availability, loafing and moulting sites could result in an extra 10 to 15 birds available in the autumn that would not otherwise be there. This is a broad guestimate only as it will be influenced by a wide range of factors specific to individual sites. Using a liberal estimate of 15 birds per hectare, an additional 1,000 hectares of new and enhanced wetlands would be required to effect an increase of 15,000 birds in the autumn population.

The cost of wetland establishment and enhancement will vary considerably, depending on site characteristics. Based on current construction, fencing and planting costs, an average of \$1,000 per hectare can be expected. This indicates that an investment in the order of \$1,000,000 is necessary in the Wellington region to achieve any appreciable permanent increase in mallards available to hunters annually.

It should be noted that environmental (climatic) factors are capable of exerting far greater influences on annual populations than that contemplated from direct habitat enhancement. What is being suggested is an increase in the habitat "base" to maintain a higher population in poor climatic years and provide additional gains in good climatic years. This is a pragmatic approach to a very complex ecological subject.

Practical Management Approaches

To achieve targeted gains in habitat a combination of the following is suggested:

- Public Wetlands - encourage increased investment by DoC in habitat enhancement in Crown owned wetlands at Lake Wairarapa and in the Manawatu. Provide direct assistance to the Department, both in manpower and finance.
- Establish a wetland establishment and enhancement fund from Fish & Game Council resources to provide incentives for habitat development on private land.
- Actively promote wetland development on private land and provide an advisory service to landowners.
- Pursue external sources of finance from private conservation grants, NZ Council grants, central and regional government grants, and corporate sponsorship for specific development projects.

SCAUP RESEARCH PROGRESS REPORT

Sarah Stokes

Scaup (*Aythya novaeseelandiae*) are New Zealand's only true diving duck, and while they are distributed over both islands, very little information is available regarding their ecology, breeding biology, and feeding behaviour. In order to improve on the limited knowledge available on scaup populations my research was carried out at the Ashburton Lakes where a large scaup population is supported. Field observations were principally confined to the island on Lake Clearwater where scaup were known to breed. Nesting biology and behaviour was the main focus of the study and detailed observational and numerical data were collected.

Nests were mainly found beneath fallen debris, pine trees and pine needles, and amongst low growing vegetation, ivy and grasses. Forty percent of the nests found on the island at Lake Clearwater were constructed from fallen pine trees whose branches had become covered with dead pine needles. Besides pine, 26% of nests occurred in elderberry, 10% in broom, 4% in matagouri bushes, 6% in snow tussock and 15% in overhanging grasses and ivy. It therefore seems that scaup nest in any material that is available and which satisfies their nesting preferences as these percentages reflect the distribution of vegetation on the island.

A total of 53 active nests were found on the island, all constructed from a variety of vegetation and topped with down. Scaup eggs are elliptical in shape with a smooth non-glossy appearance while their colour is a beige/mocha combination. In total 83 eggs from twenty clutches were measured. They ranged in length from 59mm to 75mm (mean = 68.8mm, S.E. = 0.4mm) and in width from 42mm to 47mm (mean = 44.9mm, S.E. = 0.8mm). The overall mean weight was 62g (S.E. = 1g) with a range of 49g to 71g. The overall clutch size for scaup was 7.6 eggs (S.E. = 0.4) with a range from two to 13 eggs. It also appears that clutch size distribution was bimodal with peak clutch sizes occurring at six and ten eggs.

Unfortunately, the beginning of the 1989 breeding season was missed so laying duration and incubation periods are not known. However, the period where most nests commenced incubation was from the middle of October through to the end of November. Ninety three percent of incubations were initiated during this time while 2% and 5% of nests started incubation during December and January respectively.

In addition to clutch size analysis, the time taken for the clutch to hatch, from the first initial crack, was determined as an average 22.4 hours (S.E. = 1.2). The time that chicks remained in the nest after hatching was also gauged and observations suggest that broods remain in the nest close to 24 hours. This can be compared to previous indications that chicks left the nest within 12 to 24 hours of hatching.

Besides nest monitoring, other aspects of breeding behaviour were recorded, but as yet only parental care has been analysed. Paternal care for either eggs or chicks was non-existent as males were never seen incubating, rearing, or protecting their own, or any other brood. Only maternal care was evident and, in fact, females with broods appeared to deliberately avoid male groups.

If they did associate with them, males were quickly chased off when they came within about 1 metre of the brood and chicks remained extremely close to the female when amongst male groups.

Chick mortality was extremely high. Of 286 young produced only seven (2.5%) survived to the juvenile stage and only two of the 39 females that hatched live chicks actually managed to rear them to the juvenile stage. Six of the seven juveniles were produced by one female.

The final factor investigated in relation to scaup nesting biology was whether they nested colonially or solitarily. The average distance to the nearest neighbouring nest was 5.9m (S.E. = 0.7m) with a minimum distance of 0.3m between nests, and a maximum distance of 12.5m between nests. The distance that the females had to travel to reach water varied from 0.8m to 38.6m with an average of 19.7m (S.E. = 1.2m).



WELCOME to the Cooking Corner, a new section of 'Flight' that will be of interest to the cooks in the household.

It is planned to invite selected members of Ducks Unlimited to share their favourite recipes with us. Some of which will be game recipes and I hope that this will not upset the non-hunting members of our organisation.

With the hunting season not long finished, there must be many freezers with wild duck and Canada goose meat just waiting to be cooked.

To start this new section off, I would like to share some of my favourite recipes with you and for those who do not eat game then I have included my favourite muffin recipe.

If you have a special recipe you would like to share, please send me a copy (address in front of magazine) so that it may be included in a future issue.

Goose Cacciatore

2 goose breast fillets (Wild Goose)
3 or 4 tbsp flour
1 clove garlic crushed
3 tbsp oil
1/3 c. Italian tomato paste
1/2 c. dry white wine
1/2 tsp salt

1991 ANNUAL CONFERENCE

THC TOKAANU
Saturday 13th and
Sunday 14th July 1991

I/We will be attending the 1991 Annual Conference

Name/s: _____
Address: _____

I/We will require accommodation for the nights of _____

Number in party _____

Number of rooms required _____

My/Our pre-registration fee of \$50 is enclosed.

Charge my VISA/BANKCARD/DINERS/

AMEX No: _____

Expiry Date: _____ Signature: _____

Please return this form and \$50 pre-registration fee to
Diane Pritt
P.O. Box 44-176
Lower Hutt. Ph: (0658) 58-016

Celebrities Cooking Corner

by Glenys Hansen



1/4 tsp pepper
3/4 c. water with 1 tsp chicken stock added
1 bay leaf
1/8 tsp each thyme, marjoram
1/2 tsp basil
1 large onion chopped
1 cup sliced mushrooms
1/4 c. Brandy (optional)

slice goose fillets 1/2 inch thick and coat with flour. Saute with garlic in oil until browned. Place in casserole. Mix remaining ingredients to the pan and when well mixed add them to the casserole. Bake, covered in a moderate oven for 2-2 1/2 hours.

Wild Duck Pate

6 duck breast fillets
1/2 c. white wine
1/2 c. sherry
2 tbsp Worcestershire sauce
2 tsp lemon juice

1 lg. onion, chopped
2 tsp celery seed
1 bay leaf
1 tsp thyme
1 tsp rosemary
2 cloves of garlic, chopped
2 1/2 tsp seasoned salt
5 slices bacon
1 hard boiled egg
1/2 c. mayonnaise
1/4 c. horseradish cream
1/4 tsp pepper

Place duck breasts, next 10 ingredients and 2 teaspoons seasoned salt in saucepan. Add water, if necessary to nearly cover. Simmer, covered for 1 1/2 hours. Add bacon. Simmer for 1/2 hour longer. Let stand overnight. Place meat broken into pieces with the bacon, 1/2 teaspoon seasoned salt and remaining ingredients in food processor container. Process to make moderately rough pate. If not moist enough, can add some of the liquid that the meat was cooked in. Freezes well.

Sage Duck

Breasts and legs from 2 wild ducks
1 packet Maggi Sage and Onion Sauce mix
1 apple, peeled, cored and sliced
1 stalk celery sliced

CONT OVER

MEMBERSHIP COMPETITION

Our first winners in the quarterly "Flight" membership competition are

**John Taylor of Auckland and
Mr T. Maxwell of Ruakaka**

Both win copies of our book "Wetlands: Discovering New Zealand's shy places". With Christmas coming why not give a conservationist a gift subscription to Ducks Unlimited and be in to win a prize yourself. Simply fill out the attached coupon, or send us a copy, and if it's a Christmas gift tick the Gift subscription box. The winners will be announced in the March issue of "Flight". Remember a subscription between now and March covers the period until 13 March 1992, 16 months for the price of 12.

Ducks Unlimited subscriptions are:

Life Members \$600

Gold Sponsors \$250 per yr

Silver Sponsors \$125 per yr

Bronze Sponsors \$60 per yr

Trade Members \$45 per yr

Contributor Members \$30 per yr

Junior Members (Under 16) \$11 per yr

Ducks Unlimited New Member Competition

Please enrol _____

Address: _____

as a _____ member of Ducks Unlimited.

A subscription of \$ _____ is enclosed.

Please charge Visa/Bankcard NO: _____

Expiry Date: _____ Signature: _____

New member introduced by: _____

Address: _____

☐ Tick for a gift subscription.

Please send renewal notices to: _____

All donations to Ducks Unlimited are Tax Deductible
Post to P.O. Box 44-176, Lower Hutt

COOKING CONTINUED

Small carrot, diced
1/4 cup raisins
1 onion, chopped
Flesh of an orange, sliced
6 very thin strips of orange rind
1/2 tsp dried sage or 2-3 leaves fresh sage
2 cups water

Place duck, apple, celery, carrot, raisins, onion, orange flesh and rind, sage in a casserole. Combine sauce mix with water and add to rest of ingredients. Cook in moderate oven 2 1/2 hours. Thicken before serving and adjust seasoning.

Muffins

Into a large bowl mix:
2 cups flour
1 1/4 c. sugar

2 tsp baking soda
2 tsp cinnamon
1/2 tsp salt
Stir in:
2 cups grated carrot
1/2 c. raisins
1/2 c. walnuts chopped
1/2 c. coconut
1 apple, peeled, cored and grated
In a bowl beat:
3 eggs
1 cup salad oil
2 tsp vanilla

Stir into flour mixture until batter is just combined. Spoon into well greased muffin pans, filling to the top. Bake 375°F - 190°C 18-20 minutes. Makes about 18 large muffins.

FLIGHT BOOK REVIEW

prepared by Chris Hooson

'A Field Guide to New Zealand Lakes and Rivers
Brian Parkinson and Geoffrey Cox
published by Random Century NZ Ltd

This 176 page book is well illustrated throughout by Geoffrey Cox with both colour and pencil sketches that will assist with the field identification of the rich variety of life encountered in New Zealand's wetlands.

The book is divided into two main sections, the first entitled *The Habitats*, which comprehensively deals with the spectrum of lake and river ecosystems found throughout the North and South Islands. Sectional views are provided of each type of habitat with an accompanying colour illustration that features a representative sample of the species found

there. The key details not only the common name for each specie but also the scientific one as well.

The second section is *The Species*. A full range of birds, amphibians, fish, insects, crustacea and plants are outlined with a pencil sketch accompanying each. The outline includes the characteristics of the species, which includes distribution, nest size and an indication of how easily seen each one is. This section enabled me to quickly identify several emergent plants and I also used it to assist a newcomer to identify several native trees.

Although the scientific nature of the text does not equate to bedside reading, I can see it being a popular Christmas gift for any budding or amateur naturalist, especially with its price of \$29.95.

D.U. News

Results of the D.U. National Raffle

Congratulations to the following people who were winners in this year's raffle.
1st Prize Ticket number 7100 R. Van Toor, Outram, Waterfowl Painting.
2nd Prize Ticket number 5927 A. Rees, Taradale, Framed Print.
3rd Prize Ticket number 2388 J. Corbett, Tokoroa, Binoculars.
4th Prize Ticket number 5118 D. Morrison, Auckland, Camera.
5th Prize Ticket number 5428 B. H. Paddy, Palmerston North, Book.
6th Prize Ticket number 8121 R. D. Wilson, Waipukurau, Perfume.

The Directors would like to thank all members and friends for their support and participation in this important annual fundraising appeal, which this year raised \$5,500 for waterfowl and wetland conservation.

Raffle Donors

Special thanks must go to those members who donated items for the national raffle, particularly Mr N. Marsh who once again kindly donated the binoculars, Mr Mark Newcomb of NEVILLE NEWCOMB REPROGRAHPICS, Auckland, who donated the camera, and Mr Phil Scully of SUNLEY CHEMISTS LTD Wellington who donated the French Perfume.

New Member Competition

The first winner in our quarterly membership competition is Mr John Taylor of Mission Bay, Auckland. John signed up Mr T. G. Maxwell of Ruakaka and both will receive a copy of Gordon Stephenson's book "Wetlands: Discovering New Zealand's shy places" from the Sales Dept.



The new member competition is on again with another winner to be announced in the March issue of "Flight". This time is an added bonus for the new member in that their subscription will cover the next financial year beginning in April. Therefore, they will get up to 16 months membership for the price of 12 months. Just send us the new member's name and address, along with your own name and address and both of you will automatically go into the draw.

Gift Subscriptions

Why not give a D.U. subscription to a conservationist for Christmas. This is the gift that may also win you a prize and, after all, what other gift will last well past Christmas 1991. You can use the new member coupon in this issue and tick the "gift subscription" box. This way we can send the 1992 membership renewal to you while the person who receives the gift will also receive "Flight".

Christmas Shopping with D.U.

The D.U. Sales Dept has a wide range of books, caps, cards, bags, traps, prints, shirts, badges, jerseys and stationery ideal for small and large Christmas presents and stocking fillers for D.U. members and friends alike. These are the gifts that give twice as the money that you spend goes directly into helping conserve New Zealand's waterfowl and wetlands. There are even some specials as our entire range of jerseys have been marked down to clear. They were \$75.00 and are now \$68.50.

Water Conservation Orders

Conservation orders on the Grey and Buller Rivers have been publicly notified so that submissions and objections can be lodged. So far only one objection has been lodged against the proposals for the Grey River, while seven objections have been lodged against the proposals for the Buller River. Planning Tribunal decisions on these applications are not expected until mid 1991 at the earliest.

International Ornithological Conference

This international conference is to be held at Canterbury University in Christchurch from the 2nd to the 9th of December and over 1500 delegates from all corners of the world are expected to attend. Ducks Unlimited will be represented at the conference where we will be presenting two poster papers, one entitled "The contribution of captive breeding to the conservation of Brown Teal". The second is titled "Grey Teal nest boxes: are they worth it?". In addition Grant Dumbell and Ducks Unlimited's Scientific Advisor, Associate Professor John Craig, are co-conveners of a symposium titled "Integrating New Zealand Conservation". The conference delegates may also visit

D.U. News

The Sinclair Wetlands and we will report on the success of the conference in the March issue of "Flight".

Bequests to Ducks Unlimited

We have recently been asked for information concerning bequests to Ducks Unlimited to help us to continue our conservation work in the future. While further specific details can be obtained from the Secretary, we have been recommended the following wording for making a bequest.

"I bequest to Ducks Unlimited (N.Z.) Incorporated, for the purposes of that Society, the sum of \$ free of all duties payable at my death, and the receipt of the Treasurer for the time being

or other proper officers of the said society shall be sufficient discharge to my executors for such legacy."

Please discuss your requirements with your Solicitor or Trust Officer who will be able to help you further.

1990 Sponsor Members

Since the September issue of "Flight" we have received four more Sponsor memberships, taking our 1990 total to 34 Sponsor Members. We would like to thank our latest Sponsor Members who are:

Gold Sponsor: Mr W. J. Carter, Masterton.
Silver Sponsor: Bruce Buchanan Ltd, Masterton.
Bronze Sponsor: Mr M. Finlayson, Wellington, Mr P. Matos, Auckland.

1990 Trade Members

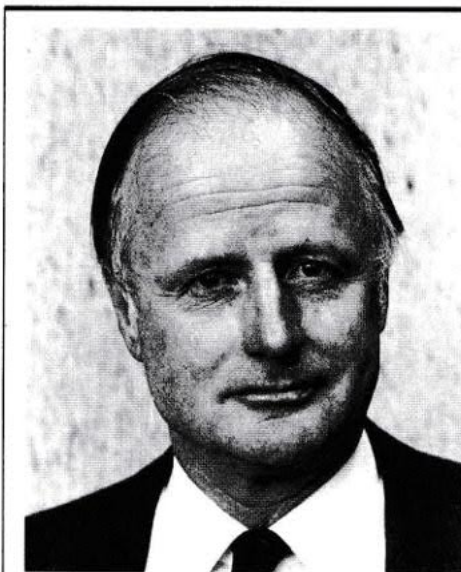
This year we have received 18 Trade Memberships from businesses throughout the country. We hope that wherever possible members will show support to these businesses as everyone who supports D.U. deserves D.U.'s support. The full list of 1990 Trade Members is:

Mr C. J. Bowen, Lower Hutt.
Falkners Garage Ltd, Wellington.
Halcyon Publishing, Auckland.
P. K. & C. M. Hope Ltd, Masterton.
Katikati Bird Gardens, Katikati.
Mr P. H. Lourie, Rotorua.
Marshall Fine Arts, Stratford.
Mr G. P. Mumm, Outram.
Northland Fish & Game Council, Whangarei.
Olin Corporation, Manukau City.
Honda Cars Hamilton, Hamilton.
Pukeko Industries, Wellington.
Reloaders Supplies, Auckland.
Custom Conservatories Ltd, Auckland.
Sportways Gunshed, Auckland.
Staglands, Upper Hutt.
Wanganui District Council, Wanganui.
Mr D. C. Yule, Palmerston North.

For people contemplating Trade Membership for 1991, we would like to point out that Trade Members qualify for significant discounts on "Flight" advertising rates. Full information is available from the Secretary.

Contributor Membership

As part of our expansion of the types and levels of contributions to Ducks Unlimited, the board of directors have agreed to change the name of Ordinary Membership of Ducks Unlimited to Contributor Membership. This change was made as we feel that this better reflects the reason why members are members as a subscription to Ducks Unlimited is a contribution to our conservation projects. Similarly, the recent expansion of the Sponsor Member programme was carried out for the same reasons. A full outline of our restructured contributor programme will appear in a later issue of "Flight".



Sir Peter Elworthy

CHAIRMAN RE-APPOINTED

Sir Peter Elworthy has been re-appointed for a second three year term as Chairman of the Queen Elizabeth II National Trust.

The Minister of Conservation said that in his first term Sir Peter had taken the Trust through some difficult years, and it was now in a stronger position to protect open space in New Zealand. Both the Minister and the Chairman look forward to a developing role for the national Trust in its conservation work with private landholders.

"The National Trust has had to take its share of funding constraints over recent years", said Sir Peter. "This has meant we haven't been able to do all we would like to do, and this is frustrating for both landholders and Trust staff. Protection of private land, with the National Trust, has enormous unrealised potential, but we are looking forward to steady progress over the next few years".

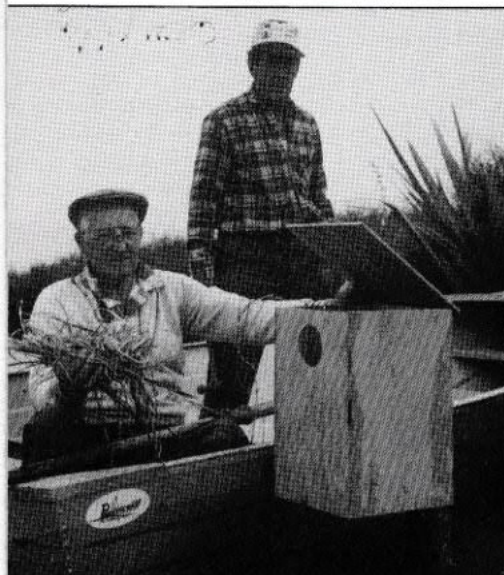
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Ducks Unlimited Nesting Box Project

On Sunday 29th October members of the DU Whakatane Chapter put up 24 grey teal nesting boxes on the Matata Lagoon area. This was a joint project between DU, the Dept of Conservation and Whakatane High School students.



Bob Reed and Peter Mayo maintaining grey teal nest boxes.

The boxes were built by a group of WHS 6th formers who raised the money to purchase the necessary materials by planting trees for the District Council.

The Dept of Conservation donated some of the posts and DU members also provided posts and boxes.

Grey Teal are a small species of duck that was self-introduced from Australia at some point in the past and the small NZ population is periodically increased by invasions of Australian Birds, probably escaping droughts.

Grey teal favour hollow trees as nesting sites. Such nesting sites are in short supply in the NZ environment and DU has for many years been erecting the nesting boxes throughout NZ and this year expect that over 10,000 grey teal eggs will be laid in DU nesting boxes. Some nesting boxes are used three times in a season. It is hoped that these boxes at Matata will help increase the population of grey teal presently living on the Lagoon.

Ducks Unlimited 1990 National Clay Target Championships

This event was staged at the Taupo Gun Club on Saturday 8th September but unfortunately, the turnout to this year's shoot was not as large as we had hoped. It was therefore decided to shoot the full programme on the Saturday, rather than on the Saturday and Sunday as planned. As a result, the board of directors have decided to run the 1991 shoot in conjunc-

tion with next year's A.G.M., as has been done in the past. At this stage, it seems that the Taupo Gun Club will again host the event and full details for next year's shoot will appear in the next issue of "Flight". The board of directors would like to thank the Taupo Gun Club committee for agreeing to stage the event for us this year, and thanks also to the members, friends and shooters who did make the effort to attend. The full list of winners is:

SKEET: HOA - P. Lawlor
A Grade 1st - R. Nixon
A Grade 2nd - G. Webber
B+C Grade 1st - R. Doran
B+C Grade 2nd - B. Bell
SPORTING: HOA - B. Becroft
A Grade 1st - T. Truss
A Grade 2nd - G. Webber
B+C Grade 1st - G. Johnson
B+C Grade 2nd - B. Bell
SPARROWS: HOA - G. Webber
A Grade 1st - T. Truss
A Grade 2nd - B. Becroft
B+C Grade 1st - D. Smith
B+C Grade 2nd - R. Doran
DOUBLE RISE: HOA - R. Nixon
A Grade 1st - T. Truss

A Grade 2nd - I. Stevens
B+C Grade 1st - R. Doran
B+C Grade 2nd - D. Smith
SINGLE BARREL: HOA - T. Truss
A Grade 1st - R. Nixon
A Grade 2nd - G. Webber
B+C Grade 1st - R. Doran
B+C Grade 2nd - B. Flight
POINTS SCORE: HOA - B. Becroft
A Grade 1st - R. Nixon
A Grade 2nd - T. Truss
B+C Grade 1st - R. Doran
B+C Grade 2nd - B. Flight
SINGLE RISE: HOA - T. Truss
A Grade 1st - R. Nixon
A Grade 2nd - I. Stevens
B+C Grade 1st - R. Doran
B+C Grade 2nd - B. Flight

The winning five man team was captained by R. Nixon and shot a score of 77, while the Mackintosh team scored a total of 1368 points. Members should also keep their eye on the March "Flight" for full details of a new shoot format which we hope to introduce next year to complement this well established Ducks Unlimited Taupo shoot.

Project Reports

OPERATION PATEKE

The captive breeding season for brown teal looks likely to be another successful one, with good numbers hatching all over the country.

The radio transmitter trial with brown teal - as outlined in the last FLIGHT has been approved by the Dept of Conservation's Ethics Committee and Grant Dumbell hopes to commence this part of the continuing research programme early next year.

Captive numbers of brown teal have been boosted recently, with Dave Johnston at the Broadlands Wildfowl Trust now having five pairs in his five new aviaries and the Masterton Intermediate School have recently rejoined the programme by taking one pair.

OPERATION WHIO

Dave Johnston also seems likely to achieve a *world first* if his pair of blue ducks are successful in rearing the brood they hatched in early October. To the best of our knowledge no-one has so far been successful in rearing a brood of blue ducks when the ducklings have been left with their parents after successful incubation by the female. This is simply because

it has rarely been tried. But Dave is out to prove it's not difficult at all!! Good numbers of blue duck eggs are being laid and we are hopeful of a population explosion.

OPERATION ROYAL SWAN

By early November at least five pairs of mute's had hatched cygnets and there is every indication that there will be a population explosion of mute swans in the North Island. Dave Johnston, with assistance from Jim Campbell and Jim Glover, is now co-ordinating the ROYAL SWAN project, and Dave reports over thirty members are still on the waiting list for mutes.

OPERATION BRANTA

DU now has a permit to band Canada Geese in the Ohakune area and the Mikimiki area of the Wairarapa.

Diane Pritt will be co-ordinating the banding programme at Ohakune and Jim Campbell the programme at Mikimiki. If any member would like to assist with this important part of our goose programme please phone Diane on (0658) 58016 and Jim on (05925) 869.

NATIONAL SALES ITEMS

BOOKS

Duckshooters: Sportsmen & Conservationists	20.00
Complete Book Australian Birds (Readers Digest)	85.00
Coloured Key to the Waterfowl of the World	14.50
Ducks, Ponds and People	14.50
New Zealand Birds	11.30
The Duckshooter's Bag	8.00
The Duckshooter's Companion - Duckshooter's Bag & Gamebird Hunting	15.80
The Hawaiian Goose	25.50
The Mute Swan	51.00
Ponds and Lakes for Wildfowl	30.00
Birds of New Zealand Locality Guide	50.00
Wildfowl by Eric Hosking	30.00

VHS VIDEOS

River in Question - The Manganui-ate-ao	66.50
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APPAREL

DU Hat - Blue/Grey (one size fits all)	25.00
DU Jersey - Red/Green/Blue (state size) ..	76.00
DU Polo Shirt - Dark Blue	40.00

BADGES

DU Decal	1.20
DU Lapel Pin	5.60
DU Cloth Shoulder Patch	9.60
DU Canada 50th Anniversary Badge	5.60
DU Duck Head Badge - Large Gold	6.75
DU Duck Head Badge - Small Gold/White & Green	5.60
DU Duck Head Stick Pin	5.60

STATIONERY

DU Ballpoint Pens Clic Bic - per box of 10	11.20
DU Maxipens - per box of 10	11.20
DU Maxipens - single	1.50
Janet Marshall Bird Calls - set of four	6.00
Ornithological Society Bird Cards - packs of 10	6.00
Waterfowl Writing Paper and Envelopes - set of 10	9.00
Waterfowl Note Paper and Envelopes - set of six	6.00
Postcards - Mute Swan/Brown Teal 10 pack	4.00

GENERAL

Limited Edition Art Prints	
Blue Duck Art Print by Paul Martinson (Members Price)	85.00
Shoveler Art Print by Russell Jackson (Members Price)	85.00
Mallard Art Print by Janet Marshall - numbered & unsigned	49.50
Fenn Traps Mk 6	28.00
DU Duck Head Flag 62cm x 44cm	41.00
DU Cam-O-Paint	10.00
DU Ashtray	4.60
DU Bottle Opener	4.20
DU Key Ring	4.60
DU Key Ring Nail Clippers	4.20
DU Letter Opener	4.20
DU Tea Caddy Spoon	4.20
DU Teaspoons	4.20
DU Plastic Ruler	1.50
DU Plastic Mugs - set of 3 assorted colours	2.00
Number Plate Surrounds (Pairs) Red, Blue, Green	33.00
Engraved Crystal Decanter	50.00
Roll Bag	24.00
Camo Back Pack	36.00

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