

RESTORATION PLAN FOR
LAKE TE ROTO KARE AND ITS
ASSOCIATED WETLANDS,
HAWKES BAY

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PROPOSAL P1703

Report prepared for

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1. BACKGROUND AND ASSIGNMENT

Te Roto Kare Wetland is located on private land approximately 5 km south of Taradale. For several decades it has relied solely on precipitation and runoff from the hills immediately surrounding it to sustain it, and for much of the year has been devoid of open water. Prior to the early 1970s when stopbanks were constructed along the Tutaekuri River and drainage improvement works were undertaken on the Upokohino Stream, Te Rotokare was periodically inundated with flood waters derived from these sources. The lake occupied an area of up to 35 ha in extent, and was of sufficient depth to enable water skiing during the 1930s and 40s. During the 1970s the former NZ Wildlife Service identified the lake as having high, and regionally significant wildlife values, and although it has since been reduced to a fraction of its former extent and is effectively summer-dry, it continues to be utilised by a variety of wetland birds including threatened species such as bittern. In addition to its intrinsic values, Te Rotokare is likely to play an important role within a regional network of wetlands being located in close proximity to a number of other similar water bodies (e.g. Lakes Runanga, Hurimoana, Kautuku and Oingo). Both the Department of Conservation, and Fish and Game NZ, advise that the area retains significant potential for enhancement if a restoration plan can be devised that is acceptable to all affected parties (Hans Rook and Iain Maxwell pers. comms.).

There have been a number of investigations since the mid 1980s exploring management options for the lakebed and surrounding area. These have ranged from works which would enable the area to be maintained in a dry condition for farming, to hydrological restoration options involving bunding and/or pumping which would enable water levels to be elevated or retained for a longer period, and many of the wetland's natural values reinstated. None of the proposals have met with unanimous support from all interested or affected parties, so none have been implemented. The only physical works to have been undertaken within the last two decades have been the installation of additional drains into part of the lake which only served to accelerate and maintain its demise. Interested parties include six landowners who would, or could be directly affected, and agencies with statutory interests (Hawkes Bay Regional Council, Department of Conservation, Fish and Game NZ).

Kris Ericksen's family own a portion of the lake bed. Kris has recently met with all of the landowners, and representatives of the statutory agencies, and circumstances and attitudes have changed markedly from those of the past. Conditional support for restoration of the lake and its wetland communities has been communicated by all of the landowners, subject to an assessment of the issues and options involved in achieving this. Enthusiastic support has also been registered from each of the agencies.

Kris' vision is to re-create the pre-1970s hydrological regime to the extent that this is possible, undertake plant and animal pest control, and enhance indigenous wetland plant communities. The lake is presently grazed to water's edge in parts and willows have invaded parts of it. Subject to availability of funds, Kris wishes to engage Wildland Consultants to undertake an independent investigation of issues and options for the ecological restoration of Te Roto Kare. This will include reviewing/revisiting options for restoration of the wetland's hydrology, co-ordinating technical input from

other parties, devising an ecological restoration strategy, and producing a report which could be used for consultation and/or to accompany applications for funding for implementation of its recommendations.

2. APPROACH

The investigation and programme will be broken down into discrete tasks and progressed on a stage by stage process as outlined below:

Stage 1. Issues and Options Investigation

- Obtain digital aerial photographs.
- Collate and evaluate relevant existing information (including cadastral and topographic data, previous investigations of hydrological and engineering options, flora and fauna observations, other unpublished reports or records held by agencies, historical photographs if available).
- Prepare a GIS base map using recent digital aerial photography.
- Convene an initial on site meeting with client and/or technical specialists from the three key agencies (HBRC, DOC, F&G) to discuss project objectives, determine what assistance each agency can provide, identify potential issues, delegate tasks, confirm outputs and timelines.
- Undertake rapid field assessment of existing indigenous vegetation, flora, and fauna.
- Identify, describe, evaluate, and map all natural features and areas of indigenous vegetation and habitats.
- Identify (and quantify) hydrological restoration options.
- Identify potential issues and effects of each option for landowners, and assess implications and opportunities for ecological restoration.
- Prepare a draft report incorporating input from the key agencies and feedback from the client. Report to include a recommended option and broadly indicative costings.
- If required, attend a meeting with, or otherwise assist with consultation with potentially affected landowners in relation to options.
- Finalise report incorporating comments and feedback from landowners.

Stage 2. Restoration Plan¹

- Prepare staged restoration plan detailing engineering works required to implement preferred hydrological restoration option, ecological restoration tasks and prescriptions (e.g. weed control, fencing, planting, animal pest control), resource consents that might be required, and costings to implement all of the above.
- Provide draft report to client for comment, receive feedback and finalise report.

3. PROVISIONAL CONTENTS OF RESTORATION PLAN

1. Introduction
 - 1.1 Background
 - 1.2 Location and history
2. Vision
3. Approach/Methods
4. Site Description
 - 6.1 Land tenure
 - 6.2 Landform, geology, and soils
 - 6.3 Vegetation and flora
 - 6.4 Fauna
5. Hydrological Restoration
6. Vegetation and Habitat Restoration
 - 6.1 Riparian fencing
 - 6.2 Removal of invasive weeds
 - 6.3 Enhancement planting
 - 6.4 Predator control
 - 6.5 Monitoring
7. Resource Consents
8. Cost Estimates
8. Implementation Plan

References

Appendices

1. List of plant species present
2. List of birds recorded
3. Weeds and guidelines for their control
5. Plant schedules
6. Planting guidelines
7. Site photographs

¹ Subject to outcome of consultation and registration of support from landowners and other affected parties.

4. RESOURCES TO BE PROVIDED BY THE CLIENT

- Any available reports or documentation including photographs relating to the study area.
- Pre-arranged access to the sites.

5. OUTPUTS AND TIMELINES

- Ten hard copies of the draft Issues and Options Report, and an electronic copy of the draft Restoration Plan with PDFs of figures.
- Ten hard copies of each final report, and an electronic copy of each with PDFs of figures.
- Provisional completion of Stage 1 by 31 March 2010 & Stage 2 by 30 June 2010.

6. COMPANY PROFILE

Wildland Consultants Ltd is a progressive ecological consultancy, committed to the care and enhancement of our natural environment. The company has been operating since 1985 and is committed to providing high quality ecological information, advice, and technical services to a wide range of clients. The company specialises in:

- **Ecological Restoration**
 - Planning.
 - Implementation - restoration planting, revegetation, weed control, pest control (including predators), monitoring, and ongoing wildlands management.
 - Large and small scale - extensive track record based on practical experience.
 - Rehabilitation and restoration of degraded sites.
- **Survey and Monitoring**
 - Survey, assessment, monitoring and management of biodiversity, threatened species, vegetation, fauna, pest plants (weeds), and introduced mammalian pests.
- **Ecological Evaluations and Solutions**
 - Assessments of land use effects.
 - Sustainable land management.
 - Policy and management advice.
 - Rehabilitation and ecological restoration.
 - Preparation and presentation of expert evidence for hearings and appeals.
 - Geographic Information System (GIS) mapping and analysis.
- **Landscape**
 - Landscape ecology.
 - Landscape architecture.
 - Landscape planning.

- **Ecological Research**
 - Vegetation.
 - Fauna.
 - Threatened plants.
- **Project Management**
 - Large and small scale projects.

Wildland Consultants Ltd has a very strong track record, developed over many years, with a long term commitment to ecological restoration. Strong ongoing client relationships are an important focus of the business. Clients include government departments, regional councils, district councils, large corporations, other consultancy firms, private landowners and businesses.

7. LOCATIONS

The company has offices in Rotorua, Tauranga, Auckland, Whakatane, Wellington, and Dunedin, and staff work nation-wide.

8. PROJECT TEAM

Both stages of the project would primarily be undertaken by Andy Garrick with assistance from GIS staff and other Wildlands ecologists as required. Profiles of staff most likely to be involved are as follows:

Andy Garrick - Senior Ecologist/Restoration Project Manager

Wildland Consultants Ltd

Andy is a well known restoration specialist, with 32 years of relevant work experience throughout New Zealand including many offshore islands. This includes: employment with the New Zealand Wildlife Service managing wetland habitats, undertaking fauna surveys and threatened species research (seven years); wild animal surveys with the New Zealand Forest Service (one year); advisory scientist to the Department of Lands and Survey (two years); self-employed ecological consultant (five years); senior fauna and habitat specialist (terrestrial and marine) with the Department of Conservation (seven years); and senior fish and game officer with Fish and Game New Zealand responsible for habitat protection and enhancement programmes (six years). Andy has been with Wildlands for nearly six years, his primary focus being associated with devising ecological restoration strategies, preparation of restoration and revegetation plans, and managing the implementation of these projects. Andy has a well developed and practical understanding of the issues associated with the restoration and management of both wetland and terrestrial ecosystems, and the effects of particular land uses and activities on these. He has a particular expertise, and extensive experience, associated with the management of wetlands and identifying hydrological restoration options. Andy was responsible for preparing the hydrological restoration prescription for the 250 ha Lower Kaituna Wildlife Management Reserve

in the Bay of Plenty in the early 1990s, and some of his more recent projects include preparation of:

- An ecological restoration programme for Awakaponga Wildlife Management Reserve;
- Otauirā (Hannahs Bay) Wetland Ecological Restoration and Development Plan;
- A conceptual plan for restoration of wetlands at Jess Road Inlet, Te Puna Estuary;
- Otumutu Lagoon Wetland Restoration Plan, Lake Tarawera;
- Identification of ecological restoration options for Pukuriri Lagoon, Kaingaroa Forest;
- Identification of opportunities for wetland restoration as mitigation for the Stage 2 runway extension at Rotorua Regional Airport;
- Restoration Strategy and Implementation Plan for Indigenous Vegetation and Plant Species of the Eastern Shoreline of Lake Wairarapa;
- An assessment of the effect of management proposals on marginal plant communities and wetland birds at Lake Ngaroto;
- Implementation Plan for Restoration of the Manawatu River Loop at Foxton;
- A willow control programme for Hamill's Wetland at Kapenga.
- Wetland Restoration Opportunities for the Holwerda Property, Katikati

Andy is a highly experienced and capable project manager with excellent people and organisational skills, and the ability to pull together effective, efficient, and motivated project teams and partnerships. Andy has extensive contacts throughout the country within both Fish and Game NZ, and the Department of Conservation, and has undertaken a number of projects within Hawkes Bay and in a number of capacities over the years. Andy is broadly familiar with Te Roto Kare and its issues, having instigated a waterfowl trapping and banding programme there during the late 1990s.

Roger Bawden - GIS Specialist

Wildland Consultants Ltd

Roger has a BSc (Technology) degree from the University of Waikato where he majored in Geographic Information Systems and Earth Science. Roger is experienced in a range of GIS applications, cartography, data collection and database management and is responsible for the company's GIS management including data capture and analysis and map production. The Company operates ArcGIS8.3 and ArcView.

Roger has previously managed his own business where he undertook a range of GIS work for various clients and is familiar with the use of survey plans, orthophotos, GPS, ArcGIS and SDR-Mapping and Design, and Visual Basis programming. He has also worked for Forest Research and Flaherty Survey and Mapping where he undertook a range of GIS, GPS, survey and mapping work

Dr Tim Day - Senior Fauna Ecologist/Pest Management Ecologist

Wildland Consultants Ltd

Tim is a new member of the Wildland team and is an experienced fauna and pest management ecologist with a significant practical and theoretical background in developing and implementing highly effective ecological restoration solutions. He has

particular expertise in the management and behaviour of pest animals and has been closely involved in aiding the successful eradication of pest animals from several mainland restoration sites. Tim completed his Ph.D in behavioural ecology, studying the feeding behaviour of native avifauna and vertebrate pests. He worked for nine years in a government research institute (AgResearch) as a scientist, where he led research to prevent native avifauna from feeding on pest control baits and led the design, research and development of effective exclusion fencing technology for multiple pest species. Tim has had extensive consulting and project management experience in his previous role as the Research and Development Manager for a commercial restoration business (Xcluder fencing). He has experience in providing sound strategic advice on pest animal and wildlife management issues and restoration project design for a range of commercial, government and private restoration clients, in both New Zealand and overseas. Tim has a strong publications record, retains a significant ongoing involvement in ecological research and plays an important advisory role in several community led ecological restoration initiatives. He thrives on the challenge of understanding animal-based ecological issues and developing appropriate, practical and cost-effective management solutions that are readily integrated into projects.

Sarah Beadel - Senior Ecologist, Company Director

Wildland Consultants Ltd

Sarah is a very experienced botanist and ecologist, having worked as a consultant since 1985 when she established Wildlands. The business has since expanded to become a nationwide company. Sarah has extensive experience throughout New Zealand in restoration planning, identification of management issues and options for natural areas, vegetation surveys and mapping, evaluation of areas for relative ecological significance, problem plant (weed) assessment and monitoring, threatened species survey and monitoring, assessment of the impacts of introduced animals, and vegetation monitoring. She has worked on many ecological surveys of indigenous vegetation and habitats on private land, to assess ecological values and identify management requirements. Sarah has considerable experience with preparing restoration plans, and successfully managing the implementation of large restoration projects. She is highly competent at managing all aspects of projects, drawing together a wide range of specialist skill sets to produce a high quality result for the client. Sarah was the project manager for the Norske Skog Tasman wetland restoration project for ten years, which is one of the largest wetland restoration projects to be undertaken in the Bay of Plenty and New Zealand. This project has won several awards and has been recognised under the RAMSAR Convention, with a national award from the Minister of Conservation for the development (and implementation) of best practise in the conservation and wise use of wetlands. She has undertaken many vegetation surveys of natural areas (protected and unprotected), including detailed field surveys of the vegetation of Tauranga Harbour and Ohiwa Harbour, and of geothermal areas in the central North Island. Since the 1980s Sarah has also undertaken many projects on threatened and uncommon plants in the Bay of Plenty and other parts of New Zealand. She has worked on many vegetation monitoring projects, including the establishment and remeasurement of transects, plots, and photopoints in a diverse range of habitats, sand dunes, wetlands, forests, geothermal areas and shrublands. She was the implementation manager for the 2002-2007 Northern Carbon Monitoring Programme. Teams established over 650 20 x

20 m permanent vegetation plots throughout the North Island and northern South Island. Sarah has been project leader for nine Protected Natural Area Programme (PNAP) surveys, and the primary author of seven PNAP reports, covering over 800,000 ha. She has undertaken natural heritage inventories for ten District Councils, and has been closely involved and/or project leader for many other large scale projects, including an inventory of wetlands throughout the Otago Region. Sarah has served on the committee of the New Zealand Botanical Society, and is currently a committee member for the New Zealand Plant Conservation Network and the Rotorua Botanical Society (secretary for six years). She is passionate about indigenous plants and ecological restoration, and is the author of more than 500 botanical reports, papers, and articles.

9. RELEVANT EXPERIENCE

- **Awards**

Wildlands is managing the streamside and riparian restoration of Olympic Park in Auckland which won the “Outstanding Park Award for 2007” (awarded by the New Zealand Recreation Association). Wildlands also won a major regional award from the Sustainable Business Network in 2005, “presented in recognition of an outstanding contribution to sustainability”. Wildlands is also nationally recognised for expertise in ecological rehabilitation and restoration. The company manages a large wetland restoration project for Norske Skog Tasman and this has won two awards; from Environment BOP (2000) and a national award under the Ramsar convention from the Minister of Conservation (2001), for industry best practice for wetland restoration. Other Wildlands projects have also won recent (2004) award from Environment BOP: Ohinemataroa (Whakatane) River restoration and a plant nursery project at the Taneatua School.

- **Wetlands - General**

Wildland Consultants Ltd has a very strong portfolio of experience with wetland restoration, assessment and site management. Staff have undertaken wetland survey and restoration projects in many parts of New Zealand, including Waikato, Bay of Plenty, Northland, Auckland, Hawkes Bay, Gisborne, Waikato, Taranaki, Manawatu, Horowhenua, Wellington (including the Wairarapa), and various parts of the South Island. Recent projects include management of the restoration of wetlands at Hannahs Bay (willow control, water management, planting, boardwalks, interpretation panels etc); management and implementation of the Norske Skog Tasman restoration project; a restoration strategy and implementation plan for indigenous vegetation and plant species of the eastern shoreline of Lake Wairarapa; a wetland restoration project for CHH Tissue upstream of the Norske Skog Treatment Ponds; identifying survey and monitoring priorities for lands administered by the Department of Conservation; wetland restoration (excavation, planting, willow control) at Lake Okaro and Awakaponga Wildlife Management Reserve; preparation of a restoration plan for seven wetlands surrounded by dairy farms on the Rangitaiki Plains. Vegetation surveys have been undertaken of all the wetlands on the Rangitaiki Plains, Lake

Tamurenuī, Tumurau Lagoon (1992), Tahuna-Putauaki (1992), Young Wetlands (1994), Kohika (1993), Kopuatawhiti (1995), Lake Pupuwaharau (1992); compilation of a wetland register for the Otago Regional Council; wetland monitoring and wetland vegetation mapping in the Bay of Plenty Region; preparation of a database of all wetlands in the Bay of Plenty Region. A major survey of wetland and stream margins in plantation forests has been completed for Fletcher Challenge Ltd. Monitoring of turf communities at Lake Whangape; survey and assessment of key wetlands in the Waikato and Franklin Districts; assessment of significance of wetlands in the Otorohanga District; preparation of a restoration plan for wetlands on a dairy farm near Reporoa; identification of restoration priorities for 100 wetlands within the Waikato Region for Environment Waikato. Many other projects have been undertaken on wetlands throughout New Zealand.

Additional detail is provided on several of these projects below:

- *Ecological Restoration of a Cut-Off Loop of the Manawatu River at Foxton:*
An outline of key issues and options for restoration of a major (11 km) meander loop of the Manawatu River cut-off for flood control works.
- *Te Ripo O Hinemata Wetland Restoration Action Plan:*
A comprehensive resource inventory and restoration plan for a 19 ha degraded wetland adjacent to the Koputaroa Stream north-east of Levin.
- *Restoration of Te Hakari Wetland, Levin:*
Development of options and a detailed restoration plan for a remnant wetland adjacent to the Ohau River.
- *Ecology and Restoration of the Te Harakeke Wetland, Waikanae (Wellington Regional Council)::*
Vegetation and habitats were described and vegetation condition (and trend) was assessed. A restoration plan was prepared that included management of water levels, indigenous vegetation, pest animals, pest plants, buffers and linkages, and monitoring.
- **Restoration of Bay of Plenty Wetlands**

Examples of recent projects undertaken by Wildlands within the region are listed below.

- *Restoration of Awakaponga Wildlife Management Reserve Wetland*

This formerly heavily degraded 8 ha freshwater wetland is on the path to recovery following an intensive five year programme involving major earthworks, willow and other weed control, planting programmes, and the design and implementation of a new water supply regime. Planting programmes have included educational and hands-on opportunities for local schools.

- *Restoration of Otairua (Hannahs Bay) Wetland*

As at Awakaponga, rehabilitation of this 8 ha wetland has involved the implementation of a novel approach to addressing hydrological issues which will assist with the treatment of water prior to its discharge into Lake Rotorua in addition to enhancing indigenous habitats and providing for passive public recreation. Wildlands is responsible for project design, community liaison, preparation of restoration planning documents, large scale and intensive willow and weed control programmes, planting, monitoring, and project management. Planting is now into its fourth year, and each year planting has involved community planting opportunities which have been set up and managed by Wildlands.

- *Te Ngae Kahikatea Protective Buffer Revegetation Project (2005-2008)*

Wildland Consultants Ltd is the project manager for a restoration project covering 8 ha contiguous with the Te Ngae kahikatea stand. This stand is the largest remaining stand in the Rotorua Lakes Ecological District. It is the only stand in the district with a wet swampy forest floor that qualifies it as true swamp forest. Eight hectares was cleared of gorse and willow using mechanical means and spray. Some compacted areas were deep ripped. About 75,000 eco-sourced indigenous plants have been planted, mainly manuka, cabbage tree, harakeke, and toetoe, but also some karamu, kanuka, and koromiko. Enrichment plantings of kahikatea and swamp maire were undertaken in subsequent years. All kahikatea planted on the site were sourced from seedlings collected from beneath scattered pole trees in the restoration area, or grown from seed collected from the stand. Pest animal control (rabbits, possum, and wallaby) was undertaken prior to planting and ongoing as necessary. Plants were maintained until canopy closure was achieved. Maintenance included chemical control and hand releasing. General weed control of gorse was also undertaken. Regular monitoring of the plantings was undertaken through site inspections and measurement of permanent photopoints.

- **Iwi-Based Projects**

Wildlands has worked on many ecological restoration projects in conjunction with and for iwi, both in the planning phases and the implementation phases. Examples of projects include large wetland ecological restoration project with the Ngati Rangiteaorere Kahikatea Trust north of the Rotorua Airport and the restoration project at Lake Pupuwaharau near Kawerau. We have worked together with iwi on the Ohinemataroa (Whakatane River) restoration project, the Foxton River Co-op Restoration Project, the Te Hakari Wetland restoration and the Kereu Wetland Project in the Manawatu. We are also working on a large structure plan project with Ngati Whakaue in Rotorua. Near Kawerau we have been working closely with iwi on several ecological restoration projects associated with the Kawerau Pulp and Paper Mills to restore traditional waterways and wetlands.

- **Ecological Management Planning**

Wildland Consultants Ltd has a large portfolio of experience in ecological management planning, including:

- Preparation of numerous restoration and revegetation plans in the southern South Island, including a suite of coastal duneland reserves (for Dunedin City Council), montane habitats (for various clients in Central Otago), and penguin habitat near Kakanui.
- Many ecological surveys (vegetation and fauna) have been undertaken widely throughout the South Island, from Nelson to Southland, including Selwyn District. These surveys have been used as the basis for active management to protect and enhance natural areas.
- Ecological restoration plan for the Karitane Estuary.
- Major contributions to an ecological restoration plan for the proposed Orokonui Sanctuary, near Dunedin, including management of a suite of pest animals and plants (for the Dunedin Natural History Trust).
- Biodiversity resource document and ecological objectives for Whangarei Heads landcare groups (NZ Landcare Trust).
- Kawau Island ecological restoration plan (prepared for the Kawau Island community, supported by ARC and DOC).
- Objectives for ecological restoration of Mohunga Peninsula (for Mohunga “landcare” group Great Barrier Island).
- Opportunities for ecological restoration of Motatau Forest and associated wetlands (for DOC and Ngati Hine, Northland).
- Strategic plan for Kuaotunu Peninsula, Coromandel Peninsula (for Project Kiwi).
- Ecosystem restoration plan for northern Te Urewera National Park (50,000 ha) (for the Department of Conservation).
- Wetlands restoration plan for the Norske Skog Tasman Wetlands, Kawerau (for Norske Skog Tasman).
- Many prescriptive ecological action plans for community groups, private companies, landowners, and DOC.

- **Ecological Restoration**

Wildland Consultants Ltd has a substantial portfolio of experience with ecological restoration. This includes restoration planning (often for areas and species with complex management requirements), contract management, supervision of physical works (including substrate restoration), planting, pest management, and ongoing monitoring and maintenance. Restoration plans have been prepared for “mainland islands”, many wetlands, industrial sites, farms, and community-based and tangata whenua initiatives in Northland, Coromandel, and Bay of Plenty, and on offshore islands. This includes an ecosystem restoration plan for c.50,000 ha in northern Te Urewera National Park. This is the largest area of mainland indigenous ecosystem undergoing active pest management for restoration purposes in New Zealand (and globally). A kiwi restoration project near Whitianga has been reviewed and a new restoration plan prepared. The potential for wallaby (and possum) eradication from Kawau Island has been reviewed for

the Department of Conservation. The company has also undertaken an ecosystem restoration feasibility assessment for a private landowner with a large area of indigenous forest (c.11,000 ha).

- **Indigenous Revegetation**

Wildland Consultants has planned and implemented many indigenous revegetation projects, in a range of environments including stormwater and effluent treatment ponds. Since 1998 the company has planned and undertaken literally hundreds of planting projects, some of which involve multiple sites and a range of habitat types. These projects have involved the successful establishment of hundreds of thousands of indigenous plants comprising at least 100 species, including trees, shrubs, grasses, sedges, and rushes suited to wetland, forest, and shrubland habitats. Practically all of these projects involve ongoing monitoring and management until plantings are well established and maintenance requirements cease or become minimal. The company implements every stage of these projects, including site evaluation and identification of options and opportunities, preparation of restoration/revegetation plans, site preparation, pest control, weed control, planting, monitoring, and ongoing maintenance. The projects have been undertaken for wide ranging purposes including protection and enhancement of indigenous biodiversity, protection of riparian margins, enhancement of water quality, site remediation, and enhancement of amenity values including recreational opportunities and aesthetics/landscape features.

Examples of several relevant projects undertaken by Wildlands are listed below:

- Norske Skog Tasman Restoration Project (1998-2008)

Wildlands is the project manager for a major wetland restoration project for Norske Skog Tasman, Kawerau centred on the pulp mill's treatment ponds near Kawerau. This project, covering c.120 ha, is into its tenth year and has involved the following components:

- assessing site characteristics and developing objectives for the project
- identifying requirements to achieve objectives
- site preparation including chemical and hand clearance of weeds, mechanical preparation (excavation and other earthworks, chipping/mulching)
- species selection, planning and management of planting operation, fertilising, mortality monitoring
- establishment of plantings
- maintenance/after-care of plantings
- GIS mapping to help plan site preparation, planting operations and maintenance
- bird and vegetation monitoring
- predator control.

High quality formal reports have been prepared on different facets of the project, e.g. vegetation, soils, fauna, project progress. A comprehensive photographic record of the project has been maintained.

- Revegetation of Stormwater and Effluent Treatment Pond Margins for CHH Pulp and Paper, Kinleith

This is an ongoing project commenced approximately five years ago. The project has entailed detailed site assessment, preparation of restoration and revegetation plans, and project implementation.

- Planting of Constructed Water Treatment Wetlands at Okaro

This involved the sourcing, propagation, planting and post planting maintenance of over 60,000 wetland plants within wetlands totalling 2.3ha for Environment Bay of Plenty as a contribution towards its lake water quality management regime for the Rotorua Lakes. The project has been described in a joint technical presentation to the 2007 South Pacific Stormwater Conference by staff of NIWA, Opus, Environmental Management Services and Environment Bay of Plenty.

- Planting of Constructed Water Treatment Wetlands at Waikeria Prison

Wildlands has recently been engaged by the Department of Corrections to design and implement a wetland planting programme associated with the remediation of a series of submerged vegetated wetland beds at Waikeria Prison. The purpose of these wetlands is to polish effluent from the prison's wastewater treatment plant prior to its discharge into a natural waterway (the Puniu River). The first of three wetlands was planted in November 2007, and the remaining two are scheduled for planting in 2008/09.

- **Weed Control Methods**

Company staff have extensive knowledge of weed control methods and weed identification, with in-depth experience in plant pest control in a wide range of habitats including stormwater ponds and constructed wetlands.

Staff are experienced in determining which control methods and herbicides (and concentrations) are most effective for the control of particular weed species, and minimising non-target impacts.

- **Weed Control Implementation**

Company staff have successfully undertaken or supervised pest plant control for a wide range of weed species using targeted methods in a diverse range of environments. Examples include:

- willow control using stem poisoning;
- willow control using foliar sprays (ground-based and aerial);

- control of woody shrubs and lianes using stem cutting and stump swabbing with herbicides or foliar sprays;
- control of wilding pines by felling, stem poisoning, foliar sprays, pulling of seedlings;
- control of wetland species such as *Glyceria*;
- control of a diverse suite of weeds or revegetation sites;
- the use of machine mulchers (bobcat and excavator-mounted) to remove large entanglements of weedy weeds.

Weed control has been implemented in the following environments:

- indigenous forest
- freshwater wetlands
- estuarine wetlands
- dunelands
- revegetation sites
- frost flats
- indigenous shrubland
- lake and river margins
- constructed wetlands.

- **Knowledge of Indigenous Ecosystem Processes**

Wildland Consultants Ltd have undertaken ecological surveys and related assessments of the following indigenous ecosystem and habitat types: indigenous forest, scrub, shrubland, freshwater wetlands, estuarine wetlands, lakes and lakeshores, sand dunes, geothermal vegetation, grasslands, herbfield, and offshore islands from the coast to inland mountains. Staff are very familiar with estuarine and freshwater wetland ecosystems, having undertaken detailed vegetation surveys of Tauranga and Ohiwa Harbours and many freshwater wetlands. Staff have a high level of understanding of ecosystem processes having previously undertaken (and published) studies on disturbance mechanisms in indigenous ecosystems, threatened species ecology, and the impacts and roles of introduced animal pests (including monitoring studies) and pest plants.

- **Fauna Survey and Monitoring**

Wildland Consultants staff have undertaken numerous projects to survey or monitor threatened and pest species, invertebrates, and freshwater fish. Examples of projects include presence/absence monitoring for threatened birds, whio (blue duck) surveys, territory mapping of kokako in Opuiaki Ecological Area, kiwi surveys (which have been undertaken widely across the North Island), frog monitoring in the Kaimai Ranges, bat monitoring, deer pellet counts, trap catch monitoring (design and fieldwork), tracking tunnels, five minute bird counts, mark recapture studies, distance sampling, and pitfall and spotlight monitoring for lizards. Fish surveys have been undertaken using spotlights, electric fishing, minnow traps, and fyke nets.

- **Assessment of Environmental Effects (AEE's)**

Wildland Consultants Ltd has undertaken many ecological assessments for AEE's, for a wide range of proposed developments. This includes wind farms (Manawatu, Northland), quarries (Bay of Plenty, Otago), roading (SH1; SH38; SH47; technical advisers on ecological matters to hearings commissioners for Tauranga routes P, J, K, northern arterial, eastern arterial), landfills (Bay of Plenty, Gisborne), subdivisions (BOP, Coromandel, Waitakere Ranges), a gas pipeline (Hastings-Wairoa), geothermal power stations, mining (Coromandel, West Coast), sand mining, water supply dams and reservoirs, walking tracks, forestry, regional prisons, hydro-electricity generation (monitoring of existing operations and assessments of proposed development), marinas, and other land uses. These assessments have included vegetation, threatened plants, fauna, fish, and invertebrates.

10. PROJECT SERVICES

Wildland Consultants Ltd can offer a range of services for a project of this type, including strategic advice, management advice, project planning and oversight, monitoring, and implementation services.

Strategic Advice

Staff often provide strategic advice on issues associated with ecological restoration, revegetation, and ecology in general to landowners, managers, committees, community groups, and boards.

Management Advice

In-depth advice, verbal and written, can be provided to guide management implementation being undertaken by other parties.

Project Planning and Oversight

The Company also have experienced project managers who have directly managed large restoration projects - up to \$3 million, over seven years. This service can include all aspects of project management, including budget management.

Monitoring

Cost-effective and timely monitoring is a key element of a successful project and Wildlands staff are very experienced in a wide range of techniques.

Implementation Services

The Company also provides a full range of implementation services, including site preparation, large (or small) scale planting, maintenance, weed and pest control.

11. INSURANCE

Wildland Consultants Ltd insurance includes :

- Professional indemnity (\$2 million)
- Public liability (\$3 million)
- Forest and Rural Fires Act cover (\$1 million)
- Statutory liability (\$1 million)

12. HEALTH, SAFETY, AND RISK MANAGEMENT

Wildland Consultants Ltd maintains a health and safety plan, which is reviewed on a regular basis. Company staff carry personal locator beacons, cellphones, and other safety equipment, and maintain daily reporting requirements while doing field work. The company has a long history of working in potentially hazardous backcountry environments, and has a clear safety record - the company Health and Safety Plan covers the types of environments and hazards included in this project.

Wildland Consultants Ltd complies at all times with the provisions of the Health & Safety in Employment Act 1992 and ensures work is executed in accordance with site specific health and safety plans.

Project Specific Safety Plan

A project specific safety plan is compiled for each individual project, identifying site specific hazards and ways to manage these hazards.

Hazard Identification

General hazards are identified in Wildland Consultants' Health and Safety Plan. Site specific hazards are identified on an initial site visit. Means to manage these hazards are then determined and recorded in the project safety plan. Hazard identification is an ongoing process and further hazards are identified, and management actions determined, as they are identified. A table of hazards and management actions is provided in Appendix 1 of the Health and Safety Plan.

Safety Training

All field staff undertake first aid training. First aid certificates are kept up to date. Specific training (agrichemicals, chainsaw, 4WD) is provided to those staff members operating potentially hazardous equipment.

Safety Records

All accidents/incidents are recorded in the Company Accident Register. No accidents have resulted in staff members having to take 1 day or longer off work. No work days have been lost due to accidents.

Accident Investigation

The procedure for accident investigation is laid out in the Company's Health and Safety Plan. All accidents (relating to quality and health and safety matters) are investigated and reported to the client.

Safety Awareness

The Company undertakes regular in house Health and Safety meetings. All Company staff are responsible for maintaining a safe workplace, including identifying new hazards.

Subcontractors

All subcontractors are required to have their own site specific Health and Safety Plans. They must also sign and adhere to Wildland Consultants' Health and Safety Plan. Regular safety audits are undertaken on all subcontractors.

13. QUALITY CONTROL

Internal drafts of all outputs will be subject to in-house peer review procedures, in accordance with Wildland Consultants company policy.

14. RESOURCES AND EQUIPMENT

Wildlands has a core staff of 45 and employs additional staff as required. All staff engaged in a particular project have the appropriate training and experience. The company maintains a fleet of 4WD vehicles, quad, and trailers, a vehicle-mounted gunspray unit, a quad mounted CDax sprayer, knapsack sprayers, chainsaws, brushcutters, planting gear, and a full complement of other field items including monitoring equipment e.g. GPS, levelling gear, digital cameras, and all-weather plot sheets. Wildlands has in-house Geographic Information Systems (GIS) - ARCGIS 8.3 and ARCVIEW, and other necessary computer software, including laptops.

15. REPORTING

Wildland Consultants maintains regular verbal and written communications with clients and project managers, including the work undertaken, progress made and any problems encountered, as is necessary to ensure that contracts are fulfilled on time and to a high standard. Reporting in writing occurs at least monthly by email (unless the client indicates otherwise).

16. MEDIA POLICY

Wildland Consultants maintain a media policy that ensures project confidentiality. Unless otherwise agreed, all media inquiries are directed to the client.

17. INTELLECTUAL PROPERTY OWNERSHIP AND CONFIDENTIALITY

As this proposal has been prepared at no cost to the client, it remains the property of Wildland Consultants. No part of the proposal is to be disclosed to any third party without the express permission of a Wildland Consultants Director.

Hard copy and digital outputs from this project will be the property of the client and will not be used by Wildland Consultants or provided to other parties without the client's permission.

SUMMARY OF COMPANY SERVICES

Ecosystem Restoration and Rehabilitation

- Baseline surveys
- Restoration plans and strategies
- Industrial site rehabilitation
- Vegetation and fauna

Strategic Advice

- Biodiversity assessment and planning
- Weeds
- Animal pests
- Threatened species
- Ecosystem restoration
- Rehabilitation
- Assessments of significance under the Resource Management Act
- Policy formulation at district, regional and national levels

Vegetation Survey

- Natural area surveys
- Coastal surveys (harbours and dunelands)
- District Plan inventories
- Sites of Special Biological Importance (SSBI)
- Geothermal vegetation
- Streams and streamides

Fauna Survey

- Birds
- Bats
- Fish
- Snails
- Insects
- Lizards
- Frogs

Mapping

- Geographic Information System (GIS) mapping and data analysis
- Vegetation pattern (past and present) and habitats
- Weeds (distribution and density)
- Sites of significant ecological value
- Bioclimatic zones
- Landform
- Ecological district boundaries
- Fauna distribution

Assessments of Environmental Effects

- Ecological assessments
- Surveys and mapping of vegetation and fauna
- Proposed land subdivision, quarries, roads, power generation, forestry, and other land uses
- Reports and advice
- Expert evidence for hearings and appeals
- Resource Management Act assessments of effects
- Independent ecological advice to councils and hearings commissioners

Threatened Species

- Field survey
- Recovery planning
- Ecological research
- Monitoring

Weeds

- Field inventories (terrestrial and aquatic) and mapping
- Assessments of weed control priorities
- Development of inventory systems
- Preparation of weed strategies
- National overviews of individual weed species (e.g. *Spartina*)
- Control options for individual species on a region-wide basis

Pest Animal Impacts

- Exclosures
- Permanent vegetation plots (Pigs, deer, goats, and possum)
- Photopoints
- Survey data analysis and report preparation
- Animal control priorities
- Wild animal management plans

Indigenous Revegetation

- Project design and management
- Contract management
- Staff supervision
- Selection of planting material
- Site preparation
- Planting
- Ongoing maintenance of plantings
- Small and large projects
- Indigenous ornamental/residential gardens and wetlands

Monitoring Design and Implementation

- Vegetation condition and trend
- Effects of introduced animal pests and grazing
- Threatened species population trends and management requirements
- Geothermal vegetation
- Wetland vegetation
- Ecological integrity
- State of the Environment reporting - biodiversity indicators

Offshore Islands

- Ecology
- Restoration
- Management
- Planning

Freshwater and Estuarine Wetlands

- Surveys
- Identification of species and habitat/vegetation types
- Assessments of relative ecological value
- Management assessments
- Monitoring