

Wet & Wild

Thanks for giving us your best shot



A big thanks to all the NWT members who sent in wetland photos for use in wetland advocacy and education. We appreciate that you realise that the more the NWT can help raise the profile of wetlands generally, the more folk in your area will be keen to protect their own wetlands, or come and give a hand with yours.

If you haven't sent your contribution, you've missed the deadline to be in the running for a reward, but we'd still love to see your photos and include them in our promotional work. Please send any disks with photos you are happy to share to: Karen Denyer at 27 Grey St, Cambridge, 3434.

Here are our favourite contributions:

Jo-Anne Vaughn's stunning selection from the incredibly picturesque Mangarakau wetland and Whanganui Inlet in the Tasman District.

Our favourite, shown above, is of volunteers Kiki and Tane Dixon helping Izzy Birnie (left) and Guy Nicholls (rear) search through raupo down for seeds for Mangarakau Wetland - the kids look like they are having a ball.

Thanks Jo-Anne, we're sending you a year's subscription to NZ Geographic magazine, a donated prize from the NZ Geographic team.

Gordon Pilone and Mari Housiaux sent in photos of their privately owned wetlands, respectively Pohangina Wetlands and Te Hapua Dunes and Wetlands. We're sending you each a copy of the new Wetland Restoration handbook, courtesy of Landcare Research.

Ex-pat Catherine Chague-Goff posted her favourite selection of South Island wetland photos from her new home across the ditch. Thanks Catherine, we're giving you an annual NWT subscription.

Wet & Wild is the National Wetland Trust's quarterly publication. We seek contributions, though published at the editor's discretion.

Submit articles to the editor Shonagh Lindsay at: shonagh.lindsay@xtra.co.nz

Each issue is available on:
www.wetlandtrust.org.nz within two months of publication, where they can be downloaded as pdfs.

A grateful thanks to Mighty River Power for sponsoring the National Wetland Trust newsletter.



NWT News

National Wetland Centre update

Good things take time, especially in a recession it seems! The Trust certainly hasn't been resting on its laurels though, and is in full steam ahead mode, forging on with developing landscape design plans, predator fence and pest control feasibility assessment, re-vegetation plan, interpretation plan, and building design plans for the wetland centre.

Our next major step is to secure a lease agreement over the site, and move into the serious funding phase.

We appreciate the funding assistance we have had from Transpower, Trust Waikato, Waikato Catchment Ecological Enhancement Trust, Environment Waikato Environmental Initiatives Fund, and the DoC Community Conservation Fund to pull together all these planning documents.

Check out our website for a copy of the National Wetland Centre business plan, visitor concept plan, and interpretation plan.

As with any NWT endeavours we'd love to have our members help out. If you are interested in being part of this exciting venture let us know.

Posters explain the NWC vision

A series of colourful A3 sized posters has been developed to explain the National Wetland Centre concept to the community. We'd love to have your help installing these in public places to promote the concept. Download them from the Wetland Centre page on our website: www.wetlandtrust.org.nz/centre.html or contact us and we'll send out a set.



Flash new interpretation signs

Keen to enhance your wetland with some interpretation signs, but short on cash for the design work?

The NWT has designed a slick series of interpretation signs depicting four wetland types: kahikatea swamp forest, peat lakes, restiad bogs, and lowland swamps. With stunning photos and snappy titles they are designed to enhance visitor enjoyment at any site of these wetland types.

The Trust is happy to share the design work with other wetland site managers. While most of the text is generic, for a small fee to cover costs we can modify the text to suit your wetland. We're also keen to expand the range of wetland types to include coastal wetlands, braided rivers, alpine wetlands, geothermal wetlands and more. Contact Karen if you are interested in helping us design these additional signs.

Two signs have already been printed and installed at Lake Serpentine Recreation Reserve by Waipa District Council. Take a walk around the lake and check them out. Lake Serpentine is accessed via a metal farm gate about 4 km south of Ohaupo on the Hamilton-Te Awamutu section of State Highway 3. Please don't cross traffic if travelling north, continue on to McFall Road a few hundred metres up the road and turn safely.

Big thanks to Environment Waikato's Environmental Initiatives Fund for covering the design costs.



Above: Gary Dyet (Waipa District Council CEO) and Peter Buckley (EW Chair) unveil the Peat Lakes Interpretation sign at Lake Serpentine

Running a wetland event?

Remember to send us details and we'll promote it free on our events page and newsletter.

Check out the events page to find out about training days, conferences, planting days, field trips and other wetland related happenings.

Follow us on Facebook

The National Wetland Trust has a Facebook Page. See what others think about wetlands and wetland issues, and link to our Facebook page to spread the word about wetlands.

Want to increase your web profile?

Our Links page has a range of useful wetland related links. If your website isn't on there let's talk. Contact karen.denyer@wetlandtrust.org.nz

Award-winning book still available for sale

The Trust has copies of Janet Hunt's "Wetlands of New Zealand" book for sale at a special price of \$50 (p&p \$7.00 extra).

Contact trustee Keith Thompson (bogman@ihug.co.nz) to purchase a copy. Focus on wetlands - national photo competition

Focus on wetlands - national photo competition?



Following our members-only photo campaign, we're thinking of going national to help celebrate the Ramsar 40th anniversary in 2011. The Trust is considering launching a new event, designed to encourage folk to seek out and capture stunning images of wetlands in their backyard, or where they holiday or work.

A series of themes could be designed to cover a range of situations, such as:

1. Wetlands working for us - images portraying the services wetlands provide for us
2. Extreme wetland make-over - restoration projects or people working to enhance wetlands
3. Wetland taonga - cultural values of wetlands captured on film
4. Wetlands for life - focus on native wildlife
5. Get into wetlands - images of people enjoying wetlands

6. Wetland for all seasons - seasonal shots showing wetlands at various times of the year

The winning photos could be displayed at the next National Wetland Restoration Symposium. Let us know what you think and if you are keen to help run or promote it.

Ramsar 40th Anniversary World Wetlands Day

Next year's WWD gives us double cause to celebrate as it's Ramsar's 40th anniversary. So fittingly, the NWT are supporting two WWD events in Auckland (Matuku Reserve, West Auckland and Barry Curtis Park in Manukau), as well as hosting an event at Lake Serpentine in the Waikato. See advert on Pg 10 for more on the Manukau event.

Survivor Lake Serpentine

5th February 2011

The National Wetland Trust is hosting a "Wet and Wild Target 40 Challenge" for World Wetlands Day next year.

Based at Lake Serpentine, the proposed site of the future National Wetland Centre, teams will face a series of wetland-themed challenges at a number of stops around the lake complex.

Supported by the Department of Conservation and many other agencies, this will be a fun event for all ages - families, friends, corporate teams - with some great prizes. Target 40 celebrates the 40th anniversary of the Ramsar Convention on Internationally significant wetlands.

Details will be put on the website and promoted locally in January.



We're planning some fast and fun challenges for our Target 40 event - though maybe not croc-wrestling!



Wild Wetland Walk at Matuku

6th February 2011, Waitangi Day

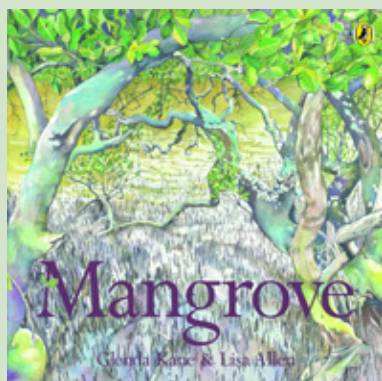
The wetland at the base of the Forest and Bird reserve, Matuku, near Bethell's Beach, West Auckland is easily seen by those approaching it from the ridge access but involves more than a kilometre of steep, sometimes slippery track. Through 2010, work has commenced on clearing a track to allow easy access by the wetland edge to control predators throughout the whole reserve. The route came upon an old embankment constructed and used in the 1920s to haul kauri logs to the railhead and on to the mill.

The Waitakere branch of Forest & Bird celebrate the 40th anniversary of Ramsar, with a self-guided walk along this embankment. With the Ramsar theme for 2011 being Wetlands & Forests, Matuku is a great example of both. Access on this day from the Bethell's valley gives a flat 2.5km return trip. Reed beds, flax and cabbage tree habitat, emerging kahikatea are to one side and the rapidly regenerating forest the other.

Fernbirds are frequently observed but bitterns [matuku] after which the Reserve is named, are heard more than seen. Of course the walk can be extended westward to the original part of the Reserve with two small easy hill sections that offer different views of the wetland and forest. Twelve years of predator control means the forest has good numbers of tui, pigeon, fantail, and, now, tomtit have returned. It is part of an important corridor from the Ark in the Park to the coast with robins nearby and one of the released kokako has wandered along also.

Access [10 am to 4 pm] will be through 119 Bethell's Road with nearby parking. The walk is suitable for families, it's flat, it's nearly all dry but sorry, no dogs allowed on the private property and reserve. We'd appreciate a gold coin donation to help Forest and Bird's predator control at the reserve.

Contacts for the Matuku Wild Wetland Walk are: John Sumich cjnk@xtra.co.nz [009] 8185267 and John Staniland bushridge@slingshot.co.nz [09] 8109516



Mangrove By Glenda Allen & Lisa Kane

This unique and quite exceptional children's picture book describes the life-cycle of a mangrove with charming rhyming text and beautiful illustrations. The hero of the story is really the mangrove tree. This is a very well thought-out concept and comfortably crosses between fiction and non-fiction. Mangroves show the fragility of our ecosystems. It will appeal to parents because it provides a lot of information and to children because it is fun to read.

Glenda Kane is a graduate of the ATI School of Journalism and has worked on newspapers here and overseas. She says she wants to teach children how to care for the planet. Lisa Allen is a graphic designer and works principally as a freelance illustrator. Lisa is currently very interested in detailed botanical drawings and is inspired by the varied landscapes of New Zealand. This is both Glenda and Lisa's first book. **Published by Puffin for age range 2-4 years**



Hydrological characteristics of the Te Hapua Wetland Complex

I was fortunate enough to be the recipient of the 2009 Golden Plover Award. This scholarship partly funded my MSc thesis on wetland hydrology. I would like to take this opportunity to thank the National Wetland Trust, as well as Greater Wellington Regional Council and the New Zealand Hydrological Society for their support. Thank you also to my supervisor, Bethanna Jackson, at Victoria University of Wellington.

Like many MSc theses, my study threatened to grow to unimaginable proportions as the year progressed. At times it seemed like the more I read (about the dynamics of wetland hydrology) the less I knew. I did, however, learn a few valuable skills along the way and have hopefully made a modest contribution to scientific circles with the piece of knowledge that I helped bring about. Te Hapua is a complex of small, privately owned wetlands approximately 60 km northwest of Wellington. The wetlands represent a large portion of the region's remaining palustrine swamps, which have been reduced to just 1% of the pre-1900 expanse. Whilst many land owners have opted to protect wetlands on their land with covenants, questions have been raised regarding potential threats stemming from the wider region.

Firstly, some regional groundwater level records have shown significant decline in the 10 to 25 years they have been monitored. The reason for this is unclear. Wetlands are commonly associated with groundwater discharge, so a decline in groundwater level could adversely affect wetland water input. Secondly, estimated groundwater resources are currently just 8% allocated, so there is potential for a 92% increase in groundwater abstraction from aquifers that underlie the wetlands. Finally, predictions of future climate change indicate changes in rainfall quantity and intensity. This would likely alter the hydrological cycle, impacting on rainfall dependant ecosystems such as wetlands as well as groundwater recharge.

Whilst previous ecological surveys at Te Hapua provide valuable information on biodiversity and ecological threat, there has been no detailed study of the hydrology of the wetlands. An understanding of the relationship between the surface water of the wetlands and the aquifers that underlie the area is important when considering their future viability. This study aimed to define the local hydrology and assess the potential threat of 'long term' groundwater



level decline, increased groundwater abstraction and predicted climate change.

Eleven months of water level data was supplied by Wellington Regional Council for three newly constructed Te Hapua wetland surface water and adjacent shallow groundwater monitoring sites. The data were analysed in terms of their relative water levels and response to rainfall. A basic water balance was calculated using the data from the monitoring sites and a GIS analysis of elevation data mapped the wetlands and their watersheds.

A survey of 21 individual wetlands was carried out to gather water quality and water regime data to enable an assessment of wetland class. Historical groundwater level trends and geological records were analysed in the context of potential threat to the wetlands posed by a decline in groundwater level. Climate change predictions for the Kapiti Coast were reviewed and discussed in the context of possible changes to the hydrological cycle and to wetlands.

Results from the wetland survey indicated that there are two distinct bands of wetlands at Te Hapua. Fens are found mostly in the eastern band and are more likely to be discharge

wetlands, some of which are ephemeral. Swamps are found mostly in the western band and are more likely to be recharge wetlands. Dominant water input to fens is via local rainfall and local through-flow of shallow groundwater, especially from surrounding dunes. The eastern band of wetlands is typified by higher dunes and hence has greater input from shallow groundwater than wetlands in the western band. Dominant water input to swamps is via local rainfall, runoff, and through-flow from the immediate watershed and adjacent wetlands.

Overall, the future viability of the Te Hapua wetland complex appears promising. Historical groundwater declines appear to be minimal and show signs of reversing. Abstraction from deep aquifers is not likely to impact on wetland water levels. Climate change is likely to have an impact on the hydrological cycle and may increase pressure on some areas, especially ephemeral wetlands. The effect of climate change on groundwater level is more difficult to forecast, but may lower water level in the long term.

Craig Allen, MSc thesis, available at Victoria University or online at the Open Research Archive.

Under Pressure in the Big City

Without the checks and balances of regional and district councils in Auckland, it will be interesting to see how the new unitary authority balances economic development and environmental protection.

From the north-east to the south-west, estuarine wetlands in the Super City are under pressure from coastal developments. Mangawhai saltmarsh on Auckland's northeastern coast, and Ann's Creek on the Manukau Harbour are two current examples. Their stories are presented here.

The salty wetland that's not 'coastal'

Tiny Ann's Creek wetland, tucked away below busy roads and rail crossings in industrial Onehunga, has been the subject of a lengthy series of memos, hearings, Crown land disposals, private sales, classifications, plan schedules, re-classifications, and court actions.

While its diverse species practically scream 'saline' to anyone with a modicum of natural history nous, the court decided that this area of mangroves, mud crabs, sea primrose and shore *cotula* is not part of the coastal marine area, and therefore does not require a coastal permit to modify it.

The site, in association with adjacent nationally rare lava fields, meets all four of the national priorities for protecting native biodiversity (released by the ministers for the Environment and Conservation in 2007). Sadly though, the land was sold by the Crown years ago, and its current owners have it pegged for a paved truck parking area, unless of course the council wanted to buy it back at market value.

The council didn't, and consent was granted by commissioners of the now defunct Auckland City Council, but declined by the equally defunct Auckland Regional Council, who proceeded to appeal the City Council decision.

The merging of these bodies, with their diametrically opposed views on the wetland, into the new Auckland Council poses a dilemma - does the new council proceed with an Environment Court hearing on behalf of half of its former self, against another part of its former self? If it doesn't and the consent stays, presumably, the wetland goes.

Meanwhile, the wetland itself continues with its daily ebb and flow of tides, and the ceaseless foraging of its eels, banded kokopu, bittern and banded rail.



Photograph: Three-square (not in shot) grades through sea primrose and shore pimpernel to mangroves at Anns Creek, in stark contrast to the industrial side of Onehunga.

Dredging could spoil saltmarsh

There is a small salt marsh at Mangawhai on the south side of the estuary about five minutes drive from the Village. It is off Black Swamp Rd, turn left into Raymond Bull Rd, and left again at the T-junction.

Park at the grassy parking area, lock your car and walk down towards the estuary on a well formed track. Often you'll be greeted by noisy pukekos, in the paddock over the fence, and paradise ducks. It is best to choose a time when the tide has been going out for an hour or so to prevent very wet feet.

At the estuary pause to look across to the old Pub first built in 1859. Burned down twice by drunken gum diggers, it was the centre of stores and supplies in those early days when there were no roads, and everyone came in by horse, walked, or sailed in a trading ketch or scow over the bar at the harbour entrance.

Turn right and walk along the edge of the estuary. You can walk right to the ocean in 1 1/2 hours, climb the Big Dune, and have a swim in the surf, but remember to come back before the tide comes in again. There are several ditches to jump over or wade around so expect to get wet feet. You can walk across the sand/pipi shell flats for a quicker return, and you may see godwits, northern NZ dotterel, Caspian terns, variable oyster catchers, South Island pied oyster catchers, white faced herons, various shags and even, if you are really lucky, New Zealand's rarest bird, the fairy tern.

The plants growing on the first part of the walk, about half a kilometre, are not rare, but are unusual, as this is the only area they grow in the Mangawhai Estuary. Some you may see are the jointed rush oioi, one of my favourites, salt marsh ribbon wood, shore pimpernel, *Selliera radicans* with its tiny lime green leaf and funny little white flower with petals on only one side. Cheery yellow-flowered Bachelor's button (*Leptinella*) ground cover, and several stretches of a patchwork of glasswort in varying colours of mauve, brown, green and red add a vibrant look to the site.

Sometimes you can see sand skinks if you carefully turn over bits of driftwood or timber on the shore. There are mangroves to the left as you walk, and if you are very, very, quiet you may be lucky enough to catch a glimpse of a banded rail or bittern hiding in them. If you carry on to the dune walk, you will see some pohuehue, *Mulenbergia complexa*, plants standing up on the sand like sentinels all on their own, with deep channels at the base where wind and water make a channel round them.

There has been a resource consent applied to remove all the mangroves in the harbour, and a proposal to put spoil from dredging the upper harbour channel onto the shore in some places. If this salt marsh site was chosen for this, it would destroy these plants completely.

Jane Vaughan, Fairy Tern Co-ordinator, Auckland

Conservation Minister endorses restoring our wetlands



The Catchment Care programme recently marked the success of its first year by hosting two restoration events at Waiwhakareke Natural Heritage Park in the Waikato and Poynters Nature Reserve on the Waimakariri River in Canterbury.

Both events were very successful with over ninety volunteers enjoying a sunny day planting at Poynters Reserve and carrying out tree releasing around young native plants at Waiwhakareke. Conservation Minister Kate Wilkinson joined the event in Canterbury and was impressed by the achievements of the volunteers and supporting organisations. She emphasised the importance of all New Zealanders getting outside and doing their part to maintain and improve the country's native plant life.

"Volunteering for a good cause is part of being a New Zealander. If all of our country's volunteers went on strike for a day the whole nation would come to a halt. If politicians did, on the other hand, I don't think anyone would notice."

Paul Padfield, Conservation Volunteers Auckland Regional Manager said of the day:

"It's an exciting milestone for the programme. We've achieved a lot over the last year. Through Catchment Care we've improved almost 3/4 million square metres of land and managed to assist many landholders with significant restoration projects."

The Catchment Care programme is a partnership between Fonterra and not-for-profit

organisation Conservation Volunteers New Zealand, providing support for projects that have a riparian or wetland focus.

The initiative was set up in 2009 to enhance and protect waterways and wetlands through activities such as riparian planting, fencing, removal of invasive species and weeding.

The programme is run throughout New Zealand and in the past year has supported important restoration endeavours by public and private landowners, as well as many community groups. Projects include assisting in restoration of many of the Waikato Peat Lakes. These waterways are nationally significant, and are the largest collection of this type of wetland in New Zealand. Globally, peat lakes are a rare phenomenon. Recognition of their unique values has highlighted the importance of their conservation and the many special native plants and animals that live in and around them.

During the year the programme has worked in partnership with Environment Waikato, local Councils, Department of Conservation and NZ Landcare Trust to improve these waterways. Through 2,385 volunteer days 26,310 trees have been planted and 107,262 square metres of weeds removed.

Lwe Hoverd, Chairperson of the Waipa Biodiversity Council notes: "Conservation Volunteers (CVNZ) teams via Fonterra's Catchment Care Programme have assisted in planting trees and shrubs within buffer zones, releasing these plants through the first year

of life, and the control of aggressive weeds at Lake Serpentine. This work has proved most useful and we are grateful for the opportunity to utilise the CVNZ teams."

In the South Island the programme has contributed to the restoration of the beautiful Lake Waiholā and Lake Waipori wetlands. These form part of a large wetland complex that is nationally significant with high ecological, cultural and historical value. The Lakes are very shallow and surrounded by wetlands, including the internationally renowned and protected Sinclair Wetlands which are home to many species of wading birds, with 55 species counted as well as 12 species of native fish living in the waters. The project has resulted in the removal of pest plants and planting of native species.

Fonterra's General Manager Sustainability, John Hutchings, says waterways are relevant and vital to all Fonterra stakeholders, both rural and urban, and in the communities they operate in.

"It makes sense for us to support water catchment projects given the importance of water quality for all New Zealanders, we're very clearly focused on sustainability - through this project we can not only have a positive impact on water quality, but also on biodiversity, while ensuring the areas around our waterways are well maintained spaces New Zealanders can enjoy."

Under the Catchment Care programme, projects that involve improving wetlands, swamps, streams and rivers may be supported. Conservation Volunteers are able to supply a team of volunteers, transport, hand tools and an experienced team leader to supervise work.

For more information about Catchment Care, how to apply for support, or to register as a volunteer please contact: Paul Padfield at Conservation Volunteers New Zealand on 0800 56 76 86 or email: ppadfield@conservationvolunteers.co.nz

Photograph: John Hutchings (Fonterra) and Kate Wilkinson, Minister of Conservation planting at Poynters Reserve

Fiona McLaughlin, Volunteer Engagement Officer, Conservation Volunteers New Zealand



Wetlands to Visit - Lake Ohia, Northland

This is a regular slot in our newsletter profiling wetlands that are accessible to the public. We are developing an on-line directory of wetlands people can visit and are still seeking sponsorship for many regions. Visit: http://www.wetlandtrust.org.nz/directory_main.html

If you wish to sponsor your region or let us know about a wetland open to the public contact: karen.denyer@wetlandtrust.org.nz

Heading north for the Christmas holidays? Check out this amazing place.

Like a setting from the Rings Trilogy, Lake Ohia is an other-worldly site. Here you will see a bizarre landscape of charred stumps and gumland scrub in a former lake bed.

It's the site of a drowned forest, with a maze of 30,000 year old kauri tree stumps exposed when the lake was drained earlier this century for gum-digging. The lake is now ephemeral, with water present for around 2 months of the year – so if you are there around New Year you may well ask "Lake? What lake?"

Classified as a gumfield wetland, this site it is now an important habitat for rare ferns, mosses and orchids. The surrounding wetlands support threatened fish and bird species.

The Gum Hole Reserve Walk is a short metalled loop track through the manuka passing a series of holes excavated by gumdiggers (watch out



for holes as you walk and keep a close eye on the little ones!)

Access is via the base of Karikari Peninsula, a 40-minute drive northeast of Kaitia. Turn off State Highway 10 onto Inland Road, the Lake is just off Inland Road. The track to Lake Ohia is on the left, 1 km north. Approximately 2 kilometres up Inland Road you can find an old gum-digging site. You can camp nearby at the pretty DoC campsite at Maitai Bay.

See more on the Department of Conservation website: www.doc.govt.nz/parks-and-recreation/places-to-visit/northland/kaitia-area/lake-ohia/



Cash value of Earth's biomes

New Scientist magazine recently published an article from a group of environmental economists who for the first time have estimated the cash value of ecosystems. They say the figures show the case for conservation is overwhelming in pure economic terms. One case study found that protecting and replanting mangrove swamps in Vietnam cost \$1.1 million - an investment that reduced spending on dyke maintenance by seven times as much each year.

Yet the scientists behind The Economics of Ecosystems and Biodiversity study (TEEB) admit frustration that most mainstream economists are blind to the value of biodiversity. The values they estimated are in dollars per hectare per year. The range represents the different values of biomes of each type around the world, with the top end of each range corresponding to prime locations.

Coral reefs (tropical and subtropical): \$14 - \$1,195,000 Key values: tourism, storm protection, fish nurseries

Coastal wetlands: \$2000 - \$215,000 Key values: waste purification, fish nurseries, storm protection

Other coastal systems: \$248 - \$80,000 Key values: tourism, fish nurseries

Inland wetlands: \$1000 - \$45,000 Key values: natural water reservoirs, waste treatment

Rivers and lakes: \$1800 - \$13,000 Key values: water supply, waste treatment, tourism

Tropical forests: \$91 - \$23,000 Key values: climate regulation, gene banks (for medicinal plants, for example), erosion prevention

Temperate and boreal forests: \$30 - \$4900 Key values: Food, gene banks, watershed protection

Woodlands: \$16 - \$2000 Key values: timber and other forest products, waste treatment

Grasslands: \$300 - \$3100 Key values: climate regulation, watershed protection (Source: TEEB)



Whangamarino Wetland Restoration



Whangamarino Weir

Whangamarino Wetland, located in the Waikato region, is a very significant wetland. It is listed as a 'wetland of international importance' under the Ramsar Convention, it is classed as a 'significant wetland' in Environment Waikato's Regional Policy Statement, and it is one of only three New Zealand wetlands chosen to be part of the Arawai Kākāriki wetland restoration programme.

A rock rubble weir was constructed in the Whangamarino River by the Department of Conservation (DOC) and the Auckland/Waikato Fish and Game Council in 1994. This was put in place to help restore 1500 ha of seasonally flooded swamp habitat in this important wetland by raising the minimum summer water level. This weir failed in 1995, and a replacement weir was constructed in 2000. Rock movement within the weir was identified in 2002; six cubic meters of material was lost downstream, and the remaining material had shifted within the weir structure.

It has been a long and drawn out process, over summer 2010 the conditions were right and Whangamarino weir was finally repaired. This is a fantastic result for the wetland and will help to hold the minimum water level at 3.2 m, maintaining habitat for vulnerable wetland species. Unfortunately, less than six months on we are already seeing some issues with the weir. Individuals have been spotted cutting the sacrificial layer of wire mesh to retrieve koi carp trapped within it, and we have had reports of at least one boat driver viewing the weir as an exciting 'challenge' to be leapt over rather than the control structure that it is.

A more permanent weir design is likely to be required at some stage, but for now the Department of Conservation have made a significant contribution to restoring habitat for

wetland plants like *Bolboschoenus*, *Eleocharis* and sphagnum moss, as well as waterfowl and wading birds.

Pesky pest predator monitoring update



Whangamarino Wetland, located in the Waikato region, is a very significant wetland. Listed as a 'wetland of international importance' under the Ramsar Convention and classed as a 'significant wetland' in Environment Waikato's Regional Policy Statement, it is one of only three New Zealand wetlands chosen to be part of the Arawai Kākāriki wetland restoration programme.

One of the objectives of the Arawai Kākāriki wetland restoration programme is to support research that increases understanding of wetland management. Hamilton-based Department of Conservation scientist Craig Gillies says that while we have a long history of controlling predators like stoats, ferrets, rats and cats in forest environments, we don't have much experience of how these animals behave, where they live and what they eat in wetlands.

"It is vital that we learn about the ecology of predators in the Whangamarino Wetland, as this knowledge will help us protect vulnerable native species like the Australasian bittern (matuku), the marsh crake (koitareke) and the small secretive spotless crake (pūweto) from the impacts of these pests," Craig says.

During the past few weeks Craig, together with Whangamarino Ranger Matthew Brady, have been setting non-lethal traps in different areas within the wetland and checking them each day.

"When a predator is caught it is sedated so we can measure, weigh and attach ear tags to it," Matthew explains. "We keep a record of which traps the tagged animals turn up in so we can get an idea of where they move within the wetland and how many there are, as well as testing the methods we're using."

This is an ongoing study with trapping sessions occurring for two weeks each season. Matthew says he is looking forward to repeating this monitoring in different seasons during the next two years to build up enough information to be able to protect special wetland species more effectively. So far two trapping rounds have taken place in February and June 2010.

In February 5 ferrets, 1 stoat, 11 rats and 4 cats were captured and tagged, and a large number of hedgehogs were also caught. Hedgehogs aren't currently part of this study but given their numbers they maybe included in future predator work. In June 29 animals were captured and tagged, including 3 cats, 8 ferrets, 7 weasels and 12 rats. There are certainly plenty of animals out there!

Kathryn Duggan (nee Carter)
Whangamarino Ranger Kaiarahi - Waikato
Area Office DoC Te Papa Atawhai



Photographs - in order of appearance:

Whangamarino weir. Crown Copyright: Department of Conservation Te Papa Atawhai (2010), Photographer: Kevin Hutchinson

Scientist Craig Gillies holding a ferret (January). Crown Copyright: Department of Conservation Te Papa Atawhai (2010), Photographer: Matthew Brady

Young Norway rat (May). Crown Copyright: Department of Conservation Te Papa Atawhai (2010), Photographer: Matthew Brady

Stoat (caught in January). Crown Copyright: Department of Conservation Te Papa Atawhai (2010), Photographer: Craig Gillies



Restoring Maketu Estuary/Ongatoro

As the landing place of the Te Arawa waka, Maketu Estuary (Ongatoro) is very significant to the people of Te Arawa. It is considered to be the “food basket” of Ngati Whakaue and other iwi, and many of the local people regularly gather kaimoana especially shellfish (pipi and tuatua) here under a taiapure* to protect stocks for future generations.

The small (215 ha) estuary largely consists of exposed inter tidal flats with an area of residual saltmarsh at the southern end, and is protected by a long sandspit managed by the district council as a recreation reserve. At the estuary's western end, between the Kaituna River and the estuary, is low lying, poorly drained farmland. Maketu township lies at the eastern end of the estuary. The southern side is well developed farmland with large embankments separating the estuary from the land.

The saltmarsh is largely in sea rush, oioi, and *Baumea juncea* sedgelands, and mangroves. *Spartina*, an aggressive exotic saltmarsh species found in the southern part of the estuary, adjacent to stopbanks and the road causeway, is being targeted for removal by Environment Bay of Plenty (the Regional Council).

The estuary is a significant site for a wide range of indigenous fauna especially feeding, roosting and breeding shore and estuarine bird species and is considered to be internationally important along with the nearby Little Waihi Estuary. It has the largest diversity of shorebird species in the Bay of Plenty, greater than the extensive 24,000 ha Tauranga Harbour to the west, and is a well-visited bird watching site.

A range of threatened species including the reef heron, banded rail, northern NZ dotterel, wrybill, banded dotterel and Caspian tern reside in or regularly use the estuary. Uncommon northern hemisphere vagrants, including the sanderling, Mongolian dotterel, curlew sandpiper, pectoral sandpiper, marsh sandpiper and red necked stint are all visitors. Banded birds have been recorded here, including E7, the famous bar-tailed godwit, and red knots that were banded in South Australia and China.

The barrier spit is largely dominated by native dune plant communities and is a notable site for katipo spiders and shore skinks. The sand spit suffers from cyclic coastal erosion but at the moment is accreting and currently provides habitat for a good number of breeding NZ dotterels and other coastal bird species. Much of the spit is a reserve administered by Western Bay of Plenty District Council,



A brackish/freshwater wetland at the southern end of the estuary, separated from it by a road causeway, supports four threatened plants - two fern species (*Thelypteris confluentis* and *Cyclosorus interruptus*), and two orchids (*Pterostylis micromega* and *Pterostylis aff. graminea*). The community-based Maketu Ongatoro wetland group, currently working with EBOP to restore the spit, is also committed to restoring the 19.5 ha “Arawa wetland”.

The cultural and natural values associated with the estuary were seriously degraded by the diversion of the Kaituna River out of the estuary in 1958 to remedy flooding problems from adjoining low lying farms. While the flooding was mitigated, the diversion destroyed an estimated 95% of the saltmarsh, and led to protests from the Maketu community.

A partial re-diversion of water from the Kaituna River back into the estuary was implemented in 1996, primarily to arrest continuing ecological decline and to achieve a degree of recovery of features such as saltmarsh. A four culvert control structure at Fords Cut diverts about 160,000 cubic metres of river water per tidal cycle, around 6% of the total mean river volume, and also allows for fish passage. However this has not been very successful and other options are now being considered ahead of the consent expiring in May 2015.

Environment Bay of Plenty (EBOP) have recently modelled a range of re-diversion options from status quo to full return of the river flow back into the estuary and made these available to the public for comment. The modelling shows that a range of partial re-diversion options would not adversely affect levels in the Kaituna River, however full return

would have an impact on flood control in the lower Kaituna area, unless mitigation took place.

A Hearing's Panel considered public submissions on re-diversion and recommended to EBOP, that the preferred option is the full re-diversion of the river back into the estuary with capability of flood relief through Te Tumu Cut (the current river mouth). The Maketu tangata whenua (Ngati Whakaue ki Maketu, Ngati Pikiao, Ngati Whakahemo and Ngati Makino) support full return of the river into the estuary.

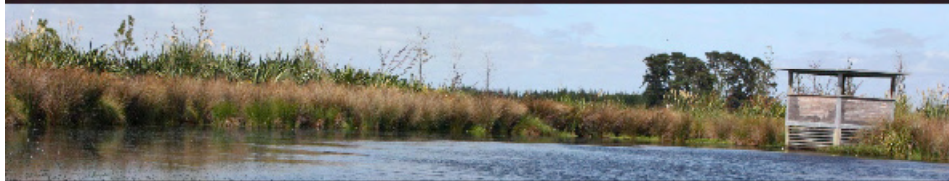
Environment Bay of Plenty recently published the Kaituna River and Ongatoro/Maketu Estuary Strategy. The aim of this non-statutory strategy is to achieve the vision for the river and estuary by 2018, including sustainable management of the river and estuary resources, to ensure the community values of clean water, a healthy ecosystem, recreational and cultural values are maintained, and to provide a bountiful source of kaimoana.

One of the “significant actions” of the Strategy is to increase the area of wetland habitat by creating a further 100 ha in the lower Kaituna River catchment. This is a notable action that has the Maketu community, iwi and various local groups excited about the prospects of recovering some of the inappropriate actions undertaken in the past.

*Taiapure, translated literally as “a coastal patch”, may be established under the Fisheries Act 1996 to recognise culturally important fisheries. They give Maori greater say in the management of their traditionally important coastal areas.

Keith Owen, DOC, Rotorua

PARKS WETLANDS DAY



Join the parks team to celebrate wetlands

Thursday 27th January 2011 10.00am-12.00 noon

Barry Curtis Park, Stancombe Road, Botany



Educational displays

Guest speaker

Waicare display

Origami

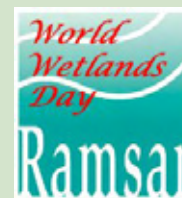
Face painting

Competitions

Guided walk

Supported by Waicare and the National Wetland Trust

Celebrating the Ramsar Convention on Wetlands 40th anniversary



Ramsar Target 40

The 2nd of February 2011 marks 40 years since the signing of the Ramsar Convention on Wetlands of International Significance. To celebrate we're promoting not just a day of celebration, but a whole year!

In New Zealand we are running a 'Target 40' campaign to celebrate the 40th Anniversary of Ramsar. The 40 could relate to 40 hectares protected, 40 km of new fencing, 40 wetland events, 40 favourite wetland species, 40 questions, or whatever 40 target you may like to set for an event.

We hope that organisations or local communities will get behind the campaign and set themselves some targets to achieve - and even offer a challenge up to other organisations/communities to match or do better.

To help focus activities and targets, a monthly themed approach is planned for the year, linking in with other key environmental dates. See the Department of Conservation website for details.

www.doc.govt.nz/features-archive/world-wetlands-day-2010/



www.weedbusters.org.nz

Wetland Trust teams with Weedbuster's 2-minute film challenge

Carolyn Lewis reports on Weedbusters' big news this month - the launch of the 2-minute Film Challenge for Years 1-8 students in 2011.

For this challenge, students need to create a short clip (up to 2 minutes long) that tells a story about ornamental garden plants that have 'jumped the fence' and are now causing environmental damage in natural areas of New Zealand. The clip might raise awareness about weeds in their local area or school, or in New Zealand as a whole. It might profile a local Weedbusters group tackling weedy sites, or it might focus on a particular type of weed. It could be a video clip or a narrated powerpoint. It could use still photography, or stop-motion animation or cartoons. It could be a play, a documentary or even a song or rap. The possibilities are endless. They might even be able to get Woody Weed, the Weedbusters mascot, to play a part in their final clip!

The National Wetland Trust is teaming up with Weedbusters to provide a prize for a special 'Weeds and Wetlands' category as part of our Target 40 campaign. We'd love to get 20 wetland entries - that's 40 minutes of creative video on wetlands.

If you have children, grandchildren, nieces or nephews in Years 1-8, encourage their teachers to take up this challenge - it is all curriculum-linked so the students involved will learn heaps about all sorts of things as they complete the challenge. Schools can sign up at www.weedbusters.org.nz to register their interest and so we can send them out tips, tricks and resources on creating their 'mini-masterpieces'.

For more information, you can also email Weedbusters National Co-ordinator, Carolyn Lewis at info@weedbusters.org.nz

Historic Wetlands & Predicting Natural Disasters

First of all, I'm glad to be back on the Trust after three years of escape in the Pacific Islands. Now why choosing this topic as a contribution to our newsletter?

Well being now a Cantabrian and present in Christchurch on the morning of the 4th of September 2010, I was very interested to follow the developments on the situation and, in particular, which areas had most suffered from the 7.1 magnitude earthquake. It is well known that Christchurch was built in a swampy area often traversed by old braids from the Waimakariri River. If you pay attention from the air when you are landing (or taking off!) you can often see those old braids in the paddocks surrounding the airport.

You would have heard by now that the areas that were most affected by the quake were in areas prone to liquefaction (a process in which when soft soil is shaken violently, water rises through its pores leaving whole streets or hockey turf pitches transformed from firm land to sludge).

The Press reported on those on 22 October and produced a map reproduced in Figure 1. I was most interested to compare this liquefaction map (showing evidence of liquefaction visible at ground surface after the quake) to that one I contributed towards a few years ago on the extent of historic wetlands in New Zealand (the map is part of the Freshwater Environments of New Zealand - FENZ - released recently by DOC to regional councils for feedback).

The historic map for the Christchurch region is shown in Figure 2. The incredibly good match between where liquefaction occurred and where swamps used to lie should certainly get a few more people (or at least I like to think that way!) to understand that there are good reasons (other than biodiversity for instance) to leave our wetlands alone.

Councils, and possibly insurance companies, should get more interested in this in the future when it comes to issuing permits and insurance policies; it is my opinion that people granting building permits in areas that were historic wetlands bear some level of responsibility when disasters like this strike. I have been wondering whether, too, the wet winter that we experienced this year made things worse. It is clear to me that during periods of intense rainfall, surplus water, whether on the surface or below, often chooses to go back to areas historically covered with wetlands.

And if you are not convinced, have a look at figure 3 showing the historic extent of wetlands in the Bay of Plenty region (in blue on the left

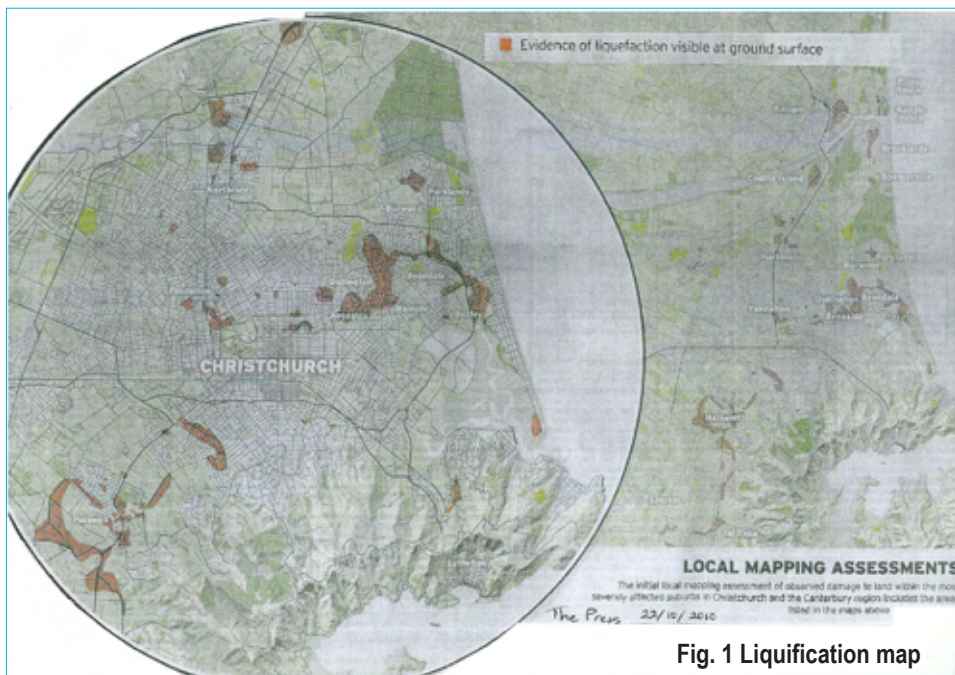


Fig. 1 Liquefaction map



Fig. 2 Historic extent of wetlands around Christchurch

diagram) and where the flood waters ended up in 2004 (in green on the right diagram)!

I am convinced that more of these comparisons could be made all around the country, so if you have any good stories like this do please send them to us!

Philippe Gerbeaux, Senior Technical Support Officer, DOC; and Ramsar STRP Oceania Regional Networker



What are the effects of willow and willow control on wetland aquatic invertebrates?

Species of the genus *Salix*, willows, have become a dominant feature in New Zealand wetlands. Willows are native to Europe, Western Asia and Northern Africa and were first introduced to New Zealand in the 1860s by European settlers.

Willows have since become a major threat to wetlands, in particular *S. cinerea* (grey willow) and *S. fragilis* (crack willow), due to their ability to tolerate a range of wetland habitats, their rapid dispersal systems and their establishment techniques.

Organisations such as Landcare Research, National Institute of Water & Atmospheric Research (NIWA) and the Department of Conservation (DOC) have undertaken studies to examine the impacts of willows on wetlands, including impacts of invasion on indigenous vegetation. Eser (1998), for example, identified willow invasion as the main threat to the South Taupo Wetland, and recommended a variety of solutions to combat invasion, including chemical treatment control (Eser 1998).

Until recently, conservation managers have eradicated willows with little knowledge of how chemical treatment affects wetlands, including its effects on aquatic invertebrates. Wetland invertebrates are important components of food webs, as an energy supply for fish and wading birds, and therefore any activities that adversely affect invertebrate communities in wetlands may also have wider implications. Scientific studies have focused on lake and river ecosystems, while research into New Zealand's wetland systems are generally unknown, and invertebrate communities are no exception.

Salix cinerea has received the most attention for control efforts as it is the most significant threat to wetlands, due to its ability to displace native vegetation, resulting in monoculture willow forest. *Salix cinerea* is generally found in permanently waterlogged wetlands and grows over a wide soil fertility range, from nutrient rich swamps to the edges of nutrient poor peat bog. The invasion of *S. cinerea* in wetlands is typically found in areas of open water communities, such as raupo (*Typha orientalis*), *Carex secta*, rushes, sedges, small wetland shrubs, and smaller dicotyledonous herbs, as this environment provides optimum light requirements for *S. cinerea* to grow and to create dense canopies. Once established, *S. cinerea* may have significant impacts on indigenous wetland communities by modifying



Yvonne Taura in the field

native understorey communities.

Intensive willow control programmes have become a recognised option in an attempt to restore and maintain wetland vegetation types to its former condition, although the ecological response to this has rarely been evaluated. Current tools available for willow control in wetlands are restricted to mechanical control and the use of non-specific herbicides, which can often result in limited success and various disadvantages. Most recently DOC engaged NIWA to conduct trials of the herbicide Garlon(r) 360, to investigate successful control treatment of *S. cinerea* within New Zealand wetlands. Field trials have been undertaken in the South Taupo Wetland, where aerial application of Garlon 360(r) was applied to an area of *S. cinerea* dominated vegetation. The outcome of the study demonstrated 95% control of *S. cinerea* with limited off-target damage to indigenous species.

Emphasis on controlling willow species throughout New Zealand wetlands have been based on target kills and restoring and maintaining native wetland vegetation types. Given the widespread distribution of willows within New Zealand waterways, it is surprising that very few studies have specifically examined their impacts on other aquatic life. Aquatic invertebrates are found in all freshwater systems, including rivers, lakes and wetlands. They inhabit the bottom substrate, swim in the water column, or live on the surface of the water. They also have fundamental biodiversity and ecological values, as the majority are native to New Zealand, and many are endemic. The

scope of research performed in New Zealand limits any conclusions regarding the impacts of willows on aquatic ecosystems.

My thesis research endeavours to investigate aquatic invertebrate communities residing within native wetland ecosystems and determine whether communities are significantly altered by *S. cinerea* infestations. Also, I aim to examine the responses of these aquatic invertebrates following willow control treatment relative to untreated sites. The results of this study will provide necessary quantitative data and multivariate comparisons regarding aquatic invertebrate community composition and abundance amongst willow communities in wetlands. A study of aquatic invertebrates living among willow communities in wetlands is timely and will be of immense value ecologically and economically to wetland managers in order to make more informed decisions for the restoration of New Zealand's wetlands.

Yvonne Taura, Unpublished Masters Thesis, Victoria University Wellington.

Eser PC 1998. *Ecological patterns and processes of the South Taupo Wetland, North Island, New Zealand, with special reference to nature conservation management.*

Seocheon Tidal Flat becomes Republic of Korea's 13th Ramsar-listed Wetland

The Republic of Korea designated Seocheon Tidal Flat (1,530 hectares; 36°00'N 126°30'E) located in the Chungcheongnam Province as its 13th Wetland of International Importance.

The Seocheon Tidal Flat was also designated by the Ministry of Land Transport and Maritime Affairs as a Wetland Protected Area on January 30, 2008.

The site is located in the middle of the western coast of the Republic of Korea. As summarized by Marian Gwilliam, Ramsar's Assistant Advisor for Asia-Oceania, the Seocheon Tidal Flat is an open tidal flat directly linked to the ocean, its ecosystem is composed of a combination of sand and/or muddy sand flats which are very important breeding and feeding habitats for migratory birds. The site is also a spawning and nursery ground for fish.

Monitoring the ecological integrity of wetlands in the Ashburton Basin, Canterbury

The Ashburton Basin sits at an altitude of 600m under the eastern rim of the Southern Alps. Kerry Bodmin (NIWA) and Hugh Robertson (DOC) spent two weeks during March 2010 exploring the inter-montane environment. The landscape is inspiring and supports a diversity of river, lake and wetland ecosystems. The site is part of the DOC Arawai Kākāriki wetland restoration programme, which aims to protect and restore these unique wetland environments for future generations.

The wetland ecosystems encapsulate swamps, marshes, fens and ephemeral kettle holes, many of which are protected within the Hakatere Conservation Park and other public conservation land. Like other areas of New Zealand invasive weeds such as crack willow (*Salix fragilis*) and grey willow (*S. cinerea*) and increased nutrient loading are recognised as major threats to the ecological integrity of these wetlands.

One of the key aims for the conservation of biological diversity is to enhance the dominance of native species, and in doing so maintaining the ecosystem services the wetlands provide to community. To track progress towards achieving conservation goals, initially, an understanding of the current wetland condition was necessary - providing a baseline which future changes can be compared against.

We spent two weeks in the field completing a vegetation plot survey of the wetlands along Lambies Stream, upstream of Lake Clearwater and adjacent to the Maori Lakes. We surveyed 27 plots (10m x 10m) with vegetation cover abundance measured across fixed height tiers (<0.3m, 0.3-1m, 1-2m, 2-5m and >5m). In each plot, we also recorded plant frequency in nine sub-plots. Soil samples and plant foliage samples were collected for analysis of nutrients and other environmental variables.

Analysis of our vegetation plots identified six distinct wetland vegetation types, these were

- Swamp vegetation characterised by the native sedge *Carex secta*
- Swamp vegetation characterised by the native sedge *Carex maorica*
- Fen vegetation characterised by the native tussock grass *Chionochloa rigida* subsp. *rigida*
- Fen vegetation characterised by the native sedge *Schoenus pauciflorus* in association with the native red tussock grass (*Chionochloa rubra* subsp. *cuprea*) and exotic grasses
- Fen vegetation characterised by the native sedge *S. pauciflorus*



Tussock grassland and *Carex secta* sedgeland set against snow-capped mountains during our March 2010 field trip. These wetlands are upstream of Lake Clearwater.

- Swamp vegetation characterised by the exotic invasive shrub grey willow (*S. cinerea*) with an understorey of the exotic grass *Agrostis capillaris* and the native sedge *Carex gaudichaudiana*.

A focus of our project was to describe the dominance and impact of willow. We found that as willow abundance increased, native species decreased (Figure 1). This reinforces the effect of willow invasion observed elsewhere in New Zealand. Mature willow (>2m height) was only dominant in some of the areas surveyed, yet willow seedlings and saplings were frequently observed.



Carex sedgeland with crack willow (*S. fragilis*), Lambies Stream wetlands.

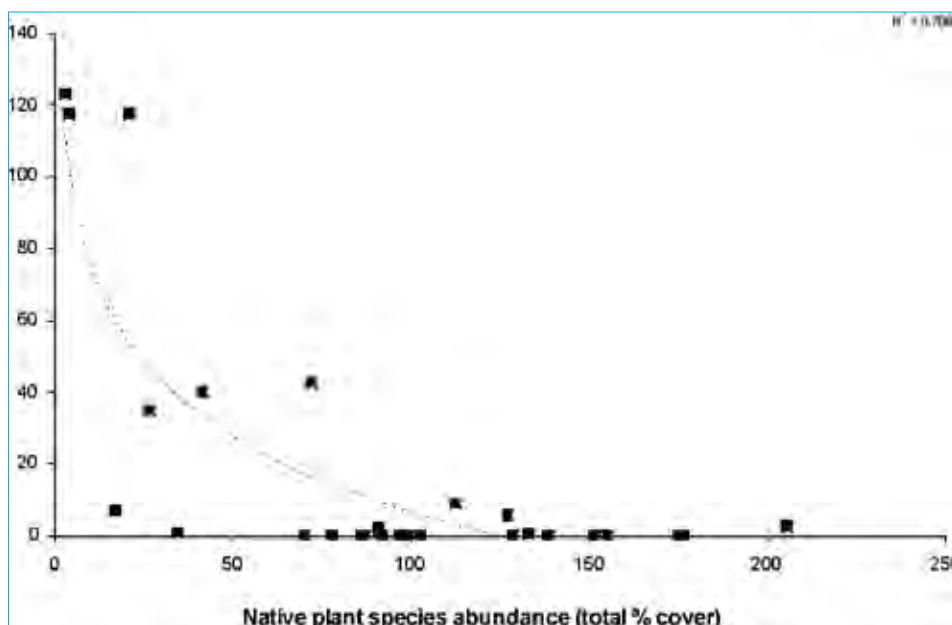


Figure 1. Relationship between the abundance of willow and native plant species at the Ashburton Basin wetlands.

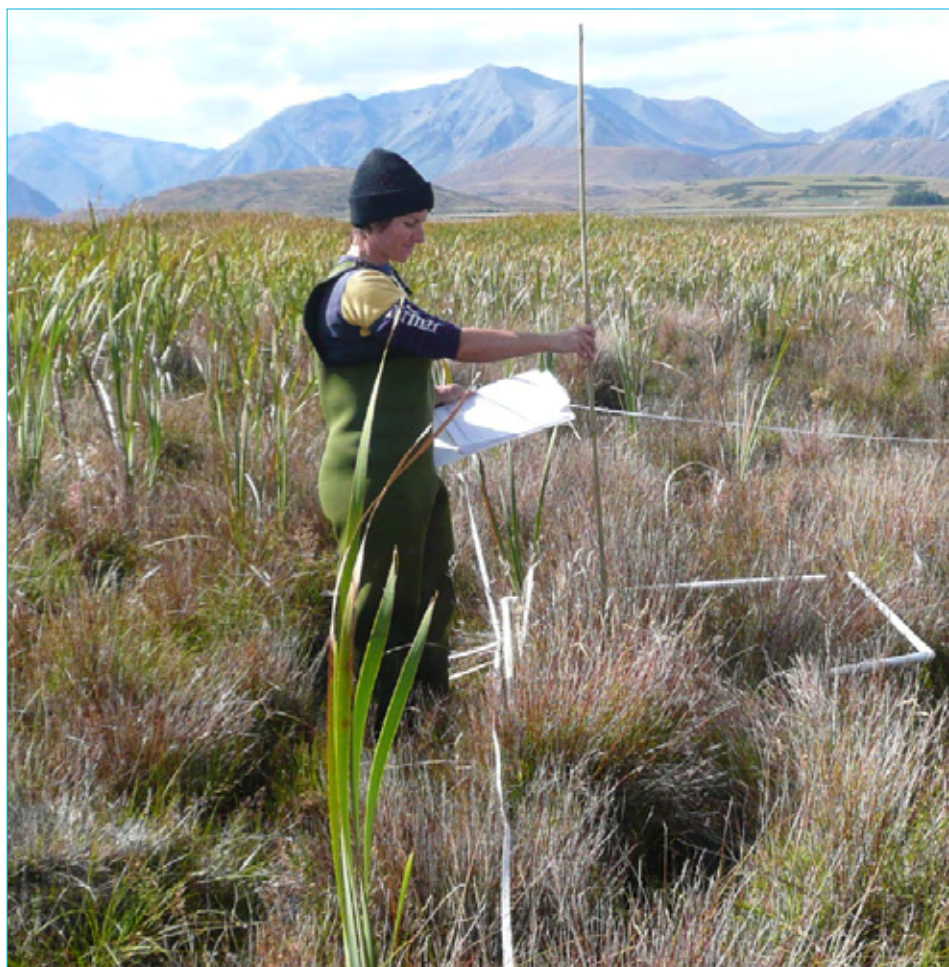
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For example, we observed that grey willow between 0.3-1m tall was present at 24% of sub-plots at Lambies Stream, and 11% at the Maori Lakes. This presents a challenge for management, particularly control of the seed dispersed grey willow that has the potential to increase in distribution and abundance.

The methodology applied was developed to provide fairly detailed information on wetland plant composition and structure, as well as important environmental factors. It builds on existing approaches such as the **Handbook for Wetland Monitoring** (Clarkson et al. 2004) and the Recce method for vegetation description (Hurst & Allen 2007). This will support the development of DOC-wide Inventory & Monitoring Tools for reporting on conservation outcomes for different ecosystem types.

Looking ahead an extensive willow control operation is planned for 2011 and 2012 in the section of Lambies Stream within the Hakatere Conservation Park. We will be monitoring this site before and after control, which will help to inform two critical questions: 1) how do the wetlands respond to management, and 2) what level of willow control follow-up is needed?

Of course, it is important to acknowledge the landowners that allowed us to access the Maori Lakes wetlands, and the DOC Raukapuka Area office staff for their support. A comprehensive report on this ecological survey is to be published soon, which describes both the methods we applied and the preliminary findings. For further information please email us on this project (or the Arawai Kākāriki

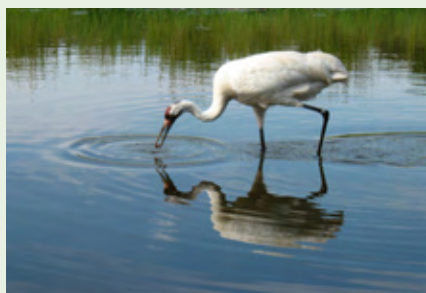


wetland restoration programme), contact Hugh Robertson, harobertson@doc.govt.nz

By Hugh Robertson (DOC Christchurch) and Kerry Bodmin (NIWA Hamilton)

Photograph: Kerry Bodmin monitoring the height of *Schoenus pauciflora*, Maori Lakes wetlands.

State of the World's Waterbirds



The rate of decline of waterbird populations has slightly declined over the last three decades, however 47% of waterbird populations are still declining and only 16% increasing, says the State of the World's Waterbirds 2010 Report.

The report also found that, dependent on economic activity and conservation measures, the status of waterbird populations is improving in regions where strong conservation legislation is implemented, such as North America and Europe. In those regions

without such instruments the rate of decline is increasing, with the situation especially alarming in Asia where 62% of waterbird populations are decreasing or even extinct, citing a combination of rapid economic growth and weak conservation efforts appearing to be lethal.

Waterbird populations are exposed to a wide range of threats such as the loss and degradation of marshes and lakes, water regulation, agricultural intensification, hunting and climate-change. The status of long-distance migrant waterbirds is generally worse than of those remaining in regions with strong conservation measures. This highlights the importance of coordinated conservation measures across entire flyways from the breeding to the non-breeding grounds.

"It is not surprising that the rate of decline of long-distance migrant sandpipers, snipes and curlews has accelerated most rapidly. Now, 70%

of their populations are decreasing. Halting destruction of their migratory staging areas is vital," says Professor Nick Davidson, Deputy Secretary General the Ramsar Convention of Wetlands. On the other hand, the improving status of cranes demonstrates that targeted conservation actions for the protection of key sites can produce positive results.

Wetlands International launched the State of the World's Waterbirds 2010 on 21st October at the Conference of the Parties to the Convention on Biodiversity in Nagoya, Japan. The publication analyses the changes in the status of waterbird populations between 1976 and 2005 using data collected for the four editions of **Waterbird Population Estimates** published by the organization since 1994. To see the full report go to:

<<http://www.wetlands.org/LinkClick.aspx?link=2334&tabid=60>>



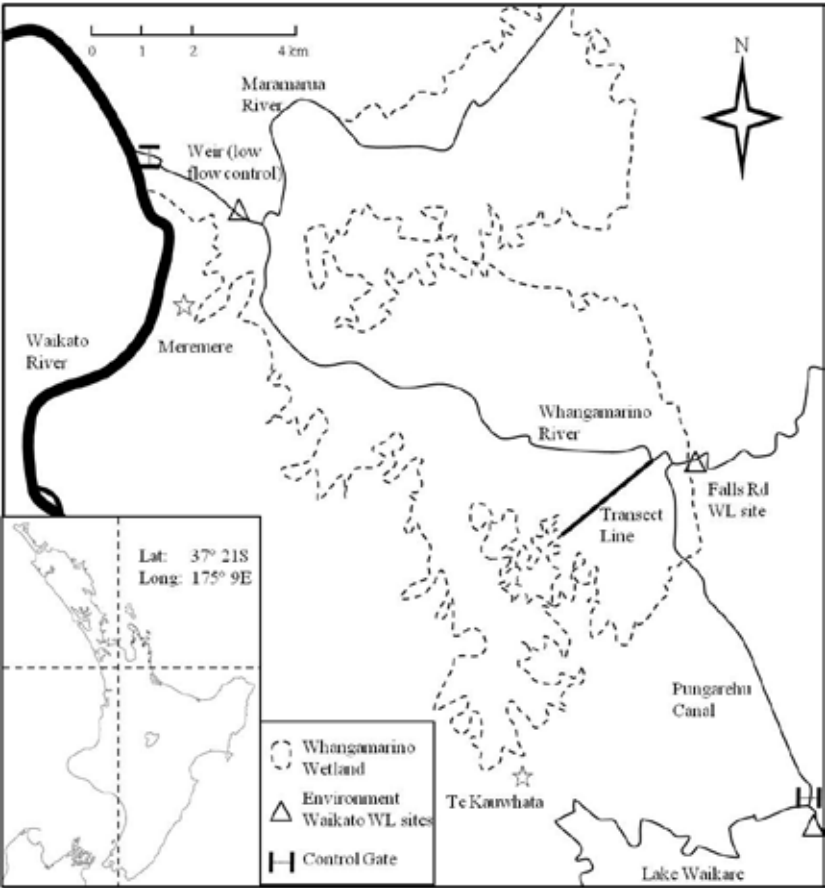
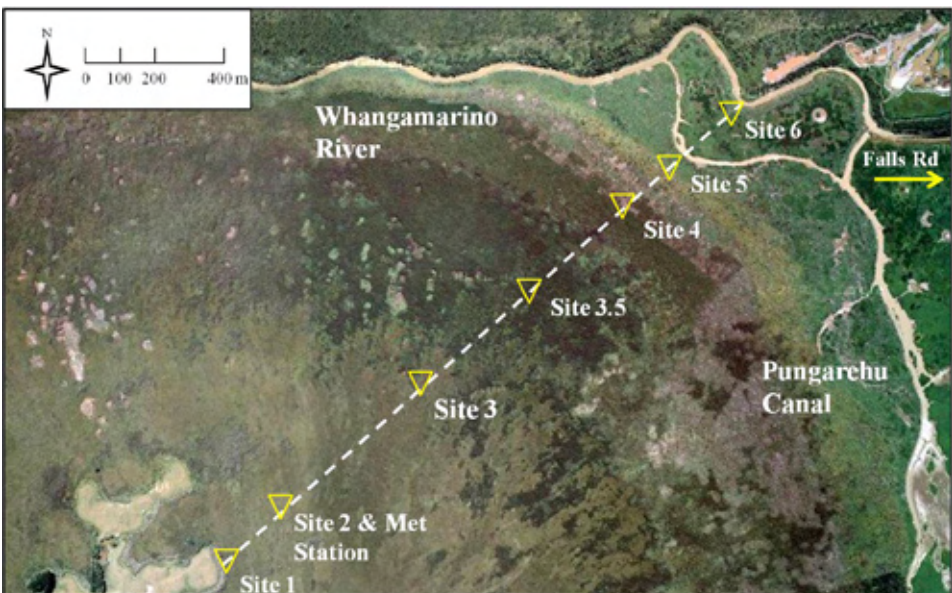
James Blyth is a recipient of the National Wetland Trust Golden Plover Scholarship Kia-ora, the Whangamarino Wetland is internationally significant and protected under the RAMSAR convention. Department of Conservation (DOC) are particularly interested in the anthropogenic effects that pose a threat to the wetlands' health.

I was given the opportunity for an MSc thesis and jumped at the chance. Having been brought up in the outdoors (including wetlands) and having a passion for environmental sciences, this suited me perfectly. The study entails a range of sciences, including chemistry, ecology and hydrology and requires a broad skill base and application of these sciences to identify the 'bigger picture'. In nature, so many biotic and abiotic aspects are interrelated, so it is entirely fitting to study ecohydrology to gain an understanding of the present health of the wetland.

The primary goal of this research is to: Investigate ecohydrological processes within a portion of the Whangamarino wetland and determine the internal and external factors impacting on the patterns and processes of water, peat and vegetation. Findings will be interpreted based on the present state of health for the wetland, and will aid in developing future goals and approaches for restoration.

One of the key aspects of this research is to identify the role the Lower Waikato Waipa Flood Control Scheme is having on wetland health. This scheme utilizes flood gates to control water levels and reduce flooding of agricultural land when the Waikato River is high. A control gate is positioned at Rangiriri (Te Onetia stream) which controls flow into Lake Waikare. A second gate is installed on the artificial Pungarehu Canal, which was built to drain water from Lake Waikare into the Whangamarino River and wetland.

Ecohydrology of Whangamarino Wetland



Above:
Figure 1

At the confluence of the Whangamarino and Waikato Rivers, a third gate is present, which stays closed when the Waikato River is high, and ensures flood water from Lake Waikare, Whangamarino River and Maramarua River is stored in the wetland. Additionally, an artificial weir has been installed 400m downstream of the confluence of the Whangamarino and Maramarua Rivers to ensure minimum water levels in the wetland are sustained when the Waikato River is low. This complicated hydrological regime is likely the key driving factor for changes in wetland health over time.

Initially, a 2.3 km transect line from farmland to the Whangamarino River was selected in the southern area of the wetland (Figure 1). The location was chosen based on variables including access, presence of changing ecotones (region lying between different ecosystems which share some ecological features of both) and a dynamic hydrological regime.

James Blyth, MSc supervisors: Dr David Campbell & Associate Professor Louis Schipper





National Wetland Trust

The National Wetland Trust was established in 1999 to increase the appreciation of wetlands and their values by all New Zealanders. Our first major task is to build a wetland interpretation centre for people to learn more about wetlands and experience their special qualities. For more information visit our website: www.nationalwetlandtrust.org.nz

Other Trust aims are to:

- Increase public knowledge and appreciation of wetland values;
- Increase understanding of wetland functions and processes;
- Ensure landowners and government agencies commit to wetland protection, enhancement and restoration.

The trust has thirteen elected trustees representing: iwi, landowners, tourism and farming industries, local government authorities, Fish and Game Councils, the Department of Conservation, NGOs, Crown Research Institutes, and universities.

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