Wet & Wild

Saving Waituna Lagoon is up to us

Waituna lagoon in Southland is one of our first Ramsar sites - we signed an international treaty promising to protect it - but now it's in a critical state. Here is an article reprinted from the Southland Times.

Green Party co-leader Russel Norman donned a wetsuit, jumped in his kayak and paddled the Waituna Lagoon as part of his dirty-and-threatened-rivers tour. Dr Norman had planned to visit the Oreti River but the crisis at Waituna was more important, he said.

He had visited the lagoon before, and said the changes that had occurred since were not visible to the eye. "I think a lot of the changes that are happening require a closer look rather than a cursory once-over. It is still a beautiful place to go and hang out. It is a great asset we want to hang on to."

Dr Norman said the area was "obviously in great distress", and this was essentially because of too much nitrogen and phosphorous sediment getting into the lagoon. "The impact of that is you are getting a buildup of algae and the die-back of fresh water plants that live on the bottom of the lagoon."

The danger was that the lagoon could "flip", becoming a muddy, non-aerated environment that would not support what lived there. Currently the lagoon supported a lot of invertebrates, fish and birds, Dr Norman said. "We have to dramatically cut the amount of nitrogen and phosphorous sediment and primarily that goes back to agricultural practices in the catchment where it is all coming from."

Dr Norman said it was possible to turn the situation around and prevent the lagoon from flipping. He compared it to patients in the emergency department of a hospital - they can either live or die. "And it really depends on us which way it goes. It is in our hands to save the lagoon."

Dr Norman had met Department of Conservation and Environment Southland staff on Saturday, and had also met some of the local farmers and the landcare group. "They feel very passionately about protecting the lagoon. There are some really tough changes that need to be made and they recognise the size of the challenge they face."

The next step was to take emergency measures during winter and get an idea of the size of the cut in nitrogen needed. He estimated about 50 per cent, and "strong rules" would be needed to achieve that. Dr Norman said the National Policy Statement on Freshwater needed to be signed off by the Government and the rules must not be weakened.

Wet & Wild is the National Wetland Trust's quarterly publication.

We welcome contributions, published at the editor's discretion. Please email to: 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

Wahoo! Big News – National Wetland Centre update

We have just secured a major contribution towards a predator-proof fence for the site of our planned national centre at Lake Serpentine. We know they aren't cheap, but there are very few predator-free wetlands in NZ, as many off-shore islands are too small, rocky, steep, or dry to support them.

We need reference sites to understand the impact of predators on wetland fauna, and some safe havens for our rare wetland species. This will also be a draw-card to the centre as we can host iconic species like brown teal where the public can easily see them.

The Waikato Catchment Ecological Enhancement Trust has granted us $100,000. We still have a way to go to fully fund this project, but this grant is a huge boost. Thanks WCEET!

www.wceet.org.nz

Waikato Catchment Ecological Enhancement Trust

We've also been busy compiling plans for the centre. You can read them on our Wetland Centre page **(www.wetlandtrust.org.nz/centre.html).** The new documents are:

- An options paper looking at predator control and feasibility of a predator-proof fence.
- A landscape plan
- A re-vegetation plan

Weedbusters prize revealed

We mentioned in the last issue that the NWT was joining forces with Weedbusters on their 2-minute Film Challenge for schools. Schools that select wetlands as the theme for their 2 minute video about weeds will be in to win a personal visit from our very own 'bug-man' Rudd Kleinpaste. Ruud is a fantastic entertainer as well as an educator and passionate advocate for biodiversity - kids (and big kids) love him.

If you are a teacher, or have kids/ grandkids at school look into this great challenge, and encourage your school to consider a wetland theme. The winning school will also be eligible for the Weedbusters prize of $1000, so focus on wetlands and your school could win both prizes!

The challenge is for Year 1-8 students, and you have until October to get your entries in. See the Weedbusters web for details:

www.weedbusters.co.nz/weedbusters_in_schools/2minute_film_challenge.asp

Don't say it with flowers - say it with wetlands!

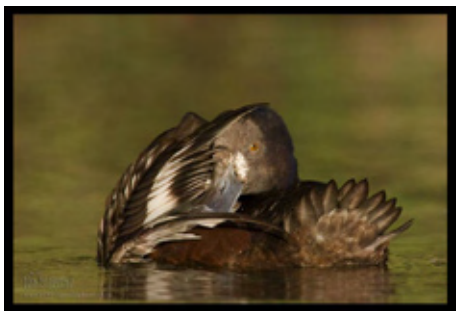
You love wetlands right? Here's a great way to support wetlands and show your friends, families, colleagues, and overseas visitors how stunning these shy places can be.

The NWT is producing a set of 5 greeting cards to showcase the uniqueness and beauty of our wetlands. Natural history photographer, Neil Fitzgerald, a keen supporter of the Trust, came up with the idea. Neil's photos have been previously been displayed as a revolving slide show at NWT Symposia. Remember that incredible close up of the scaup with water droplets falling from its beak? Or its shy cousin coyly covering her face with her wing? Or the stunning detail on the dragon fly and the sun dew?

The cards will come as a pack of 5, including 2 three-fold panoramas and a mixture of 3 single-fold upright and horizontals. Each of the cards will be blank inside, so you can use them for birthdays, Christmas, thank you's, corporate promotions, or just 'greeting from NZ' for your homesick relatives overseas. Talk to us about corporate pack options.

Packed sets of cards and envelopes will be available in 4-6 weeks. Sets can be pre-ordered by emailing monica.peters@landcare.org.nz

$12 + P&P ($1.20 Standard post)



One of Neil's amazing photos.

Facebook page

The NWT has a Facebook page - sign up as a friend and send the link to your friends. Link via our Latest Updates page on www.wetlandtrust.org.nz

Website overhaul

It's served us well for the last decade, but we are excited at the prospect of giving our web site a good overhaul to incorporate new technology and styles. We've teamed up with Craig Boxall of PixelFusion and the Media Design School to give their students a real life client to work with. We'll choose the best design that meets our needs. If you have any suggestions for content or other features let us know.

Events

Don't forget to check our events page for wetland walks, field days, training courses, talks or other happenings. And let us know if you are planning any - we'll promote it on our website, facebook page, and newsletter - take advantage of the free promotion to tell the world what you are planning!

National Wetland Restoration Symposium, March 2012

The 5th National Wetland Restoration Symposium will be held in Invercargill during March 2012, see www.wetlandtrust.org.nz for updates. This symposium is being organised by the Southland Wetlands Working Party in conjunction with the National Wetland Trust.

Wetland trails

Gay Munroe and the Southland Wetland Working Party are creating a Southland wetland trail to launch at the next symposium. Seven wetlands are likely to be featured, including the internationally significant Awarua-Waituna wetlands and the intriguingly named Amoeboid Mire. If you are interested in helping with the trail or sponsoring it, contact Gay at g.munro@woosh.co.nz

Marshes get Mobile

Staff at Mai Po, World Wildlife Fund (WWF), Hong Kong, consider that technology is key to attracting young people to understand and get involved in conservation issues. A six-month scheme has provided training to 200 primary school teachers.

With the aid of well designed, readily accessible IT learning materials (both online and offline) and mobile learning devices, teachers have the opportunity to explore ecological, social and economic features of the wetland environment and learn about all the environmental education resources provided by WWF, says Yamme Leung, Education Manager for WWF-Hong Kong.

www.wwf.org.hk/whatwedo/education/

How Will You Celebrate Ramsar 2011?

In our spring issue last year we gave you 40 ideas to celebrate 40 years for the 40th anniversary of the Ramsar Convention.

Since then a committee has prepared a strategy for New Zealand, suggesting a different theme each month. Take a look at the list below and consider how you might take this opportunity to profile wetlands or wetland projects you are involved in.

In recognition of the theme for April - Wetlands on the Farm - we have included in this issue of *Wet and Wild* a story about a wetland creation project in the Bay of Plenty - prepared as part of a sustainable land management kit being developed by the NZ Landcare Trust.

Let us know what you are doing to celebrate the 40th anniversary of Ramsar.

Contact karen.denyer@wetlandtrust.org.nz or jsimmons@doc.govt.nz

New Ramsar site in Korea

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

The Seocheon Tidal Flat is an open tidal flat directly linked to the ocean, its ecosystem a combination of sand and/or muddy sand flats which are very important breeding and feeding habitats for migratory birds and a spawning and nursery ground for fish.

This Ramsar Site supports globally threatened bird species such as the vulnerable Saunders' gull, the critically endangered spoon-billed sandpiper and the endangered spotted greenshank. It supports 1% of the population of Eurasian oystercatcher, providing an important habitat for over 3,000 individuals as a stopover site during winter and as a breeding area.

There are 125 species of fish which include the river puffer, Korean rockfish, and other marine life such as the Japanese eel and 95 species of macro benthic animals. Locals take advantage of the farming tracts and paddy fields in surrounding areas. Various marine food can be harvested including shellfish such as clams and Dongjuk, octopus, and crustaceans such as the Korean shrimp. Threats to the area include extraction of living organisms from the tidal flat and increased pollution in the surrounding areas. The Division of Fisheries and Ocean Division (Chungcheongnam-do province) is directly responsible for managing this diverse and culturally rich wetland. **(Extract from a message sent by the Ramsar secretariat, edited for brevity.)**

MONTH	THEME	LINKAGES	TARGET 40 POSSIBILITIES
February	Wetlands and forests	WWD – forests for water and wetlands	40+ people at each event
March	Coastal wetlands	Sea Week; bird migration; World Water Day 2011 (Urban water management)	
April	Wetlands on the farm	Earth Day	
May	Wetlands – a hunter's paradise	Duck hunting season; Biodiversity Day; South Pacific Stormwater Conference	40km of fencing erected around wetlands
June	Wetlands working for us	Arbor Day; World Environment Day; World Oceans Day; NZ Agricultural Fieldays	40m of boardwalk built
July	Wetlands and cultural values	Matariki; Maori Language Week; International Bog Day	
August	A world of wetlands	Launch of whitebait season; Anniversary of Farewell Spit and Awarua Wetland gaining international status; Ramsar in general – promotion about the Convention	
September	Love your wetland	Conservation Week (Love New Zealand); Keep NZ Beautiful; Frog Week	40 sites planted and/or 40 x 40 plants planted
October	Wetlands for life	World Habitat Day; Rugby World Cup (Living Legends planting)	40 hectares protected
November	Wetlands in the backyard and town		40 best photos of wetlands
December /January	Wetlands – get into them	Summer holidays	40 wetlands to visit

Who did what on WWD 2011

The 2nd of February 2011 marked the 40th Anniversary of the signing of the Ramsar Convention for the Protection of Wetlands. This international treaty was signed by 160 countries, including New Zealand, to facilitate the protection of wetlands around the world. Since this time, New Zealand has designated six sites as Wetlands of International Importance.

The anniversary of the signing of the Ramsar Convention is celebrated as World Wetlands Day. A fantastically diverse range of events was promoted on the DoC and NWT websites this year, showing the growing interest in celebrating this special day.

Have we missed your event? Contact us and tell us about it, and make sure it's on our events page next year.

Auckland Council

Ahead of the game, Auckland Council held a Parks Open Day in late January at Barry Curtis Park - a fun morning for all the family with educational displays, origami, face painting, competitions, guest speaker and guided walk.

Far North

First off the block on the actual day was the Far North World Wetlands Day launch at dawn in a collaboration between Ngai Takoto A Iwi Research Unit, Mountains to the Sea Trust, the Far North Environment Centre, OSCAR, Bushlands Trust and DOC. People were invited to send videos, photos and poems about Northland's wetlands.

Gisborne

In Gisborne locals were invited to view a screening of *Water Whisperers Tangaroa* at the Tairawhiti Environment Centre. Shot in stunning locations around New Zealand, the film explores the work of ten communities seeking to heal damaged waterways and protect them for future generations. Also that day a weeding working bee at Sistersons Lagoon, was organised by Women's Native Tree Project Trust and Tairawhiti Environment Centre.

Hamilton Zoo

Hamilton Zoo ran an evening Wet and Wild walk - an exclusive, tour, including a 'meet and greet' with Hendrix the tuatara before exploring the Free Flight aviary and Waikato Wetlands and a rare behind-the-scenes look at the zoo's Hochstetter's frogs.

Find the Ramsar site: Locating our 6 Ramsar sites was one of the many tasks for the NWT's Target 40 Challenge Event at Lake Serpentine. **Photograph**, **Karen Denyer.**

Waikato

The National Wetland Trust hosted a Target 40 Wetland Challenge at Lake Serpentine, in association with the Department of Conservation, Waipa District Council, Environment Waikato, NIWA, the NZ Landcare Trust, Landcare Research, the Waikato Biodiversity Forum, and the Hamilton Environment Centre. Teams of four competed against each other to complete a series of wetland-themed challenges around the wetland complex, aiming to gain 40 points or more to be in to win the main prize sponsored by Mighty River Power.

Canterbury

Guided walks were held at Lower Heathcote River and Southshore Spit in Canterbury. Participants learned about wetland ecology with a two hour guided walk and commentary by a Canterbury City Council Park Ranger. Also in Canterbury Fish and Game ran a fun day for all the family at Ohoka, with fishing lessons, electric fishing demonstration, flax weaving, stream life exploration, plant safari, live lizard trapping, and "love your drain" talk.

West Coast

Over on the West Coast an afternoon guided boardwalk tour across the wetland margins of Mahinapua Creek was followed by a paddle boat ride in the aptly named Up the Creek in a Paddleboat event organised by DoC Hokitika.

The Bug Man (Ruud Kleinpaste) was a big hit at Hapuka Estuary, also on the West Coast, explaining about all the bugs you see and don't see on an interactive walk.

Other West Coast events included the Secrets of the Springtide at Kowhai Bush Walk. All the family were welcome to come along and look for whitebait and other coastal wetland species. DoC, Hokitika also invited people to test their knowledge online with their 40 Questions Wetlands Quiz (try it out yourself on the DoC website). Prizes included 'Wetlands of New Zealand' by Janet Hunt, and a cruise on Mahinapua Creek from Paddle Boat Cruises.

Southland

The Waituna Landcare Group celebrated wonderful Waituna Wetlands in Southland with planting of red tussock and toe toe followed

Left: Te Henga Wetland was the perfect location to celebrate World Wetland Day in Waitakere, Auckland.

Right: The event provided opportunities for people to learn about wetlands and their values .

Photographs by Shonagh Lindsay, National Wetland Trust

by a drive through of local properties to visit privately owned wetlands, and sessions on Donatia preservation techniques, Awarua Waituna Action Group's fencing programme, fish friendly drain management, QEII covenant protection, bio-control options and launch of the new Southland community nursery website.

Waitakere

Forest and Bird hosted an event at their Matuku Reserve, Te Henga, a 120 hectare property which includes part of Te Henga Wetland. The event was supported by the National Wetland Trust of New Zealand, Auckland Council, Ducks Unlimited and Waitakere Rivercare.

The generosity of local landowners allowed access to the southern portion of Matuku Reserve through private land. A newly formed walkway following a historic tram track allowed people to explore the edge of the wetland, mostly keeping their feet dry! A highlight of the walk was numerous informative signs that had been erected by Forest and Bird stalwart John Staniland. These gems of knowledge provided information about native trees, weeds, and the history of the track. This led to the only remaining piece of railway iron along the route, and an old log chute (now largely overgrown and filled in) where kauri were once slid down to the trams for transport to the mill.

In all an estimated 300 people enjoyed the event. People from all ages and nationalities participated, from pre-schoolers to international travellers and even a member from the armed forces. After the walk, people enjoyed the opportunity to learn more about wetlands and how to protect them with hands on displays and activities provided by the supporting organisations.

How can you help to protect wetlands?

- Fence off ponds, lakes, and boggy areas from stock and allow native plants to flourish.
- Plant tall native trees to shade the water of ponds and lakes.
- Conduct pest control around the perimeter to improve the condition of existing wetlands.
- Provide stock with a trough for drinking water rather than allowing access to streams and ponds.
- Never move aquatic plants, fish or other organisms between water bodies. This is how pests are spread.
- Join a local care group that looks after streams and wetlands.
- Support organisations that protect wetlands such as National Wetland Trust of New Zealand, Forest and Bird, and Ducks Unlimited.

Help us create an Inventory of WWD events

The Wetland Trust is compiling a record of all WWD events held since 2000.

We intend to maintain a year-to-year record and to feature a review of the events each year in Wet & Wild.

So if you organised a WWD event during the past 11 years, could you please send us the answers to these questions, and with as much information as possible.

If you attended an event but did not organise it yourself, could you please let us know who to contact for details.

The details we need:

1. Your name

2. Contact address (physical or email)

3. Contact phone number

4. Year for which information applies

5. Nature of WWD event (please describe)

6. Wetland name(s) and type(s)

7. Organiser of event (with contact details)

8. Number of participants.

9. Additional information (eg brochures, articles, or where to locate them)

10. Source of funding for event

Where to send this:

Please send this information to Keith Thompson, either by email to:

bogman@ihug.co.nz

Or post to:

Keith Thompson

PO Box 13062, Hamilton 3216.

Restoring a wetland

This month's theme for our year-long Ramsar celebrations is 'Wetlands and farming", so we've included an article written for the NZ Landcare Trust's Kaimai Catchment Project, reproduced with their permission.

Just add water...

With the help of Fish and Game and the Regional Council, the Sheely family has turned a worthless boggy paddock into a tranquil wetland on their coastal Aongatete life-style block.

A radical vision

Paddy Sheely immediately decided that the mucky, waterlogged paddock on the coastal land he bought in the mid 90's was useless for grazing. He's since found a much more valuable use for it. As a newly restored wetland, it's a special amenity feature on the life-style block, adding value in a property market where water views are increasingly sought after.

It was John Cheyne and John Meikle of the local Fish and Game council who first suggested the radical idea of ripping up the paddock with a bulldozer. Like doing up an old villa, Paddy realised that it was going to look a lot worse before it looked better, but he had a clear vision of how it would all turn out.

Under John Meikle's supervision, and with some funding from Fish and Game, the NZ Game Bird Habitat Trust, and the Bay of Plenty Regional Council, the surface was scraped down a metre or so, with gently sloping sides and a sinuous margin. It didn't all go smoothly - when the bulldozer broke through the cap of impervious marine mud, spring water bubbled up in such profusion the machine sank overnight up to its gunwales. The driver had to wade out in the morning and gingerly haul her out!

Kick-starting nature

Once contoured, with a weir in place and some basic planting to soften the bare edges, it was more or less a matter of 'just adding water'. The high tide spill-over (backed up freshwater) from the adjacent stream rapidly filled the depression to create a shallow pond, and it wasn't long before the birds cottoned on.

Paddy, with his science background, knew if you give nature a kick start, she'll take over. "Nature's much better than us at deciding what plants should go where" he says, so he just focussed on putting in around 4500 early succession plants, flax, cabbage trees and the like, and kept on top of the weeds.

"The more you do yourself, the more mistakes you make. Leaving it to nature might take longer, but you get a better result" he reckons.

His work these days is just a spot of weed control, "a bit of hand releasing and a tickle of roundup here and there" to keep the bindweed and blackberry under control.

He uses low concentrations on the bind weed, just 3 ml of roundup per litre, to protect the native reeds that have popped up.

Mostly he leaves the grass to provide moisture and cover for the plantings. He says cabbage trees are his top performer. "You can put them on clay that's as bare as a badger and they survive".

Animal pests don't seem to be a major problem here. Only a couple of stoats have been caught, and the Sheely's secret weapon against rabbits run on the smell of a Tux biscuit - two eager Jack Russell terriers trained to ignore the birds and go for the pests.

Benefits all round

The benefits for Fish and Game included increased habitat for waterfowl, and an easy access site for novice hunters. Paddy isn't obliged to provide access, but is happy to allow the odd spot of duck shooting in season.

The Regional Council also saw biodiversity benefits - wetlands being rare in the Region now - as well as the value of the site to store floodwaters and trap sediments and nutrients, improving water quality.

The funding and advice the Sheelys got was welcomed, but the most important support was the endorsement that what they were doing was worthwhile.

Today that once worthless paddock is a vision of tranquillity. Ducks and swans glide serenely across clear water that dragon flies hover above. A rich diversity of native water plants shimmers below the ripply surface, while rushes and sedges soften the water's edge. Iconic cabbage trees and flax stalks add sculptural drama. Recently Paddy heard the first frog - not a native species, but a good sign of a recovering habitat; "when we were kids we used to catch tadpoles by the thousands".

Protecting the investment

Paddy says there has to be a dollar value in restoration, "...that's what is going to make the next land owner think 'Shivers, I'm going to

look after this'..". To make doubly sure, Paddy has put a regional council covenant on the title to protect his investment in perpetuity.

He is also aware of the broader benefits of showcasing his wetland project to other landowners. Without wanting to have too many people potentially trampling the sensitive site, Paddy would like to put in a walkway and allow farmers and land management staff to see the results, "Education is the key to drive things forward'.

Nature at work

With the young wetland already looking well-established and functioning, the Sheelys are planning the next phase; tackling weeds on a downstream area, and continuing to restore the bank of the adjacent Whatakao Stream to reduce nutrient and sediment input to the Harbour. "It's important to work on sections at a time, and not bite off more than you can chew."

Nature has responded well to the kick-start she received on this property. Now the springs provide clear water, the fruiting plants attract the birds, the birds bring seeds of more native plants, and the maturing plants have started shading out the weeds.

As for Paddy, he envisions a new house built on the rise overlooking the wetland - a nice place to retire to where he can sit back watching nature at work.

The beauty of his created wetland is not lost on Paddy, and he willingly shares it with his elevated neighbours by carefully planting to retain view shafts. Perhaps those tantalising glimpses will rub off, and the neighbours will look twice at their own boggy paddocks.

Prepared by Karen Denyer for the New Zealand Landcare Trust's Sustainable Land Management Guide - part of the Kaimai Catchments Project.

Funded by the Ministry for the Environment's Sustainable Management Fund, the project is a partnership between the NZLT, the community and resource management agencies in the Tauranga Harbour and Waihou River catchments along the Kaimai-Mamaku Ranges.

It aims to address land sediment and nutrient run-off issues through the promotion of sustainable land management and biodiversity enhancement.

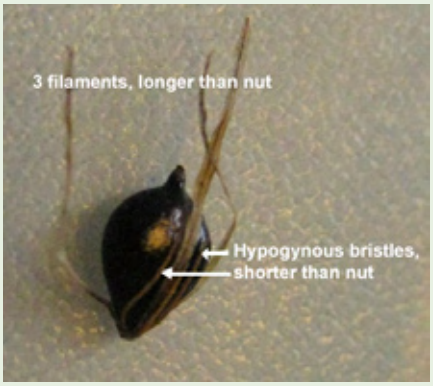
Photographs by Karen Denyer

Left: The Sheelys' Aongatete paddock before it was restored as a wetland.

Right: The Sheelys' restored wetland.

Plant profile

By Monica Peters



Latin name *Bolboschoenus fluviatilis*

Family CYPERACEAE

Other names marsh clubrush, kukuraho, purua grass

Status Non –threatened

Distribution North and South Island

Habitat Coastal to lowland in saltmarshes and other poorly drained saline areas. Also found in freshwater along river and lake margins. Can invade pasture abutting tidal streams and estuaries.

Features Summer-green, perennial sedge commonly forming dense clumps. The Greek derived bolbos, meaning "swelling or bulb" refers to the tubers which grow on the ends of the woody rhizomes. The triangular stems are 1.5 - 2.5 m tall and die back over winter. Leaves are numerous and grass-like. The Inflorescence is terminal. 3- Angled nuts are 1.5-2.0 mm long, pale cream, though occasionally black and glossy.

B. fluviatlilis is a useful species for landscaping/restoration projects uses, as it is fast growing and provides shelter for wildlife around pond and wetland margins. It can also be used to stabilise banks as it will not spread into water deeper than 250mm.

Flowering October - January

Fruiting December – May

Although the 3 species of *Bolboshoenus* look similar, *Bolboschoenus fluviatilis* is taller than both *B. caldwellii* and *B. medianus*. *B. fluviatilis* is also the species most likely to be found in freshwater. Further differences between the 3 species centre on the flowering parts which require careful examination.

References: www.plantman.co.nz www.nzpcn.org.nz Johnson P.N. and Brooke, P.A. 1998. *Wetland Plants in New Zealand*. Manaaki Whenua Press

Photograph left: Detail of flowering parts, John Hobbs, Rotorua Botanical Society

Right: *Bolboschoenus medianus* nut showing hypogynous bristles shorter than the nut (you'll need a hand lens to see these in the field). Photograph Karen Denyer

	Nut shape	Nut colour	Stigma #	Bristle length and location
Bol flu	Trigonous	pale cream to black	Always 3	hypogynous bristles = to nut
Bol med	Compressed, sides convex	black and shiny, sometimes grey	3 or 2	hypogynous bristles shorter than nut
Bol cal	Compressed, sides depressed	cream to brown	2	bristles half length of nut

Wetlands and Farming – a case for incentives

Regional Councils and Territorial Authorities either have too few statutory powers to control erosion or nutrient losses on private land, or else they have sufficient, but don't use them. In any case, much of the local government, as well as community, efforts are only corrective (cliff-bottom ambulances) rather than preventive and we therefore need a better formula to provide protection for water bodies and wetlands.

Progress towards improving water quality in rural areas still depends largely upon voluntary efforts by landowners. Most celebrated of the initiatives is the Dairying and Clean Streams Accord, launched, with much fanfare, by Fonterra, MAF, MfE and the Regional Councils as long ago as 2003. The Targets set for the Accord were not particularly ambitious, so it is disappointing to see (http://www.maf.govt.nz/news-resources/news/farmers-making-changes-to-target-water-quality) that only 2/5 targets have been met after 8 years.

Only the easiest goals have been scored, but even they only involve fencing *half* of water bodies from stock access and building *half* of the stock crossings needed. The least flattering statistic is the poor support forthcoming for wetlands. The 2005 target (50% of regionally significant wetlands fenced) was met in only three Regions and the 2007 target (90% fenced) was met in only one. But meeting Accord targets is very much a shared responsibility and even by 2010, several Regional Councils had still not identified all of their significant wetlands.

So what to do? Wetlands can't wait; they're still degrading. *Voluntary* schemes are not going to protect ecosystem services provided by wetlands, because when farm economics are tough, the environment is first to drop off the management plan. Fonterra could get tougher with its members, but there's an understandable conflict of interest there. There are cries for more regulations, but that's not going to happen very quickly either. A new rule of a type that would make a significant difference would take at least five years to draft and get into the statutes, even if the votes are there to enact it.

Most people agree that moving towards environmental sustainability will need a mix of methodologies: a range of voluntary measures driven by landowner commitment and cost savings, supported by a backbone of external drivers (rules). But there is a third way: voluntary schemes with realistic incentives.

So why haven't we explored the use of incentives more thoroughly? Most businesses will improve their environmental practices if it makes sound economic sense. For instance, NZ farmers will pay $1500-4500 for a Whole Farm Management Plan (WFMP) if the investment pays for itself (which it usually does). We haven't had farming subsidies in New Zealand for a long time, and we can get very self-righteous about countries that do.

However, a recent industry initiative (National Farmers' Union) in the UK has a different twist to the incentive carrot: the Campaign for the Farmed Environment (CFE), which has strong support from Natural England, the Environment Agency and various conservation organisations. The CFE still requires farmers to adopt a voluntary approach to environmental land management, but the secret weapon that gives the CFE teeth is the Environmental Stewardship Scheme (ESS). This is a whole-farm sustainable land management scheme, which aims to 'protect water and soil, prevent erosion and water pollution and promote wildlife conservation'.

Farmers can qualify for Entry Level Stewardship (ELS) by building up 30 points/ha, averaged across the farm. So a 100ha farm would need to amass 3000 points to qualify for a £30/ha payment of £3000/year. To earn these points the farmer can choose from a menu which includes targets such as ditch management (42pts/ha) and low-input permanent grassland (85pts/ha), or points for effluent disposal, soil management, adjustment of stocking rates, reducing fertiliser usage, etc. And 12 metre set-back riparian fencing (400pts/ha) offers a lot more environmental protection and enhancement than our own Clean Streams 2 metres! The Higher Level Stewardship (HLS) is more targeted and pays more.

Menus, awarded points and payments would obviously need adjusting for countries with different values, but maybe there's some merit in evaluating the ESS approach as a means of breaking out of the on-going carrot-or-stick debate in New Zealand. It could help to achieve sustainability goals more quickly and, if well designed, should pay for itself by tackling more of the environmental problems at source instead of at sink. Preventive management is almost always less expensive than corrective management. Of course, targets would have to be more prescriptive than they are at present, but they wouldn't be 'rules' as much as 'entry qualifications' for a voluntary management scheme. And anyway, prescription wouldn't be such a bad thing if it gets us away from the deceit of 'management by percentages', where a much-touted "30% reduction in x" may still be ten times what the real sustainability target has to be.

So bringing this back to wetlands: with a well designed incentives scheme, we could see fewer silt-traps and more erosion control, more self-sustaining native vegetation, better drainage management and fewer artificial weirs in wetlands that shouldn't have them, prospects for *real* reductions in nutrient inputs to wetlands, and greater emphasis on *functional* improvements to wetlands rather than mitigation being confined to beautification.

To a landowner with a business to run, a voluntary scheme without incentives looks about as attractive as regulations with penalties. Voluntary schemes can work if the farm economics are OK or the incentives are right – if the things you really want doing offer either enough personal satisfaction or enough points. If, for instance, the number of points earned goes up with the width of the riparian strip. So there are actually three ways to skin the sustainable environmental cat and all are needed in the mix, but incentives have the potential to be a major player, maybe even the best value for money - and particularly so for wetlands.

Keith Thompson, National Wetland Trustee

Wetlands to Visit - Rakatu Wetlands, Southland

If you are travelling the Southern Scenic Route and in the Te Anau area, why not stop off at the Rakatu Wetlands in the Waiau River Valley. These wetlands lie close to the Waiau River and across from Fiordland National Park, 15 km south of Manapouri. They are clearly sign posted and access is free.

This is a Waiau Fisheries and Wildlife Habitat Enhancement Trust project. The wetlands are a mix of 115 ha of natural and open water habitats. Grazing stock is excluded, providing opportunity for regeneration of native vegetation. Bird life abounds (fern bird, the shy marsh crake as well as more common species) and the area has become a refuge for native fish, particularly long-finned eel. A new pest trap network will further enhance the habitats over time.

Nine km of walking tracks provide a number of opportunities to experience the wetlands and Waiau River environment. If time is a factor, take the 10 minute walk to the lookout above the upper two wetlands. From here views looking north encompass the Waiau River, the Redcliff Wetlands and the Takitimu Mountains. The long loop track around the whole complex takes 2-3 hours and includes the natural wetlands as well as the open water habitats.

If trout fishing is your recreation, take the track to the banks of the Waiau River and try your luck!

Jan Riddell, Communications Officer, DoC
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www.weedbusters.org.nz

Both purple pampas (*Cortaderia jubata*) and common pampas (*Cortaderia selloana*) are giant grasses, originally from South America. Pampas was brought to New Zealand as a windbreak plant and a stock food, as well as for ornamental use. It is often mistaken for the native *Cortaderia*, toitoi (or toetoe) but are easy to tell apart if you know what to look for.

Pampas forms massive clumps that build up on themselves over time. They have long serrated leaves with an obvious raised central vein, and fluffy upright flowerheads. Common pampas has creamy white flowers from January to June, while purple pampas has pinky purple tinged flowers from January to March.

Toitoi, on the other hand, grows from a crown at ground level, has a number of parallel veins along the length of the leaves, and has yellowy golden flowerheads that are not as fluffy as pampas and which droop rather than stand upright. If your plant isn't flowering try the 'tear test' on the leaves - bend a leaf back on itself to form a crease then try to rip it - if it tears easily it's the weed, if it resists it's the native - remember if you can rip it, rip it out!

Pampas tolerates heat and frost, salt, wind, wet and drought, moderate-shade, most soils, low fertility, and recovers quickly after fire. Massive amounts of well-dispersed seed are produced that are spread long distances by wind and occasionally water. Seeds are also spread by soil movement, dumped vegetation, contaminated forestry machinery, clothing, and on animal pelts. Common seed sources are plantation forests, roadsides, farm hedges, quarries, and wasteland.

Pampas rapidly colonises sprayed, burnt, slipped and otherwise disturbed sites and quickly becomes dense. It replaces groundcovers, shrubs, and ferns, creates fire hazards, provides habitats for possums and rats, and impedes access. Once pampas has invaded an area, it is normally followed by weedy vines.

Favoured habitats for pampas include forest light gaps, slips, margins, disturbed sites, open habitats, riverbeds, cliffs, inshore and offshore islands, tussockland, fernland, herbfield, duneland, coastline, gumlands, salt marsh, estuaries, shrublands and wetlands.

Pampas can be controlled with glyphosate, but it is so dense that repeat sprayings or the use of a motorised sprayer is often needed. Clumps can also be dug out. Seed banks reinfest bared, burnt and sprayed sites, and grazed plants resprout. Plan for increased fire risk after control. Pampas recedes as shade increases, so encourage weed replacement (planting, regeneration) as you carry out control. Follow up as needed, but do not reapply herbicide too soon after the initial treatment - wait until the plant actively begins growing again.

Auckland Checks the State of its Wetlands

The Auckland Council has continued the regional wetland monitoring project established by its part-predecessor, the Auckland Regional Council. Karen Denyer and Craig Bishop report on progress.

Two teams of four have just wound up the second season of wetland monitoring in Auckland, setting up plots in around 40 wetlands to measure change in vegetation cover and composition, walking the perimeter to listen for birds and assess the state of the edge - often where effects of drainage, stock incursion or weed encroachment first show up.

The programme, started by Dr Matt Baber with help from the NWT's EO Karen Denyer, draws largely on the national *Handbook for Monitoring Wetland Condition* produced by Bev Clarkson and others in 2004 - there's a copy on the National Wetland Trust website's publication page.

The main departures from the national methodology are driven by the regional focus of the project. As Matt explains, *this isn't about assessing the state of a specific wetland, it's about assessing the state of the entire regional wetland resource.*

Multi-tier approach

Matt developed a multi-tier approach to monitoring. Tier 1 is the broad-brush, quick 'warrant of fitness' check, based on setting up hundreds of permanently marked plots across the region (so far in forest and freshwater wetlands, with saline wetlands, dunes and other ecosystems to come later). Each plot takes a day to set up, and will be re-visited every 5 years to build up long-term data on changes in wetland health in the region. This will help answer questions like:

- Are wetlands getting weedier?
- Are new weeds appearing or changing their distribution?
- Are birds increasing with all the pest control going on?
- Is there any change in number or composition of native plants in Auckland's wetlands?
- Are some types of wetlands doing better than others?
- Are we seeing more recently fenced wetlands?

Knowing what's going on will enable the council to see if its policies, wetland protection rules, and programmes are working, or if they need to find another approach, or tackle a new threat.

Left: Waist-deep in cutty-grass, and still smiling! Michelle Dublon in a wetland on the Awhitu Peninsula.
Right: The team at work in re-constructed urban wetland, Waiatarua Reserve, Meadowbank.

The vegetation methods

The Tier 1 wetland plot is a 15x15 m square, within which a general sketch and description of the vegetation is made. A 10x10 m corner is where the handbook vegetation plot method is applied, listing each plant species and estimating the % of the plot's ground area it covers in 3 fixed height tiers (another slight departure from the handbook). The teams then subdivide the plot into 9, and in the dead centre of each smaller square place a 2x2 m sub-plot and list each species present again by 3 tiers, to obtain frequency data to supplement the % cover data. Some water quality data are also measured, and soil and foliage samples collected for nutrient analysis.

The 'handbook' methodology is likely to be applied to Auckland's Tier 2 and 3 sites - those where the council wants more regular and detailed information about particular wetlands of interest, such as the region's jewels, major restoration projects, and wetlands on regional parks.

Some findings

Already the teams have found new distribution records for some native plant species, data gratefully received by the Auckland Herbarium at the Museum. They have also found some interesting invertebrates, with one team member turning out to be a bit of a 'leech-mag'!

The data for this season are still being compiled, but last year 129 native and 102 exotic plant species were recorded in the plots, with many more species present in the vicinity, and some only able to be identified to genus. The most bio-diverse plot, plant-wise, was a wetland in the Hunua Ranges. It had a whopping 65 species present in the 15x15 m plot, 45 of them native species, with another 7 natives just outside the plot!

A number of threatened species were also found: ferns (*Cyclosorus interruptus* and *Thelypteris confluens*), dwarf musk (*Mazus novae-zeelandiae subsp. impolitus*), swamp blueberry (*Dianella haematica*), water milfoil (*Myriophyllum robustum*), spotless crake and North Island fernbird.

Wetland pressures and conditions were also scored, with a regional average from Year 1 sites of 19 out of 25 - a pretty good score. Weeds and artificial structures like culverts, stopbanks or drains were the main factors that pulled scores down. Condition at the wetland edge was on average 18 out of 25, with weeds again the main culprit, along with a lack of vegetated buffer around most of the wetlands visited. As all of the first year's sites were in parks and reserves, stock damage was not an issue.

New manager of the programme, Dr Craig Bishop, says the Auckland Council is hugely grateful to the many landowners who have opened their farm gate and allowed wetland plots to be set up on their property. He's planning on sending them each a copy of the NWT *Wet and Wild Places* book as a thank you gift, along with a copy of the data for their wetland.

If you are interested in the Auckland monitoring programme contact Dr Craig Bishop at craig.Bishop@aucklandcouncil.govt.nz.

If you want to visit some of Auckland's wetlands check out the Visiting Wetlands page on the NWT website: **www.wetlandtrust.org.nz/directory_main.html**

Fighting in the Quiet Corners

Many of our members are actively engaged in advocating for the protection, restoration and enhancement of wetlands under the Resource Management Act 1991. Forms of advocacy include making submissions on changes to regional policy statements and plans, district plans and publicly notified resource consents, always with the goal of improving the way in which wetlands are considered and provided for within these processes.

This can be a difficult task, as wetlands are subject to an enormous array of pressures and often slip through the cracks of policy, and the overlapping responsibilities of regulatory agencies. Building resilient and diverse wetland communities is vital however, and this advocacy has generated and will continue to generate more positive outcomes.

Wetlands provide habitat for critical life stages of many animals, and are the sole domains of many other shy and cryptic species that number among our most endangered. Wetland ecosystems have amazing assemblages of plants, and their unique hydrological cycles underpin their function, resilience and biodiversity. The balance in which these ecosystems sit is often fragile, and so too then, is their persistence on the landscape.

Many councils around the country have taken great strides in cataloguing their wetland ecosystems and committing to protect them from development pressures. Wetlands are threatened by invasive species, direct drainage for pasture conversion and other activities, and ongoing disturbance from nearby housing, agricultural and industrial activities and transport infrastructure. In addition to the direct effects on wetlands of development, they are also affected by activities carried out at a distance to them. Drainage near wetlands in land use conversion, intensification of dairy farming, redirection of storm-water and increased impervious surfaces all have serious implications for wetland ecosystem function, with many effects not apparent for decades. This presents a planning challenge, and requires a precautionary approach.

Planning under the Resource Management Act requires that a range of competing values are balanced against each other, and means that wetlands and their biodiversity don't always enjoy priority. Balancing of competing values invariably involves trade-offs, which are not new to environmental management. However the increasing use of compensatory mechanisms such as biodiversity offsets in New Zealand and around the world is generating very variable outcomes depending on the parameters applied to their use.

Environmental compensation is where positive actions (planting, pest management, protection) are undertaken by a consent applicant, such that the overall effects of their development project are more acceptable to the community. Environmental compensation can present an opportunity to secure additional conservation gains that are otherwise out of reach due to low conservation funding availability in New Zealand. Compensation options also increase flexibility in environmental management by providing an array of alternatives to simply not proceeding with any given proposal.

Despite positive possible outcomes, the use of environmental compensation in relation to wetlands must be approached with some caution. Risks in providing for wetlands to be damaged on a site, and compensated for elsewhere have a range of implications for biodiversity. If the compensation is not equivalent in wetland type, rarity and quality; is undertaken at distance from the site of impact and is not carried out before or at the time of impact, the adverse effects on biodiversity at a local scale can be severe. Similarly, if the loss is permanent (e.g. a wetland drained for a highway), but the compensation is temporary (e.g. 5 years of pest control somewhere else), the net effect 6 or 7 years later may well be negative.

Nevertheless, the concept of environmental compensation is gaining acceptance, and there will be growing impetus for councils to include reference to it in second-generation planning instruments (similar to the parameters found in the Proposed National Policy Statement on Indigenous Biodiversity that MfE is presently consulting on).

Members are encouraged to stay engaged in the planning process, and consider whether environmental compensation provisions that are included in district, regional and national planning instruments are likely to help New Zealand achieve our biodiversity goals as they relate to wetland environments. And, in addition, what types of provisions will generate the best outcomes.

Photograph: Awarua-Waituna wetlands in Southland – vulnerable wetland ecosystems depend on advocacy and efforts of the public and regulatory agencies to ensure their ecosystem resilience.

Marie Brown, NWT Trustee & University of Waikato PhD candidate investigating environmental compensation under the RMA.

Does advocacy work?

Remember our story in the last issue of Wet and Wild about proposals to remove 87 ha of mangroves from Mangawhai Harbour and dump spoil on a saltmarsh?

Here's what Jane recently told us: *We as submitters were all sent the result of the request for total removal of mangroves yesterday. The Commissioners decided that it is not going to happen, but said that some form of control may be looked at in the future. The dredging of the upper harbour channel was also not permitted and pipi beds came into it. I feel quite pleased that they mentioned some of our lay peoples observations. We are all thankful that it is all over, and we are hoping that all parties can get together and talk about where to go from here.'*

Read about the decision here: www.nrc.govt.nz/News/Large-scale-mangrove-clearance-rejected-/

Wetlands on the Web

How do you showcase a wetland project in the wop-wops to school children learning about the importance of wetlands? Get them on a virtual field trip of course!

The nationally important Ö Tu Wharekai Wetland Restoration Project in Canterbury's high country is only 1 1/2 hours drive from Christchurch. However, it's isolated enough that schools, particularly primary, find it hard to visit. The rugged terrain and weather in the high country doesn't help either!

Yet, three "field trips" later, over 5400 students from throughout New Zealand have "visited" Ö Tu Wharekai. The students virtually wade in swamps to learn about wetland plants like *Carex secta*, set nets to trap eels, electric fish streams, and investigate pit fall traps for geckos and skinks.

These field trips are run by LEARNZ, funded by the Ministry of Education. LEARNZ runs about 20 free virtual field trips each year.

Field trips are facilitated by a LEARNZ field trip teacher and hosted by guest "experts" - in our case DOC rangers. Classes log on to the website each morning and can download illustrated background readings, related activities, photos and almost live videos from the field, live and recorded audio-conferences, daily diaries and an "Ask-an-Expert" web board. A virtual field trip takes place over one week, but classes can access the resources at anytime.

It has been a fantastic way of getting a huge number of students engaging with the wetland, and teachers love it as it provides multi-media learning opportunities. In the new technological age, distance is no longer a barrier to learning.

Ö Tu Wharekai Wetland Restoration Project is one of the best examples of an inter-montane wetland system remaining in New Zealand, and is nationally important for wildlife.

It contains a mosaic of diverse wetland habitats nestled amongst high country tussocklands and set against the towering Southern Alps/ Ka Tiritiri o te Moana. The project includes the braided upper Rangitata River, and the 12 lakes that make up the Ashburton Lakes, along with ephemeral turfs, streams, swamps and bogs.

It is one of the three Arawai Käkäriki sites, a national wetland restoration programme run by the Department of Conservation. O Tu Wharekai is aiming to help stop the decline of wetlands through intensive management of the wetlands, researching and trialling new methodologies and raising awareness of the plight of wetlands.

Check out the introductory information and video on http://rata.learnz.org.nz/summary.php?vft=highcountrywetlandecology111 and O Tu Wharekai at www.doc.govt.nz/otuwharekai

Photograph: DOC ranger Lorraine Cook being interviewed by LEARNZ teacher Paul Millican and filmed by support crew Shelley Hersey

Wendy Sullivan, Project Coordinator
O Tu Wharekai Wetlands, Department of Conservation, Raukapuka Area Office

Natural Restoration at Te Hapua Wetlands – Kapiti Coast

When Jill Abigail and Joy Anderton made the lifestyle decision in 1999 to move from Wellington to the Kapiti Coast they needed a project that was going to fulfill them as much as their careers had done in the city. As motivated conservationists they finally found what they were looking for - a property that included a section of the Coast's ecologically significant Te Hapua wetlands.

While their wetland had been grazed and some damage was apparent, it still contained dense swathes of harakeke (swamp flax) and ferns and they were excited by the prospect of restoring it.

Joy and Jill's determination to use an organic approach whenever possible added to the challenge. That meant no weedkiller or toxins for pest control (and so a lot more backbreaking work), and eco-sourcing all their plants. They only compromised these principles a couple of times - they unfortunately needed more drastic measures for the eradication of willows, initial blackberry control and to control invasive bindweed.

In 2004 Jill and Joy were among the first of a number of landowners in the area to covenant their wetland, protecting just over 4 ha of this threatened ecosystem, more than half of their 7.3 ha property. With QEII funding support they were able to fence off the area. Additional funding from the DOC Biodiversity Condition Fund allowed them to build a boardwalk across a boggy area to carry out work deeper in the wetlands, and to plant an area of flax, toetoe and native grasses to filter nutrients seeping in from animal waste on adjacent properties.

The results of their hard work, which they say they couldn't have done without the help of many friends and volunteers, was acknowledged in 2006 with a Ballance Farm Environment Award. The award celebrates landowners who run socially, environmentally and financially sustainable projects.

The Kapiti Coast district stretches 30 kilometres from Paekakariki in the South to Otaki in the North and extends inland to the top of the Tararua Range. It is named for Kapiti Island, which dominates its west coast. It was once covered with a mixture of dense coastal forest and extensive wetlands, but much of this was cleared in the 19th century for dairy and sheep farming.

Kapiti Coast covenants are split equally between wetlands and forest remnants. Peter Ettema, QEII's field officer for the area, is impressed by the level of community involvement to protect natural places in the region. At Te Hapua just north of Waikanae, for example, the community has formed an incorporated society, The Friends of Te Hapua Dunes and Wetlands, to protect the integrity of the swamp complex, and a number have put covenants in place to secure ongoing protection of wetland areas on their land. He says the Greater Wellington Regional Council and Kapiti Coast District Council both provide excellent support in establishing and managing covenanted land on the Coast.

There are 56 registered covenants in the Kapiti area covering around 310 ha. Another 13 covenants have been approved and now await the registration process. They add another 235 ha to the total area of formally protected open space on the Kapiti Coast. Wetland areas are protected in 34 covenant blocks on the Coast.

What is eco-sourcing?

Eco-sourcing is sourcing native plants from local seed for local use. It maintains natural plant distributions and gene pools in a given area.

Why eco-source?

Local plants are more likely to survive because they are suited to local conditions. Sometimes plants that aren't sourced locally can become invasive.

Eco-sourcing will help preserve the distinctiveness or character of vegetation of an area. For many species in New Zealand the appearance, physiology and genetic make-up vary considerably throughout their range. It ensures that plantings to restore native vegetation are as natural as they can be.

Where to go for help

Seek advice from your local QEII field officer or other conservation experts about eco-sourcing. The internet provides a lot of information on eco-sourcing and nurseries that can supply eco-sourced plants for your restoration project.

Anne McLean, Communications Officer, QEII National Trust. Reprinted from *QEII Open SpaceTM Magazine* **Photographs by Jill Abigail and Joy Anderton Left:** Jill Abigail and Joy Anderton in their wetland **Middle:** The wetland at the beginning of the weed control stage and with the new plantings well established. **Right:** The wetland today.

World Migratory Bird Day

Join others around the world and take part in World Migratory Bird Day on May 14-15, 2011 by organizing birdwatching events, educational programmes, lectures, art exhibitions and other public events; however you decide to participate, your contribution will help make this campaign a success!
www.worldmigratorybirdday.org

Christchurch: a city haunted by its environmental past?

By Cath Knight on 26 Feb 2011

It is with both horror and immeasurable sadness that I contemplate the tragic consequences of the massive earthquake on the city that I lived in for 8 years, and which I still regard with immense affection. I cannot even begin to imagine what life must be like for its residents today, especially those who have friends or family who have perished.

No one could ever have contemplated this level of devastation to a city that was so established - historically, and seemingly, structurally. But some clues to what has led to this unprecedented scale of destruction may be found in its environmental past.

Christchurch was one of New Zealand's first cities: the first pioneering settlers made their home there in the 1840s, but it was in the 1850s that organised settlement began, with the "first four ships" from England arriving at Lyttelton Harbour.

The founding fathers of Christchurch showed great foresight, laying out the city in a grid pattern, with numerous parks, squares, and tree-lined avenues and waterways. No expense or labour was spared in the construction of the city's iconic buildings either: many of these are the most beautiful examples of stone masonry in New Zealand, and make the city the special place that it is.

But much of that - literally - came crumbling down on the 22nd February 2011, in what was technically "only" an aftershock of the September 2010 quake.

This time, the epicentre was in Lyttelton Harbour - much closer to the city than the September quake. But it seems that much of the damage has been concentrated either in the inner city or along the city's many waterways. The root of much of this damage is liquefaction, a phenomenon whereby soil loses its strength and cohesiveness and takes on the constitution of liquid, usually in response to a major earthquake. A key factor which determines the extent of liquefaction is the depth of the water table.

So, why would Christchurch be more prone to this than other cities? Originally, the area that is now Christchurch was an extensive coastal wetland, thickly forested with matai and totara, and other swamp forest species. However, much of this forest was burnt off (whether deliberately or accidentally, we do not know) by the earliest inhabitants of the area, the so-called Moa-hunters (or Archaic Phase Eastern Polynesians), who arrived in the area possibly around 1000 AD.

By the time Europeans arrived in the 19th century, there were only isolated patches of forest, with a mixture of tussock grassland and swamp making up most of the area. One of the earliest descriptions of what was to become Christchurch is that of Captain W.B. Rhodes, whose barque Australian visited Port Cooper in September 1836. He climbed the nearest saddle of the Port Hills and saw a vast grassy plan with two small patches of forest (Riccarton and Papanui), and observed "All the land that I saw was swamp and mostly covered with water."

For that reason, as Geoffrey Rice points out in "Christchurch Changing", the earliest European settlements were on Banks Peninsula, rather than down on the flats. But eventually, over the course of the subsequent decades, the settlers succeeded in draining the wetlands for farmland and settlements, and channeling the many waterways into two more "orderly" rivers: the newly named "Avon" and "Heathcote" (known

as “Otakaro” and “Opawaho” to the Maori of the area). Their efforts to establish a vibrant, thriving and attractive city were apparently successful, with Christchurch becoming the second largest city in New Zealand, and its growth showing no signs of abating.

And so it appeared that successive generations’ efforts to subdue and control the natural environment that formed the foundations of Christchurch City was complete. But after a century and a half of more or less being kept under control, that nature has shown itself - combined with formidable seismic forces - to be far from subdued.

Perhaps our sense of confidence and self-assurance in our own powers over nature are less justified than we thought - with consequences that are more tragic than anyone could have possibly imagined. I hope there will be lessons here for all who will be part of creating a vision for our cities of the future - cities that are not only functional and attractive, but also enduring and safe for those who live in them.

Incidently, I also lived in Osaka, Japan, when the Great Hanshin Earthquake hit the port city of Kobe in 1995, killing 6,434 people. In this earthquake, one of the areas that sustained the most damage was Rokko Island, an artificial island created literally by scooping earth from nearby hills and dumping it into the sea. This island also experienced intense liquefaction as the soil from which it was constructed loosened up and moved, destroying buildings and infrastructure.

This article has been reproduced with permission from Dr Cath Knight. The original is available on the website Envirohistory NZ, along with many other interesting articles on the relationship between human beings and the natural environment. Cath has a particular passion for wetlands and lowland forest.

http://envirohistorynz.wordpress.com/

Photo top: The Provincial Council Buildings, on Durham Street (with the Avon River in the foreground). The Provincial Buildings were built between 1858 and 1865, and were designed by Benjamin Mountfort, Canterbury’s leading Gothic Revival architect.

Photo bottom: The Provincial Buildings today. It is unclear whether they - or many other of the city’s historic buildings damaged in the quake - will be able to be rebuilt.

The Dollar Value of Wetlands

Wetlands are worth more to us than many people realise. They may be wet, boggy, inhospitable places, but they’re part of our natural wealth, providing a variety of natural or ‘ecosystem services’ that we often take for granted. It’s been estimated that wetlands across the globe provide us with services worth trillions of US dollars every year - entirely free of charge.

What is an ecosystem service? It can be the provision of any natural resource taken from an area for free and sold for profit. Local wetland resources include flax, sphagnum moss and eels, all of which have been harvested for the cost of labour and transporting them to a market, and were otherwise free in that no initial investment went into planting or raising them. If the harvest is managed sustainably, it will continue to be an ongoing source of income.

Another ecosystem service is where a resource is used as a public utility, for example, Lake Kaniere as the water supply for Hokitika. Apart from the cost of piping it to town and treating it to kill bacteria, the water comes free from a natural dam bulldozed into place by a glacier, and topped-up by regular rain.

Water-based recreation and tourism are two other important ecosystem services provided by West Coast wetlands, which are both free and generate income.

Possibly the most valuable service that wetlands provide is flood protection.

For example, kahikatea forest and flax swamps on the Kowhitirangi flats historically stored water in times of heavy rain, like a giant sponge. The water was later released slowly into the Hokitika River, thus reducing peak flood levels.

What is the economic value of ecosystem services? The answer isn’t obvious, as it can be much more than the dollar value of the moss or the eels.

Sometimes the value can be estimated as the cost of replacing the resource or patching up the effects of losing it. For example, if the flood storage service is reduced by draining a swamp, the cost can be measured by adding up the loss of productive land that may be eroded downstream and the extra stop banks needed to protect downstream assets. This, at least in part, was the value of the flood-protection services of the original swamp.

Often, we don’t find out how useful things are until we’ve lost them. Wetlands are not just about wet feet - they’re definitely worth hanging on to.

Dave Eastwood, DOC biodiversity and assets programme manager, Hokitika

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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