

Wet & Wild

In the face of poverty ... wetlands are lifelines

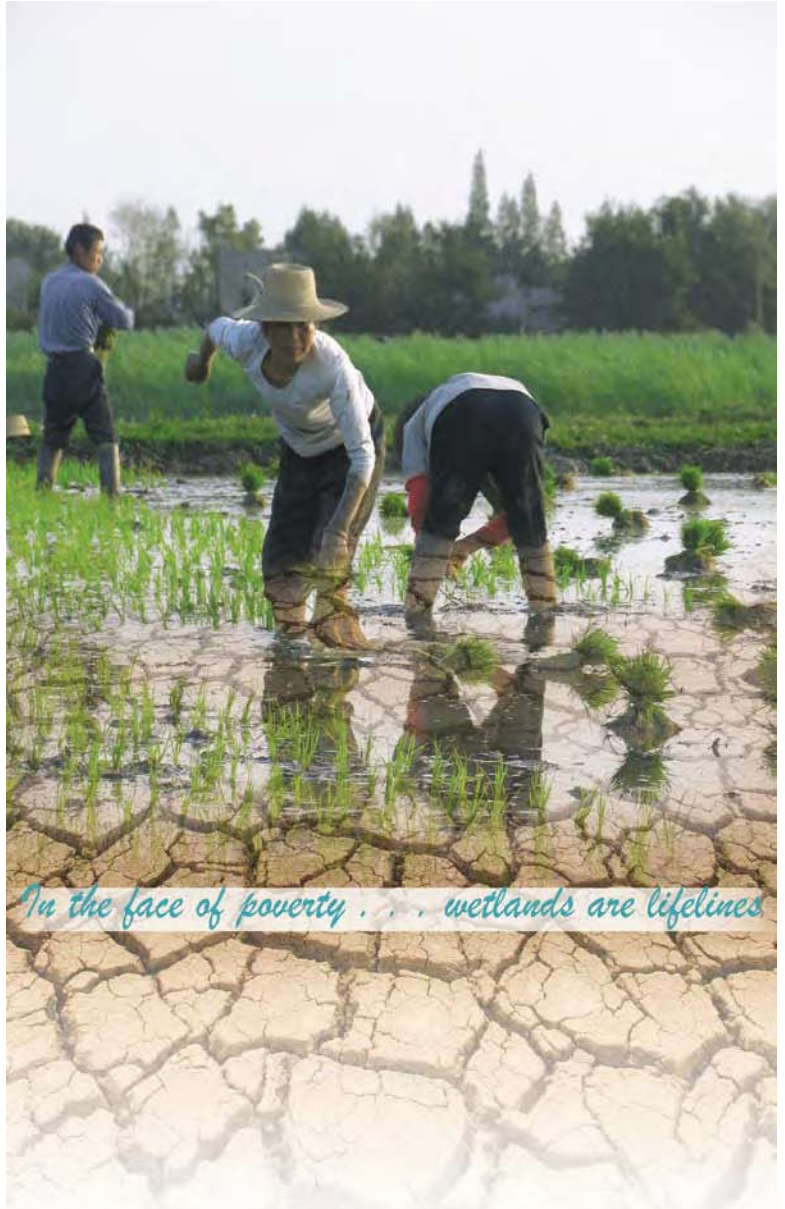
The Ramsar theme for World Wetlands Day 2006 is 'Wetlands as a tool in poverty alleviation', which is closely linked to the theme of its 9th Conference of the Contracting Parties (COP) - 'Wetlands and water - supporting life, sustaining livelihoods'.

The conference focuses on how wetlands can be a vital lifeline for the poor. This is especially true for the rural poor, who comprise three-quarters of all poor households worldwide, and where wetlands can be a primary source of rural income, vitally important when other sources of income fail. In New Zealand we do not have the same issues in terms of economic poverty, and so we have adapted the theme for our WWD events to that of *Wetlands as Lifelines* with the subtext that they are tools for sustainability.

Wetland ecosystems are part of our natural wealth. A recent assessment of the dollar value of our natural ecosystems estimated them at US\$ 33 trillion, with the same study estimating the global value of wetland ecosystems at an amazing US\$ 14.9 trillion, 45% of the total. Global freshwater consumption has risen ten fold since 1900 - more than double the rate of population growth. One third of the world's population today lives in countries already experiencing moderate to high water stress. By 2025, two out of every three people on Earth may well face life in water stressed conditions.

The ability of wetlands to adapt to changing conditions, and to accelerating rates of change, will be crucial to communities and wildlife everywhere as the full impact of climate change on our ecosystem lifelines is felt.

A large number of agencies come together to hold events to mark WWD, including Fish & Game NZ, the lead agency for the events, the Department of Conservation, Royal Forest and Bird Protection Society, Iwi, Regional and District Councils, and the National Wetlands Trust.



Wet & Wild is the National Wetland Trust's quarterly publication. We seek contributions, though published at the editor's discretion. Each issue will be available on www.wetlandtrust.org.nz within a month of publication, where they can be downloaded as pdfs. Submit articles to slindsay@fishandgame.org.nz. A grateful thanks to Mighty River Power for sponsoring **Wet & Wild**.

Contact the NWT on www.wetlandtrust.org.nz





Wetlands as Lifelines

*National WWD event on
Saturday 4 February 2006 in the Waikato*

9.00am Meet at the Rangiriri Carpark, opposite the site of the National Wetlands Centre, to depart on the field trip taken by Keith Thompson, wetland ecologist by 9.15am. Bus transport provided from the carpark.

1st stop (10.25am) Fish & Game owned Flax Block to commemorate the 10th anniversary of the work that the Fish & Game council had done at the Flax block, a major wetland rehabilitation project, which demonstrates the role gamebird hunting plays in creating, maintaining and restoring wetlands.

2nd stop (11.45am) Kopuatai Peat Dome - a indigenous restiad vegetation type, which is unique on a global scale (hence its Ramsar status) that also plays an important role in flood control and protection for the Piako and Waitoa catchments. We walk 1.3km along the stopbank to reach the viewing area where we will also have a packed lunch. Transport provided for those unable to do the walk.

3rd stop (1.20pm) Toilet stop at Ngatea.

4th stop (2.20pm) The amazing shell banks of the world-renowned Miranda Chenier plain. Here we view thousands of shorebirds, which feed in the rich mud of the Thames Estuary Ramsar wetland. Talk also by Keith Woodley, Miranda Shorebird Centre, on how wetlands, such as Miranda, can become tourist destinations.

5th stop (4pm) Peter Buckley's farm where Peter will discuss how landowners can achieve great land management alongside wetland habitat for wildlife.

Fish & Game will also launch the 2006 New Zealand Game Bird Habitat limited edition collectors' stamp at Peter's farm. Proceeds from the sale of this special stamp are used to fund further development and enhancement of New Zealand wetlands.

Returning to the Rangiriri carpark by bus by about 5.30pm. A packed lunch is provided, but please bring food for morning and afternoon tea as well as water or juice as it can be a long thirsty day. And be prepared for hot as well as cooler weather.

To register to attend the national WWD 2006 event, please contact Shonagh Lindsay, Public Relations Advisor, Fish & Game NZ, on 09 849 3994 or slindsay@fishandgame.org.nz

News

GRANTS

Thanks to Gordon Stephenson's tireless work the NWT has received the following grants towards the costs of producing working drawings for the National Wetlands Centre:

- \$45,000 from Environment Waikato's Environmental Initiatives Fund
- \$5000 from the Department of Conservation's Community Conservation Fund
- \$3,500 from the Waikato District Council's Rural Discretionary Fund

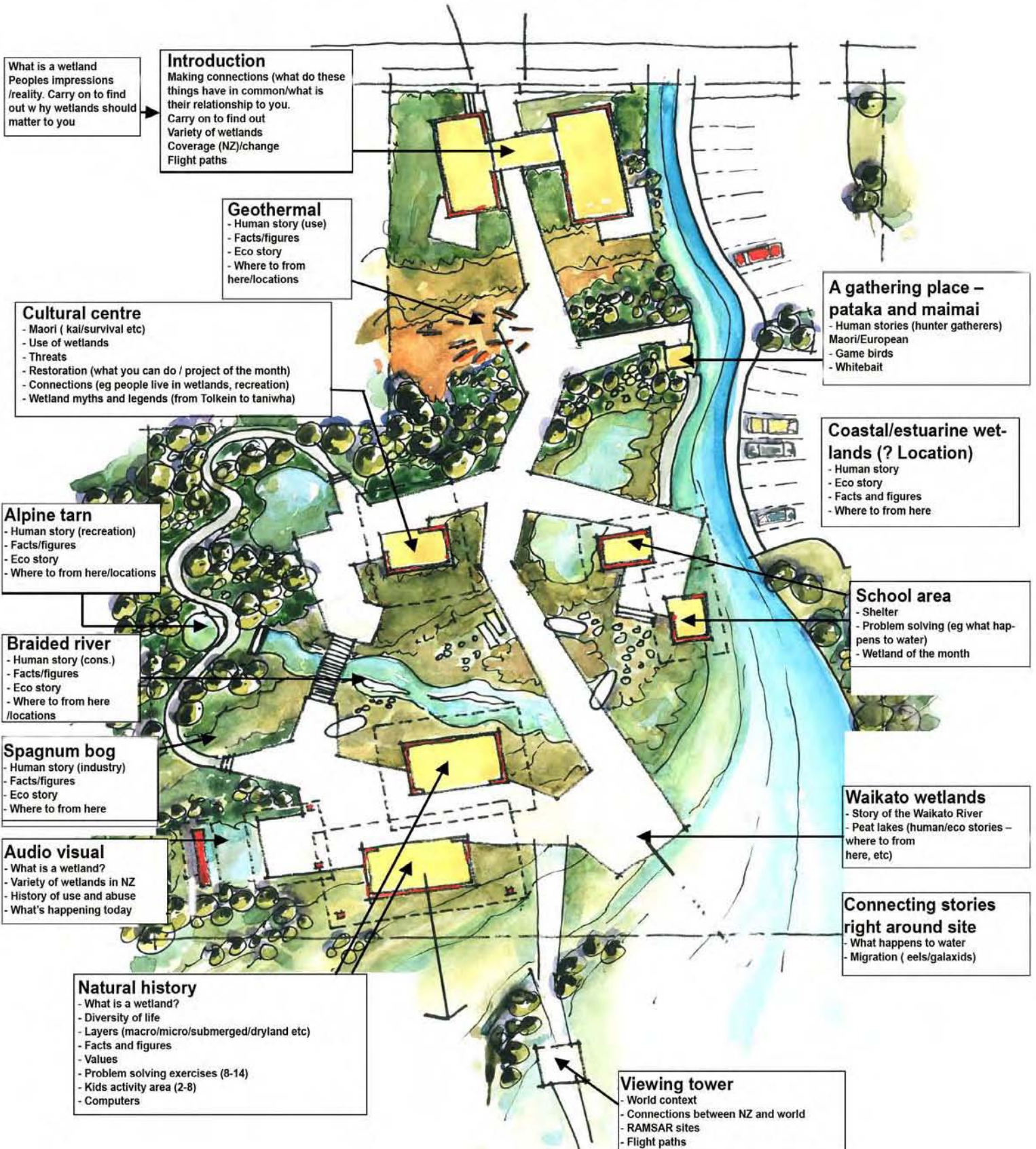
And \$5000 from the W N Pharazan Trust.

NATIONAL WETLANDS CENTRE

So far the Centre's ongoing development has focused on further developing the overall fundamentals of the Centre scheme. These include the concept of slowing people down, and making them "linger" as they move through the Centre's buildings and landscape by using such design ideas as:

- A loop to enable a circulation
- Formal and informal paths
- Geothermal area close to entry
- Maimai as part of the Waikato theme
- Totara grove
- Kahikatea swamp in the wetter area
- Sphagnum moss
- Alpine tarn
- Braided river and water fall
- Swing bridge for variety of experience
- Audio Visual with projection outside (over pond, bog, quiet and shaded)
- Restiad and sporadanthus bog in the Waikato wetlands area
- School students collection point
- A viewing platform possibly located off site so closer to Lake Kopuera so as to view the lake and wetland environments as well as the Centre and its many dimensions

Connections – why wetlands matter



Celebrating Success!

2006 Wetland Restoration Forum

February 23-25 2006 at the University of Waikato, Hamilton



The 2006 Wetland Restoration Forum will be a highly practical, participant driven event focused on knowledge exchange, training and networking. A joint venture between the National Wetland Trust, Environment Waikato, NIWA, Landcare Research, and the University of Waikato, it will bring together landowners, iwi, policy makers, wetland scientists and people committed to wetland biodiversity from all over New Zealand.

The first wetland forum was held in February 2004 as a direct response to the need to bring together wetland practitioners across the country to discuss and promote wetland restoration. It attracted 110 participants, 42% from community groups and 58% from government agencies and research organisations, which is not surprising given that wetland restoration has been growing steadily over the last 10 years. For example, 25% of projects receiving Biodiversity Condition Funding in the last funding round were on wetland restoration.

The key objectives of the Wetland Restoration Forum are:

1. The active and practical exchange of knowledge and practice of wetland management and restoration between participants drawing on a wide spectrum of experience.
2. The documentation and analysis of best practice restoration techniques from case studies of wetland restoration presented at the Forum. The analysis will inform the development of robust restoration guidelines and tools to speed up wetland recovery providing significant biodiversity benefits. This was a critical gap identified at the last forum.
3. Raising awareness amongst the general public of the values of wetlands.
To achieve the objectives of the Wetland Restoration

Forum the programme has been designed to maximise information sharing through both formal and informal components. These are summarised below:

Plenary sessions

These 2 sessions will bring together all participants to hear a key international speaker (Professor Tim Moore, McGill University, Canada) and national speaker (Associate Professor Bruce Clarkson, University of Waikato) discuss the forum theme of 'Celebrating Success'.

Training workshops

These will be practically focused with examples of techniques and where possible will involve hands-on training. Workshops will be led by invited wetland practitioners and will cover weed management, wetland revegetation, wetland hydrology and species management.

Technical sessions

These will provide the opportunity for participants to share their knowledge by presenting information on wetland restoration. Community groups and govt agencies will be encouraged to speak about the successes of their wetland restoration projects alongside scientists discussing their latest research results.

Soapbox session

An impromptu / informal session that encourages anyone to speak for up to 5 minutes to promote

- * wetland restoration work they are doing
- * educational materials they have produced
- * other wetland restoration services.

Poster/Displays session

These will be on display throughout the symposium in the foyer where morning and afternoon teas and lunch will be held. A session where the posters/displays will be manned will also be included.

Community outreach session

An evening talk by David Bellamy on the forum theme of 'Celebrating Success' that is open to any member of the public. This will be immediately followed by a panel discussion where wetland experts will respond to questions from the public on wetland issues.

Fieldtrips

A chance for participants to visit showcase projects in the Waikato region where successful wetland restoration has taken place. These fieldtrips will involve visiting the following sites:

- 1) Lake Okaro, Rotorua. Issues: wetland restoration, pest fish eradication, lake algal blooms
- 2) Whangamarino Wetland, Lake 'B'. Issues: restoring hydrological regime, willow control, wetland restoration.

Tentative Programme

Thursday February 23

8:00 - 9:00 am Registration

9:00 - 9:30 am Opening by National Wetland Trust representative (Gordon Stephenson) and Environment Waikato councillor, Jennie Vernon (TBC)

9:30 - 10:15 am Key note address
Professor Tim Moore, McGill University, Canada: An international perspective on wetland restoration

Morning Technical sessions: restoration case studies and research

Afternoon Workshops: weed control, species management, wetland hydrology

Poster session

Evening Public Forum at Waikato Performing Arts Centre, Waikato University. Address by Dr David Bellamy

and discussion by panel experts comprising Dr Bellamy, Professor Moore, Tony Roxburgh.

Friday February 24

9:00 - 9:45 am Key note address

Assoc. Prof Bruce Clarkson, Waikato University. A national perspective on wetland restoration and involvement of community groups

Morning Technical session continued

Afternoon Workshops continued

Soapbox session

Evening - Symposium dinner (suggested \$50 - \$70)

Saturday February 25

All day **Field trips:**

- 1) Lake Okaro/ Rotorua
- 2) Whangamarino/ Lake 'B', Lower Waikato

Costs

Corporate members: \$175 for symposium, dinner and field trips extra (dinner likely to be about \$50 and field trip \$40).

Non-corporate members: \$75 for symposium, dinner and field trips extra (community members, students, etc are subsidised by the symposium).

Registration and Information is via the National Wetland Trust website: www.wetlandtrust.org.nz

Restoring the Ocean to Health: riparian restoration

Our activities on the land are dramatically effecting the vital functioning of the ocean. Up to 80 percent of marine pollution is thought to be from urban, industrial, and rural sources. The ocean is essential for carbon dioxide absorption from the air; buffering the atmosphere against the extremes of heat and cold; and evaporation, producing the fresh water that sustains us. Through protecting and restoring our water ways (riparian zones) we can reduce the degrading effects of this pollution.

Many of our land-based activities have their ultimate effect in the sea. Waste and run-off from roads carries oil, petrol and other chemicals down stormwater drains into the sea. Other sources of pollution include leakage from industrial sites, leaching from waste disposal areas and increasing sediment loads from soil erosion. It has been estimated up to 390 million tonnes of sediment are washed into our seas every year.

Rural areas contribute a lethal cocktail of animal defecation, fertilisers, herbicides, pesticides, fungicides, insecticides and other chemicals. This problem has grown exponentially in recent years through more intensive farming requiring increased amounts of fertiliser. In the year ending 2002, for example, 770,000

tonnes of nitrogen fertiliser were applied to our farm land, more than 10 times the amount used in 1983.

The increased stock carrying capacity for fertilised pasture may be great news for the farmers, but it exacerbates another problem - animal waste. In the catchment of the Waikato River, for example, there are some 3000 dairy herds and their combined effluent is equivalent to the human waste of 5 million people.

The effects of all this terrestrial run-off into the ocean are wide and numerous. Nitrogen from fertilisers cause eutrophication and hypoxia (lack of oxygen); blooms of toxic algae which affect shellfish and human health; and the invasion of nitrogen loving weeds.

Increased turbidity causes problems for marine life by damaging plants and animals through abrasion and reducing light penetration restricting photosynthesis. Sedimentation reduces the variety of substrates available; removes predator-hiding places and prey refuges; clogs fish spawning gravels; and reduces food quality, particularly for grazers.

So how can we control this pollution that is pouring into our seas? Fortunately progress is being made. The 2003 Dairying and Clean Streams Accord contains a number

Continued on Pg 7

David Bellamy to open \$million walkway



When considering who would be the most prestigious and eminent person we could possibly get to open our ambitious, albeit small, walkway we immediately thought of Professor David Bellamy, hoping it would be compelling enough to entice him to Huntly.

Bellamy replied to our invitation with the response that: "If our walkway was anywhere as good as indicated he would be honored to be invited and to open it."

And so on February 25th 2006, the Lake Hakanoa Walkway will be formally and officially opened by David Bellamy, accompanied by his wife Shirley, and with the Maori Queen, Dame Te Ataarangikaahu, in attendance.

Not to miss such an opportunity, we have also planned a range of activities for his visit and walkway opening. They are as follows.

Thursday (February 23rd) he meets with key Kaumatua of Waikato Tainui before a visit to Rakaumunga School where a number of school students from surrounding schools gather to meet him. He will then take a private walk around the 3.62 km Lake Hakanoa Walkway with Keith Thompson and Wayne Bennett, escorted by Sheryl Staines, environmental chairperson of the Lake Hakanoa Walkway committee. That same evening he will be guest speaker at a Wetlands symposium being held in the Trust Waikato Arts Centre at Waikato University (see previous article).

Friday 24th February he visits Huntly College and Kimihia Schools, with students from other schools in the area also there to meet him. On that day he will also meet with environmental staff from Genesis Power


and Solid Energy. In the afternoon a group of Huntly locals and supporters of the Lake Hakanoa Walkway, at the invitation of Mayor Peter Harris, have an informal meeting with Bellamy chaired by Keith Thompson.

Friday evening a formal dinner will be held at Cooks Landing, subscribers to 'Wet and Wild' are invited to contact the writer at bcurle@xtra.co.nz if they wish to purchase a ticket. Tickets will be restricted to 120 in total with 10 people per table. The cost of a table is \$900. The restaurant will provide four bottles of wine to each table as part of the ticket purchase price along with a superb meal. Bellamy will be the only speaker at the dinner event, and during the evening a lucky draw will be held with the prize being some of Bellamy's French Merlot courtesy of our guest. The evening commences at 6:30 pm.

Saturday 25th February at 5:30 am there is a private unveiling and blessing of the Lake Hakanoa Walkway by local Tainui dignitaries at its entrance. A small Whare at the walkway's entrance will have four panels unveiled: two of which have a painting by local artist Valeta Mathias, depicting her presentation of Lake Hakanoa through Maori eyes. A third panel details the history and significance of the lake written in Maori and translated to English on the same panel. The fourth and final panel details the 13 zones the walkway is divided into and includes their features.

Later that morning Bellamy and his wife attend a market day in Huntly where at 11 am Bellamy will be presented with a gift by Business Huntly chairman David Layne in appreciation of his visit to Huntly. At 12:30 pm (time to be confirmed) the Bellamy's will meet at the Green Cathedral, a significant section of the walkway,





and board a waka with Dame Te Ataarangikahu and other dignitaries to be paddled to the Walkway Entrance for its official public opening at 1pm. At the opening ceremony's conclusion Bellamy, escorted by Mayor Harris, will invite all there to follow him in 'pied piper fashion' for a walk around Lake Hakanoa Walkway where he will stop at each of the 13 zones and give his interpretation of what can be seen. Afternoon tea will be available at its end. (Details to be finalized).

Lake Hakanoa Walkway

To date the funds raised to establish the walkway have passed \$520,000, however with 'work in kind' and volunteer efforts the true cost is very close to \$1,000,000.

Zone 1 - Walkway Entrance, is depicted by a winding paved path, representing the Waikato river, which leads to two large Pou with a small whare attached and two koru shaped brick walls attached to the sides.

Zone 2 - The Huntly College Native Tree Reserve has 40 native trees, numbered and matched to a large billboard showing their Latin name, common name and sponsor's name. Although still in their infancy the trees are very popular with school groups.

Zone 3 - Seibu Bunri Gardens named after a Japanese school, which is to preparing a landscape architect-designed Japanese Garden that follows the recently released plan.

Zone 4 - McMillan Walk named after a prominent local identity and horticulturist. Within its 200 metres everything has been left in its natural state.

Zone 5 - The WEL Energy Trust Global Gardens are a 350-metre stretch of scalloped gardens from nine different countries around the world.

Zone 6 - Environment Waikato Bog Garden & Wild Life is a 600-metre stretch of wetlands in which its pre-existing stretch of willow has been replaced with some 1200 appropriate wetland species.

Zone 7 - Palm Beach, although distant from Hawaii, has 60 Palm trees, including six eight-metre high Queens with other species there to provide balance. It has a bridge at its start, donated by the local Lions Club, that has two spectacular interpretation boards displaying the 26 most common birds and fowl in the lake.

Zone 8 - is a developing bog garden prepared entirely by Noel McMillan and has a 120-metre boardwalk through its centre.

Zone 9 - A Perennial Garden, will be the most colourful area of the walkway. Its 120-metre semicircular garden backdrop is a metre high dropping to 150mm at the front. Its width of five metres will encompass a vast number of annuals planted to a theme appropriate to the area and walkway.

Zone 10 - is an as yet unnamed 'Maori' area, to be named before February. Its layout consists of ponds, native shrubs and three koru shaped and chevron style paths. All paths meet in the centre where a Mauri stone will be placed to symbolise the centre of the umbilical cord. Later four interpretation boards will display New Zealand's early history from a Maori perspective and how the tribes, hapu, and iwi of today have developed from that. Local Maori are building seven large Pou, which will be erected at the lake edge to represent the first seven waka that arrived in New Zealand around 1350.

Zone 11 - The Ponga Grove has the Green Cathedral as its flagship. It is regularly used for weddings and Church services as well as other meetings. It has seating for 170 and contains a lectern, altar and registration table consisting of three Glenbrook rocks and macrcarpa tops. There is a car park for 40 cars adjacent to the Cathedral. The rest of the Ponga Grove has a large area of afforestation.

Zone 12 - Cabbage Tree Domain is a cabbage tree dominated wetland area reinforced with the addition of 150 Cabbage trees.

Zone 13 - Huntly Domain which has a short open space going past a Lion Club Band Rotunda to the Walkway Entrance.

By Brian Curle, Lake Hakanoa Walkway Committee

Restoring the Ocean to Health cont:

of plans, including: keeping dairy cattle away from streams, rivers and lakes by fencing off riparian access; building bridges over frequently crossed streams and water courses; treating and discharging dairy effluent; and monitoring the application of nutrients to crops and pastures to minimise losses. Many local councils have now begun recognising and developing riparian zones. The Sustainable Management Fund defines these as "three dimensional zones of direct interaction between terrestrial and aquatic zones".

Planting of these riparian zones with native plants and fencing off water ways to prevent stock trampling vegetation and defecating directly into streams can improve water quality dramatically. Water clarity improves, weed infestations are minimised and, with shading, the cooler water temperatures are better for fish. The increased vegetation along streams minimises bank erosion reducing the effects of floods and the subsequent sediment load washed out to sea.

The improved water quality and enhanced terrestrial and aquatic environment from adequate riparian management can also lead to economic benefits to farming, aquaculture and tourist industries.

By Derek Paterson (Source Department of Conservation)

ABCD Flax Block Rehabilitation - Ten Years On

World Wetland Day celebrations in the Waikato next year include a brief stop to view land once part of the North Island's early flax milling industry and now valuable wetland habitat for waterfowl and non-game species alike.

Located between Morrinsville and Ngatea on the Hauraki Plains, the Flax Block is a seasonally flooded swamp of about 810 hectares, which following its early flax milling history gradually evolved into a wetland holding thousands of ducks able to hide up in its willow-choked areas throughout the game season. However, as part of the lower Piako Flood Protection Scheme, it also came under considerable pressure from the farming community to be drained and utilised for grazing.

Fortunately, Gordon Robinson, long involved with the area, and Steve Chapman, Thames Fish & Game club, had another vision for the block. Bringing together local hunters they successfully lobbied the Department of Conservation (DoC) to form the Upper Piako Management Association to undertake management actions in the wetland. And as the block was public land under DoC's stewardship as well as being gazetted as a Wildlife Management Reserve, DoC was able to offer Fish & Game the opportunity to rehabilitate the area for wildlife with a focus on waterfowl and game species.

So ten years ago Fish & Game began to improve and maintain the Flax Block's wetland habitat with a programme incorporating maintenance of water level regimes, creation of open areas within willow-choked sites, and advocacy of wetland management as a legitimate land use. With a grant of \$50,000 from the Game Bird Habitat Trust Fund they were able to undertake some of the investigatory and physical works. Local hunters provided a good understanding of how the water regime functioned within the wetland along with the options needed to enhance gamebird habitat and recreational hunting. And while considerable 'ground-



truthing' and investigations were necessary, this local input provided direction to guide restoration goals.

Auckland/Waikato Fish & Game also contributed around \$10,000 along with several hundred staff hours put into the project by Phil Teal (Wildlife Management Officer). This ensured that all information and regulatory requirements were met, and that project management was co-ordinated to ensure design, logistical, and safety requirements were met. The project's main objectives were to increase diversity of habitat especially for waterfowl as well as maintaining hunting opportunities. To achieve this they focused primarily on refining its water level management through:

- Undertaking an accurate survey of ground levels;



- Topping up the high ground in the central area of the site to establish/confirm separate management units;
- Clearing willows to establish an improved passage for water;
- Establishing a water control structure to manipulate water levels;
- And creating open water areas by removal of willows

remarkable. The results of this GPS survey were also used in modelling undertaken by the Regional Council for the lower Piako River for different rainfall/flood scenarios. It confirmed Fish & Game's contention that the Flax Block did not materially affect river water levels either in the immediate vicinity, or distances upstream.

A "water passageway" was created in the low areas of the wetland by clearing a 10m wide line of willows. This provided boat access for hunters and allows the wetland water levels to be manipulated relatively easily.



Phil Teal, Fish & Game Officer, Auckland/Waikato, and team setting transects in the ABCD Flax Block located between Morrinsville and Ngatea

Before proceeding with confidence Fish & Game had to undertake an intensive survey of ground levels in the areas, which meant establishing several 1.3km to 2.5km transects throughout the block to gain enough information to reliably manage the water level regime. Constructed on very difficult terrain using a digger unit, they had the dual purpose of establishing possum poison and trapping lines throughout the wetland (the Animal Health Board made a contribution to their costs).

A GPS (Global Positioning Satellite) ground survey of the up to 3km transects at 50m intervals, as well as a large number of supplementary readings taken within and around the wetland site. This was undertaken to determine: the position of the water passageway course to coincide with the low points of the wetland and the most appropriate water level regime.

Back in 1996, this GPS survey was absolute state of the art technology, and achieving an accuracy to 5cm in the transects in such difficult terrain was truly

An integral part of the project was the construction of a water control structure to manipulate water levels within the block via the water passageway. The design, though relatively simple with sheet piling and wooden planks to maintain 'micro-management' of water levels, allows floodwaters to escape easily, water to enter the wetland easily for flushing, and also the management technique of dropping water levels for "draw down" of the ponds to ensure their sustainability. A total of 16 open areas were created, each approximately 100m by 60m, which were opened to public ballot in late February 1997.

While the eastern side of the wetland has benefited greatly from the project, the western side continues to be compromised by Flood Control Scheme provisions, which maintains the water level regime below a preferred level. Despite intense lobbying in 1996 by some upstream landholders to essentially drain the block, the concept of wetland management being a valued land-use was reinforced, and it incorporated wetland values into flood management protocols for this river.

Ten years on, this wetland project still remains a testament to the active conservation measures of hunters who volunteered their time as well as the dedication of Fish & Game staff to bring the project to fruition. Without the vision of hunters such as Gordon Robinson, the Flax Block wetland may still be a willow-choked site with few hunting opportunities. Today, however, the Flax Block provides hunting opportunity for scores of hunters, and has opened up wetland habitats that allow waterfowl and non-game species to flourish.

By Phil Teal, Fish & Game Officer, Auckland/Waikato



RESTIAD BOG DEVELOPMENT AND NUTRIENT DYNAMICS OF THE DOMINANT SPECIES

Vegetation and peat in lowland restiad (dominated by Restionaceae) raised bogs on North Island (Waikato region) and Chatham Island, New Zealand, were sampled to investigate the main environmental controls of pattern and change. Vegetation classification based on a chronosequence of Waikato restiad bogs revealed a sequence from sedges, through *Empodisma minus*, the main peat-forming restiad, to phases dominated by a second restiad, *Sporadanthus ferrugineus*.

The sequence paralleled temporal successional patterns and was used for interpreting plant-nutrient dynamics along a successional gradient. As succession proceeds, von Post (an index of peat decomposition), total P, total N and % ash in peat decrease. *Empodisma* was considered to be the key species in restiad bog development. It is tolerant of a wide environmental range, establishing early in minerotrophic wetlands to initiate restiad bog development, and persisting through to late ombrotrophic phases.



Sporadanthus traversii

influence and long history of sea-bird nutrient inputs.

Nutrient responses in the heath and restiad components of the bog were compared by measuring plant ^{15}N natural abundance across N and P gradients. Heath shrubs revealed considerable isotopic variation (-2.03 to -15.55‰ for *Leptospermum scoparium*), with foliar (^{15}N strongly positively correlated with P concentrations in foliage and peat. In contrast, restiad species revealed little isotopic variation, with *Empodisma* and *S. traversii* having (^{15}N levels around 0‰, and *S. ferrugineus* being significantly more depleted (mean -4.97‰).

On Chatham Island, the ecological role of *Sporadanthus traversii* in restiad bog development is similar to *Empodisma* in Waikato, being the main peat former and occupying a wide environmental range. Peat under *S. traversii* had significantly higher total N, total K, available P, bulk density and von Post, and lower pH than Waikato peats under *S. ferrugineus* or *Empodisma*. This was attributed to a strong oceanic



The differences in isotopic signatures between heath shrubs and restiads were linked to contrasting nutrient demands, acquisition mechanisms, and root morphology. *Leptospermum* shrubs on low nutrient peats were stunted, with low foliar %P and high N:P ratios, suggesting they were P-limited. The concurrence of (^{15}N depletion and %P in plant tissues suggests N fractionation is promoted by P limitation. In contrast, the constancy in (^{15}N of the restiad species through the nutrient gradients indicates these may not be P-limited.

The contrasting (^{15}N signatures of co-habiting *Empodisma* and *S. ferrugineus* in late successional bogs suggest the species are accessing different sources of N. *Empodisma* has a thick layer of cluster roots overlying the deeper *S. ferrugineus* roots, and would be better positioned to intercept aerially derived N. The hypothesis that this root disposition allows *Empodisma* to preferentially access the primary N input from rainfall was tested using a ^{15}N -enriched tracer.

At plots co-dominated by *Empodisma* and *S. ferrugineus*, 1.6 mmol m⁻² of 99 atom % excess ^{15}N as $(\text{NH}_4)_2\text{SO}_4$ was applied to the peat surface, followed by deionised water, simulating a rainfall event of 34 mm. After 5 hours, cores were harvested and analysed for ^{15}N .

Approximately 90% of the recovered isotope was in the upper *Empodisma* root layer. Seven weeks after tracer application, young shoots of *Empodisma* were significantly enriched whereas adjacent *Sporadanthus* shoots were not. The results confirm that species acquire nutrients from different rooting zones, with *Empodisma* accessing nutrients at the surface from rainfall and *S. ferrugineus* acquiring nutrients from deeper peat layers. Niche differentiation facilitates species co-existence, which, on a successional time scale, may be a mechanism for slowing the rate of competitive displacement.

Abstract by Beverley R. Clarkson

Wetland Action on the Ground

A wetland restoration project managed by the NZ Landcare Trust

Those who work with wetlands in New Zealand know that where once they covered extensive areas throughout the country, they are now some of New Zealand's rarest and most-at-risk freshwater ecosystems with over 90% lost nation-wide. And that despite moves to protect what is left, their extent is still declining.

In the Waikato Region, wetland loss has been particularly severe. 75% of the Region's 110,000 hectares of freshwater wetlands were lost between 1840 and 1995. Much of this loss was associated with wetland drainage and conversion to agricultural land use. The New Zealand Landcare Trust is working in partnership with the Ministry for the Environment's Sustainable Management Fund to re-establish rare wetland ecosystems in the Waikato Region.

One particular Waikato wetland ecosystem - lowland restiad bogs (dominated by the giant jointed rush *Sporadanthus*) - which once covered an area larger than 10,000 hectares in the Waikato District has now been completely lost from the district. In the Waipa District, a single giant jointed rush ecosystem remains - the Moanatuatua Scientific Reserve. Originally, the Moanatuatua Bog covered an area of 8,500 hectares. Presently, the 114 hectare scientific reserve is all that is left, and the long-term future of this small area of natural wetland is fairly bleak.

Other than this small remnant giant jointed rush reserve at Moanatuatua, there are only two other sites in New Zealand where this wetland ecosystem type remains - New Zealand's internationally recognised (Ramsar) Whangamarino Wetland and the Torehape Peat Dome in the Waikato Region. The giant jointed rush is endemic to the Waikato, and is found nowhere else in New Zealand or the world.

What will this project do?

It aims to re-establish new areas of the giant jointed rush wetland ecosystem (*Sporadanthus*) in the Waikato and Waipa Districts of the Waikato Region. The re-establishment of giant jointed rush wetlands may be performed using scientific techniques developed by wetland researchers at Landcare Research in Hamilton. The restoration of wetland vegetation at sites formerly mined for peat in the Waikato's Hauraki District suggests it may be possible.



'Sporadanthus wetland ecosystem in the Moanatuatua Scientific Reserve, Waipa District

The company Yates-Gamman Mining has been permitted to harvest the top metre of peat of some bog remnants including a 300 hectare site at Torehape on the Hauraki Plains. The company is required to restore natural vegetation on these harvested areas so that peat formation can eventually restart. Yates-Gamman Mining have partnered with Landcare Research to find the best practical approach for restoring the vegetation of these peat bogs. The research work has clearly identified effective ways to re-establish *Sporadanthus* on these mined sites.

The wetland re-establishment techniques developed at Torehape provide an opportunity to undertake similar restoration initiatives for the giant wire rush (*Sporadanthus*) in both the Waikato and Waipa Districts. This is the basis of this proposed SMF Project - the implementation of existing research knowledge to create new habitat for this rare wetland type. In essence, the re-establishment of *Sporadanthus* wetlands in the Waikato and Waipa Districts would require sourcing *Sporadanthus* seeds (and other species) from the Moanatuatua Scientific Reserve (or the Ramsar sites) and re-establishing these seeds/plants in 'new' prepared sites.

How will the project be managed?

It will be administered by the New Zealand Landcare Trust who will appoint a Wetlands Coordinator to manage the project over the next 12 months. The Wetlands Coordinator will focus on developing wetland re-creation action plans (feasibility strategies) for re-establishing this



rare wetland ecosystem type. The action plans would be community and agency-based partnerships that identify the opportunities, protocols and costs for undertaking practical wetland re-creation in the Waikato Region.

Project Benefits

As well as increasing the regional (and therefore national) extent of this rare endemic wetland ecosystem, other benefits will also occur. For example:

* By re-establishing *Sporadanthus* vegetation, other indigenous plant and animal populations that associate with this vegetation type will also be enhanced (for example: native orchids, invertebrates and birds) .

* Local iwi will be directly engaged in the project, offering the potential to enhance cultural and spiritual values through ecosystem rehabilitation.

* The newly established wetland sites will provide local communities with new recreational and educational opportunities.

* Knowing the real costs of wetland rehabilitation will assist local government agencies in determining what land developers need to contribute to remedy or mitigate the effects of land development initiatives associated with wetlands.

Project Partners

Generously supported by the Ministry for the Environments Sustainable Management Fund and the New Zealand Landcare Trust. Other project sponsors and supporters include: Tainui; Nga Iwi Toopu o Waipa, JD and RD Wallace Farm, the Department of Conservation, Environment Waikato, Waikato and Waipa District Councils, Landcare Research, and the University of Waikato.



The giant jointed rush Sporadanthus

For more information, or to discuss any aspects of the project further contact:

New Zealand Landcare Trust Research Manager Dr Nick Edgar at: PO Box 4305 Hamilton; Tel. (07) 8583796; Fax (07) 8584964; or email: nick.edgar@landcare.org.nz

Are you thinking about constructing a pond?

Not all ponds are created equal. Some are both interesting and attractive - while others can smell badly, have insect plagues, algal blooms, aquatic weed infestations and pest fish. Poorly sited and designed ponds can also destroy habitat, degrade water quality and damage streams and wetlands.

'So you are thinking about a pond' is a new Guide published by Greater Wellington with assistance from Boffa Miskell to help lifestyle-block owners, farmers, developers, duck enthusiasts and landscape architects overcome issues and problems they may face when constructing a pond.

Ponds can be an interesting and attractive feature on a property - but it's easy to overlook important features essential for their long-term success. The Guide provides an overview of the issues and problems faced by people constructing artificial ponds. It gives direction on how to plan and design a healthy pond and maintain these naturally dynamic systems. It also provides advice on getting a Resource Consent. Depending on what you're planning, you may need specialist ecological and engineering advice.



The Guide is both for people wanting to build a pond, as well as those who would like to rebuild ponds that have been badly designed, built in the wrong place, or poorly maintained. So if you already have a pond it has advice to help make your pond more sustainable by improving its water quality and appearance. It does not cover stormwater or effluent treatment.

The Guide's advice is available on Greater Wellington's website: www.gw.govt.nz/wetlands. There are also a limited number of hard copies available.

For more information, please contact: Melanie Dixon, Greater Wellington PH 04 801 1036 melanie.dixon@gw.govt.nz



Creature Feature - Japanese Snipe



The Japanese Snipe is our **'Creature Feature'** this issue because not only is it the rarest wetland bird in New Zealand, but you may actually get to it if you visit Forest Lake in Hamilton. The bird has been seen on the edge of this small lake, despite the presence of people and dogs, which goes to show that if the habitat is right the wildlife will follow.

Japanese Snipe in New Zealand

Also known as Latham's Snipe, the Japanese Snipe is a species of the "Gallinago" genus. On record, there are five species of Gallinago in Japan, it's also found in Eastern Australia and Tasmania during the summer, but is a fairly unusual sight in NZ.

What do they look like?

It has a long straight beak and white stripes along its wings as well as white stripes above and below its eyes. It has yellowish white, yellowish brown, brown, and black feathers with a mottled effect, and measures about 30cm.

Where do they like to live?

They particularly like to live in grassy clearings in wild forests or bogs and the edge of wetlands and marshes. They even live in man-made places like pastures and forestation lands, though more prone to accidents there.

What do they eat?

Seeds and leaves as well as insects.

How do they breed and nest?

Among all five species, the Japanese Snipe is the only snipe that breeds in Japan where it breeds from late April to the middle of June. Their display includes circularly soaring high in the sky while chirping "Zbyyak, zbyyak", then abruptly turning a nosedive by folding wings and, within a hair's breadth of the ground, making a turn to fly high up again, repeating this movement.

In May, each pair builds a nest of dry grass at the roots of grass, bushes, or bamboo leaves where they lay 4 eggs. In early June, baby birds hatch after 22 days of brooding. The newly born birds are already covered with down, and have large feet so they can walk with their parents soon after their down dries, although their parents usually keep them in clustered grass so they can hardly be seen. If you get to see parents and baby birds, you will notice there are usually only one or two baby birds as more than half born never fully mature because of various accidents. After their breeding season they leave Japan to reach Australia late August through September. Their exact migratory route is still unknown, but it is thought they go straight down to Cape York of Australia via New Guinea.

What do they do in Australia?

After arriving at the northern part of Australia, they travel south along the east coast to the southeastern part of the country and Tasmania Island, where they spend their non-breeding period. Here they hide during the day in the woods and clustered grass spread throughout marshy places, creeping out on to soft muddy waterside areas at night to feed. They calmly devote their wintering lives solely to feeding, without displaying any lively nose-diving, even though many birds of other species are briskly singing while breeding.

Chippiyaku Kamui --- The Snipe that Fell from Heaven

There is a Japanese legend about the snipe from Ainu myth called "Chippiyaku Kamui" (Kamui means God) in which a Snipe is sent by the gods of Heaven to see if "Ainu" (human being) could live in the lower world. The lower world was so beautiful that the snipe forgot the gods' order and played there. Spring, summer and autumn went by before it remembered the gods' order and flew hurriedly back to heaven. However, the gods reproached it, hitting it with sticks and throwing it down to the world below.

The snipe had a hard time in the lower world's cold winter where it spent many days healing its body. When spring came again and the colorful flowers blossomed, it missed its homeland. It flew to the high sky, but when it remembered the gods reproaching and punishing it, it could not ascend any further.

"Chippi-yak, chippi-yak, chippee-yak ... I sing, as I fly up to the heavens, but then I am overcome with sadness, that is why I make sudden dives over and over again, tearing through the sky with a piercing sound of feathers. Do as you are told, or you will end up like me said the snipe to end his tale."



MEET THE NWT TRUSTEES

There is an enormous amount of knowledge, experience and credibility in our group of trustees. Several are leading wetland practitioners, with Gordon Stephenson one of the first advocates for wetlands in New Zealand. Read on for a brief summary of the talents, experience and skills of several more of our trustees.

Maggie Bayfield

Maggie is a consultant in Wellington, but previously worked for the Taranaki Regional Council determining the schedule of regionally significant wetlands and implementing the wetland protection programme. She has extensive experience working with landowners to protect and manage natural areas - with the council, the Taranaki Tree Trust and QE II National Trust (Director and Chairperson from 1991 – 2000). "I am working on the Wetland Trust to assist the protection and effective management of wetlands throughout New Zealand."

John Preece

John was born and bred in Nelson, where he spent most of his life in the top of the South Island. He currently lives in Culverden (North Canterbury), but most of his work is still in the Nelson area. He has been

working in the field of conservation for 25 years, the last 6 of which have been largely involved with wetlands as a private consultant. The work has been mainly associated with wetland inventory and provision of biodiversity advice about wetlands to private landowners. "I see the primary role of the Wetland Trust as providing leadership in wetlands management in New Zealand and look forward to being involved in making a difference."

Bev Clarkson

Bev is a wetland plant ecologist who works for Landcare Research, Hamilton. She leads a collaborative PGSF-funded research project on New Zealand terrestrial wetlands, involving researchers from Landcare Research, NIWA, and University of Waikato. Her particular interest is functioning and restoration of restiad peat bogs, i.e. those dominated by members of the jointed rush family (Restionaceae). This includes restoration of the threatened endemic giant cane rush (*Sporadanthus ferrugineus*; Restionaceae) at a cut-over peat mine, Torehape Bog, Hauraki Plains. Her goal is to aid in wetland restoration success by developing practical guidelines based on a greater understanding of functional processes.



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