

**MEETING THURSDAY FEBRUARY 4**  
**7:30 pm Australian National University**  
Meeting details back page

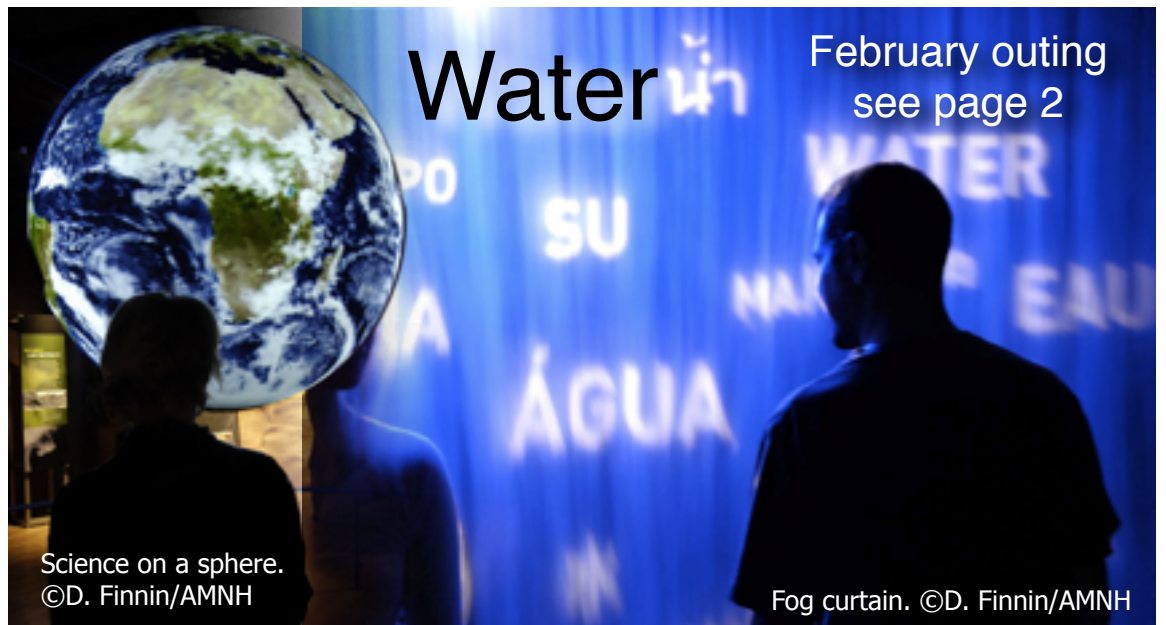


Bat artwork - Art Explosion



**Bats - and why they are important**

Speaker: Michael Pennay President of the Australasian Bat Society  
Michael says there are insectivorous bats everywhere, when you know where to look, including the Botanic Gardens and Black Mountain. He has loads of enthusiasm combined with great knowledge.  
We anticipate an interesting talk.  
We will try and see some bats after the February meeting.



Science on a sphere.  
©D. Finnin/AMNH

Fog curtain. ©D. Finnin/AMNH

February outing  
see page 2

GPO BOX 249  
CANBERRA ACT 2601

FIELD NATURALISTS' ASSOCIATION OF CANBERRA INC.

**FIELD NATTER**

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# Field Naturalists' February Outing - Water at the National Museum



We will go to the National Museum to see the Water Exhibition, followed by afternoon tea at the Museum. Those who have already been to the Exhibition have spoken highly of it. Meet near the information booth at the Museum at 2:00 pm. For further information about the outing, contact Tony Lawson on [tlawson\(AT\)homemail.com.au](mailto:tlawson(AT)homemail.com.au) or 6161 9430. Beat the heat and meet indoors.

Experience water like never before in this thought-provoking, entertaining and inspiring exhibition, **Water: H<sub>2</sub>O=Life**.

Adults \$10, Child \$5, Concession \$8, Family \$22.

This exhibition takes a vivid and in-depth look at:

- the many ways water shapes life on earth
- cultural and spiritual aspects of water
- pressing environmental issues
- actions we can take

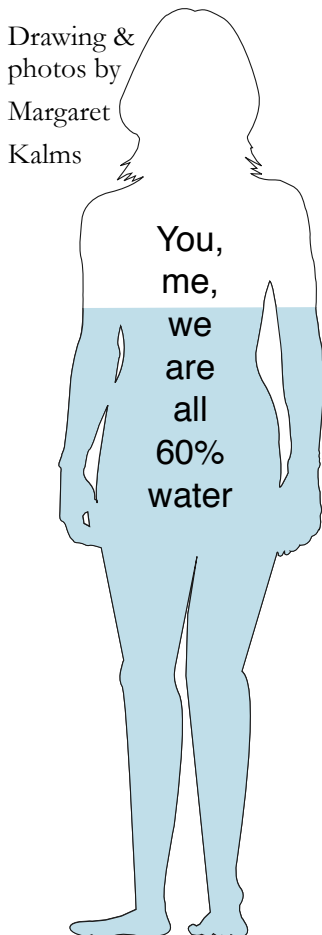
The exhibition features:

- interactive displays
- live animals
- global perspectives
- Australia's water story

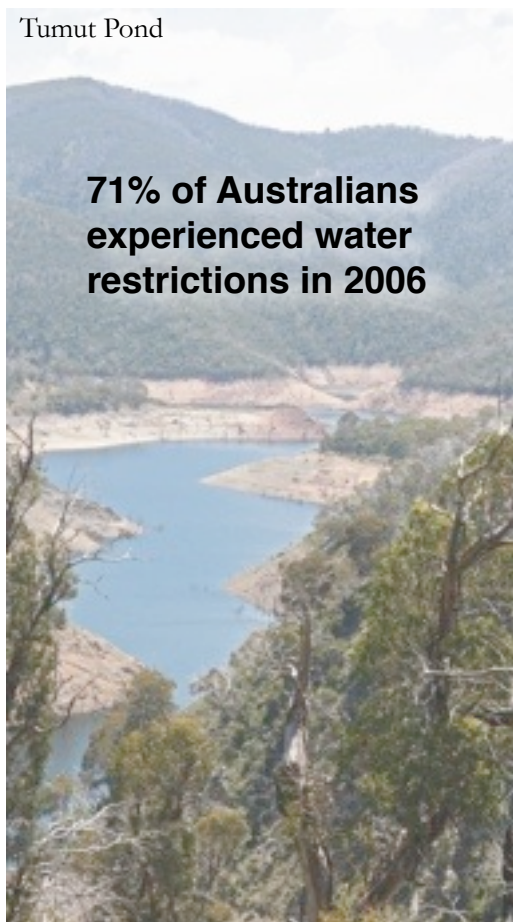
Water: H<sub>2</sub>O=Life was created by the American Museum of Natural History in New York, assisted by the Science Museum of Minnesota, St Paul. It was curated by the American Museum of Natural History's Dr Eleanor Sterling.

The exhibition is travelling the world to various international partners and completed its Istanbul show before coming to Australia. As the exhibition travels to each international location, a module telling the local water story is added.

You can find more at <http://www.nma.gov.au/exhibitions/water/>.

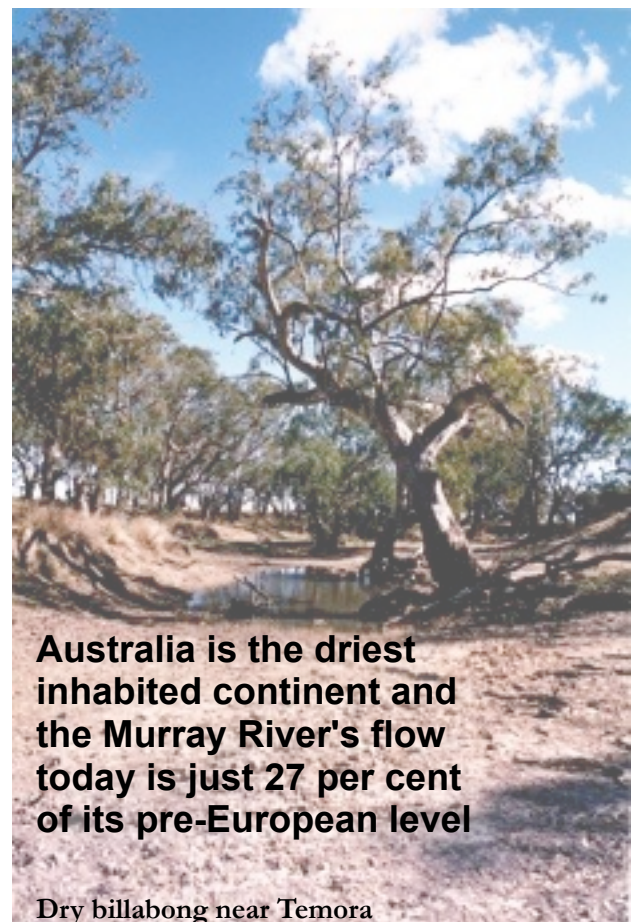


Drawing & photos by Margaret Kalms



Tumut Pond

**71% of Australians experienced water restrictions in 2006**



**Australia is the driest inhabited continent and the Murray River's flow today is just 27 per cent of its pre-European level**

Dry billabong near Temora

## Ancient plant remains help us understand our East Timorese neighbours

**Nuno Vasco Oliveira** completed his PhD at the ANU in 2008. During 2004 and 2005 he excavated cave deposits in East Timor, looking for often charred remains of plants. These he analysed using light-powered and scanning electron microscopes (SEM). Dates were obtained using accelerator mass spectrometry (AMS)



Bui Ceri Uato Mane (BCUM) rock shelter

Analysis of the ancient plant material from this shelter involves comparisons between modern reference material and archaeological specimens.

No rice or millet (*Setaria italica*) is present in any of the excavated material, suggesting neither of these crops were introduced with the first pottery (3600 to 3800 BP) or domesticated animals. They may have only arrived in a later period, when these caves were no longer regularly lived in. The analysis indicates that different fruits and possibly tubers were used since the Early- to Mid-Holocene.

Taro (*Colocasia esculenta*) and members of the pea family first occur when pottery shards do, though taro, which preserves poorly and so is difficult to detect, could have been present earlier in Timor.

At Jerimalai, on the eastern end of Timor-Leste - as this newest nation is now known - various palm species were identified in layers older than 40,000 years (40 ky). This suggests that the first human populations in East Timor used one or more species within this Araceae family, including *Areca catechu*, *Arenga pinnata*, *Borassus flabellifer*, *Cocos nucifera*, *Coryphautan* and *Metroxylon sagu*.

Maize (*Zea mays*) and sweet potato (*Ipomoea batatas*), both of New World origins, are today

among the most important crops in East Timor. Contrary to what is likely to have happened in Polynesia, where archaeology suggests some cultural contact with South America in pre-Columbian times, these two crops appear to have been introduced by the Portuguese.



Starch-rich trunk of Coryphautan palm

Today a diverse range of food plants is still used. "In an unpredictable environment where prolonged dry weather and an irregular wet season are the norm, diversity of resource exploitation seems to be the preferred subsistence strategy to avoid potentially catastrophic food shortages."



Transporting Coryphautan palm

by Dierk von Behrens,  
Canberra Friends of Dili,  
[vbehrens\(at\)grapevine.net.au](mailto:vbehrens(at)grapevine.net.au)

Part 2 next month.

## PERU: THE HIGHS OF THE HIGHLANDS: CUZCO TO MACHU PICCHU

### An adventure by Horst and Kay Hahne

There is something for everyone in South America; the Andes, the Tropics, Inca ruins, Macaws and Parrots. Peru, the 3<sup>rd</sup> largest country with 30,000,000 people, lies between the Equator and the Tropic of Capricorn, with altitudes over 6000m (highest peak is 22,200 ft). The mountain peaks over 5000m were snow-capped.

Ian Fraser led a tour group of 14 to new heights of experiences. A 1-hour flight from Lima on the coast to Cuzco at 3400m was a quick lift up to soaring altitudes. We felt light-headed and out of breath with not much exertion, with headaches, diarrhoea, nosebleeds and even blurry vision. I was lucky and not affected too badly by the altitude. Our local guide encouraged us to take our altitude sickness pills, and to drink coca leaf tea (high altitude tea) and water. There is a first time for everything – we were guzzling a drink made from the same plant from which cocaine is derived!

We spent the first two nights in Sacred Valley by the fast flowing Urumbamba River. The hotel gardens were full of flowers, attracting many hummingbirds. Early risers saw a couple of Giant Hummingbirds – the world's largest hummer at 21 cm. This

gets our eye 'in tune' - smallest are minute at 6 cm. Peru has 125 species of hummingbirds. We saw a Black-tailed Trainbearer with tail much longer than the body. Next, within the rushing river, we spotted 2 Bar-winged Cinclodes, 2 White-capped Dippers and to our delight, 2 Torrent Duck males carrying on a frenzied and vocal display for a female. Amazingly, even the ducklings are strong enough to swim upstream in the white rapids!



Collared Inca

We visited a place with all four species of cameloids native to Peru. Llamas are domesticated and are used as a pack animal. Alpacas are domesticated and shorn for their long, fine wool that makes lovely soft, warm clothing. Vicuñas were rounded up for shearing and released. They produce an excellent quality, fine wool. Guanacos were hunted for meat. The last two are not so abundant these days. Native Quechua women still weave in bright colours. In the past natural dyes were used such as *Indigofera suffruticosa*, or indigo for blue; *Bixoa orellana*, a plant for red; *Coccus cacti*, small powdery white cochineal insects cultivated on prickly pear cactus and harvested for cochineal red; and *Purpura* molluscs for purple. Woven cloth found in ancient Inca gravesites are examples of the finest weaving ever seen. Even today no person or machine can come close to the exquisite perfection of those clever Inca women.



Alpaca at Machu Picchu

Around the highlands of Cuzco, the Quechua Indians live and farm as their Inca ancestors centuries ago. We saw no machinery, instead we saw a man ploughing his cornfield with oxen and a handmade wooden plough with metal blade. Higher up on a slope with smaller plots, another man was tilling his cornfield with a handmade wooden foot plough or *taclla*. It has a foot plate for leverage and a narrow metal blade strapped on with leather thongs. He invited us into his tiny adobe abode. When he threw some lucerne onto the floor, 2 dozen guinea pigs came scurrying from under his bed! Almost every household raises them to eat. They are tasty, clean, harmless, eat scraps and breed rapidly. Even today some of the ancient Inca terraces, aqueducts and irrigation channels are used to channel snowmelt from the high mountains for irrigation and households.

In Cuzco a huge market sold many types of potatoes and tubers such as the only edible *Oxalis*, and manioc *Manihot esculenta*, a cassava, an edible starchy root used to make bread and tapioca. Potatoes were freeze-dried in the high country by wetting them, let freeze overnight, thaw next morning and squeeze out excess water, then store. When needed, add water and cook. Presto – the world's first instant potatoes! All varieties of corn, pop corn, sweet corn, maize and mealies are *Zea mays*. Ears and kernels were of different shapes, sizes and colours, eg white, yellow, bluish or dark purple-red. We had a dessert and a soft drink made from the purple kernels. Also sold were phenomenal flowers, fantastic fruits, nutritious nuts and daintily dressed frog legs and live frogs and kicking in a bucket of water!

Cuzco, the capital, (Acamama) was the centre of the Inca Empire which spread from Ecuador and Colombia in the north to central Chile in the south. The first Inca Emperor lived around 1200 AD. A quasi-mythological character, a demigod, he is attributed to founding the Empire. The 13<sup>th</sup> and last Emperor was Atahualpa who lost to the Spanish conquistadors under Francisco Pizarro in 1533. The Incas

had very clever architects and engineers with buildings and roads still in evidence today. The temple called Qorikancha ("Place of Gold") had no gold plating inside or out, nor ornaments nor idols. The Spaniards took it all. Despite a severe earthquake in 1950, the 15<sup>th</sup> century building still stands. Every block of stone is perfectly smooth and even. Water spirit levels were used. Windows and doors are trapezoidal shape for added stability.

Saqsayhuamán is a stupendous, megalithic, ancient Inca fort – 540m long and three tiers reaching 19m high. Yucay limestone and green Saqsayhuamán diorite porphyry were used, some in mega sizes! The largest worked stone ever found is at this site – 8 x 4.2 x 4.6 m and estimated at 200 tons! The blocks are polygonal, often with 5 sides, but up to 8 and one in Cuzco has 12! These fit together very neatly without a crack, no mortar used, all different sizes and shapes made to fit together perfectly. How did they move those huge, heavy blocks with limited tools and the quarry 35 km away? Perhaps a 35 km long earthen ramp, wooden rollers and mucho manpower? If only they could tell!

We walked up the Inca Trail to the Sun Gate and looked down at last on Machu Picchu, the Lost City of the Incas. Horst and I plus 3 others continued on the train to Machu Picchu Village, also known as Aguas Calientes (hot waters). A bus zigzags up and up to the Machu Picchu ruins. This ancient citadel was missed by the Spanish and therefore not looted or damaged. Hiram Bingham, found it intact in 1911. 13 sq km of terraces and construction, with over 3000 steps linking its many levels. It is difficult to get to, built on the top of a mountain 600m above the Urubamba River. It was probably built as a retreat for the Emperor for it is only 80 km NW of Cuzco. Or perhaps it was a fortress to repel the eventual advance of the inhabitants from the Amazon jungles who threatened the empire; or a site dedicated to the worship of the sun and inhabited by royal virgins called *acllas*. In any case, it was well hidden from the Spanish and left untouched. Bingham returned in 1912 with specialists to clear vegetation, survey and excavate – sponsored by Yale University and National Geographic. The mountain itself

is 250,000,000 years old and granite. All those stone blocks for houses, temples, store houses, terrace walls, etc are this solid, heavy granite. Our group visited it a second day and walked in the Sacred Plaza at 2430m, gazed at the huge stone altar (for sacrifices perhaps?) and climbed up to the astronomical observatory or 'calendar of the seasons' - Intiwatana (*Inti* = sun).

At our hotel, extensive native gardens were alive with colourful hummingbirds, tanagers and orchids. The orchids (500 species in this region) were tiny or medium-sized, on trees or the ground, green, white, pink, mauve. The bright orange-red wakanki orchid *Masdevalia veitchiana* was my favourite. The many *Heliconia* blossoms and hummingbird feeders with sugar water attracted Speckled and White-bellied Hummingbirds, Sparkling and Green Violetears, Chestnut-breasted Coronets, Collared Incas and White-bellied Woodstars. Bananas stuck onto a tree attracted Saffron-crowned, Silver-backed, Blue-grey and Blue-necked Tanagers. My pencil was flying, taking notes; Horst was taking photos. What a holiday!

**Part 2 next month.**



Wakani Orchid  
*Masdevalia veitchiana*



*Anguloa virginalis*  
orchid

## Nature Reserves Investigation

The Commissioner for Sustainability and the Environment, Dr Maxine Cooper, has invited submissions about her Investigation into Canberra Nature Park...

A series of terms of reference is available under which responses can be organised. Contracted experts are already in the field assessing the condition of the ecosystems and habitats in the components of Canberra Nature Park. Actions to protect and enhance these areas will be considered. Management plans for the Nature parks and adjoining lands will be reviewed. Needed changes will be noted as will knowledge gaps. The need for management of grazing pressures is also amongst the terms of reference.

FNAC will be making a submission but individual efforts will show the Commissioner that there is concern for the vulnerability and state of our natural areas. It's also a chance to show support for the Environment ACT personnel who are often working to maintain Nature Reserves and Urban Open Space with resources which are inadequate for the needs they observe everyday. Details at [www.envcom.act.gov.au](http://www.envcom.act.gov.au)

Rosemary Blemings, Conservation officer.

## Field Trip to Kioloa - 5-8 March - Last chance to book your place!

So far we have 15 places booked for this weekend. But there is room for more. The cost is \$45 per person per night for a shared room (or \$270 per room for the 3 nights). This covers accommodation plus the hire and cleaning of kitchen facilities and an amenities room. Please confirm your booking by paying Sylvie at the February meeting or no later than 15 February.



Spend Canberra Day long weekend with friends. We will stay at the ANU's Coastal Campus, a 860 acre property adjacent to Murramarang National Park with lots of wildlife and diverse ecosystems. Enjoy Bushwalking, swimming, birdwatching, beach combing or just chilling out.

Our activities will depend on what is of interest at Kioloa and the surrounding area at the time, but they will include bushwalking, birdwatching photography and swimming and maybe, in the evening, spotlighting. Bring your own torch. The facility is self-catering so we will need to bring our own food and linen.

For further information please contact Sylvie Sampson on [phone number] or [email address]

SylvieSampson (at) Bigpond.com



<b>Australian National Botanic Gardens Lunchtime Talks</b> (12:30 – 1:30 pm, Thursdays, February to November)		
The Australian National Botanic Gardens (ANBG) Lunchtime talks are held every Thursday in the Theatre opposite the bookshop. Forthcoming talks are:		
4 Feb	Max Bourke	<i>2010 The International Year of Biodiversity: What philanthropy and you can do about it</i>
11 Feb	Betty Wood	<i>Spring Flowers of South Africa</i>
18 Feb	Franz Grossbechler and Mark Jones	<i>The Importance of Seed Collecting</i>
25 Feb	David Headon	<i>The Deep Cultural Roots of the ANBG</i>
4 March	Bill Stevens	<i>Bloomin' Showbiz</i>
11 March	Roger Farrow	<i>Flowers of Tibet</i>
18 March	Paul Scrannell	<i>Albury Children's Garden</i>
25 March	Chris Cargill	<i>Cryptogams: What they are, their role in nature and their exploitation</i>

## The International Year of Biodiversity

This is the start of The International Year of Biodiversity. We might give some thought about what Field Naturalists' can do to help - activities, talks, outings, fundraisers, letters to our leaders. Get creative! Both practical and creative suggestions are useful. Here is your chance to make a difference! Submit suggestions to the editor, Margaret Kalms <margaret(at)artofwoman.com.au> or mention them at our monthly meetings.

We are losing our biodiversity at an alarming rate. Australia has the highest rate of mammal extinction in the world and we are predicted to lose many birds and plants. The biodiversity loss seems to increase with every new report.

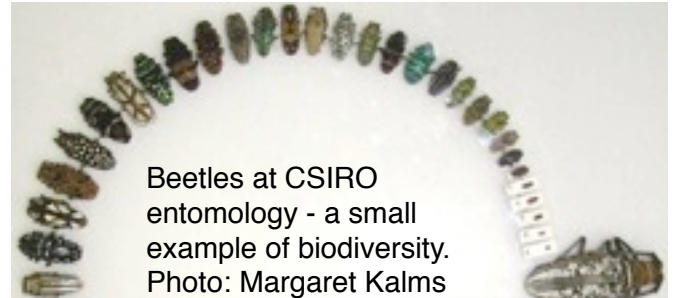
The official UN site is:

<http://www.cbd.int/2010/welcome/>

The UK Natural History Museum has this site:

<http://www.biodiversityislife.net/>

Tony Lawson



Beetles at CSIRO entomology - a small example of biodiversity.  
Photo: Margaret Kalms

## A Response to The International Year of Biodiversity - Dierk von Behrens

The only time the word 'population' is listed in the 24 November IYB implementation document - <http://www.cbd.int/iyb/doc/iyb-implementation-plan-en.pdf> - is in the following paragraph:

"28. Local authorities will be important parts of the Committees. As the urban **population** of the planet surpasses the 50% mark, cities will become important loci for biodiversity policy. Cities who are currently working with the SCBD through the local authorities initiative, or are part of the Countdown 2010 network should be encouraged to hold activities and to promote the IYB. National Governments are encouraged to take include local authorities in their planning."

The word 'human' occurs 12/14 times only in the context of 'human well-being'. The other two messages are identified as key ones for the IYB:

"Humans are part of nature's rich diversity and have the power to protect or destroy it. Human activity is causing the diversity of life on Earth to be lost at a greatly accelerated rate. These losses are irreversible, impoverish us all and damage the life support systems we rely on everyday. But we can prevent them."

What I miss on this official web-site is the spelling out of the consequences of human needs and demands as outlined in the year's second key message:

"Biodiversity, the variety of life on Earth, is essential to sustaining the living networks and systems that provide us all with health, wealth, food, fuel and the vital services our lives depend on."

The spelled out message should be: **we must act urgently to reduce human population growth.**

**On the alternative web-site the word 'population' is almost exclusively used about threatened and recovering wildlife populations. However, on the page about Red kites headed 'Soaring success' there is a green box highlighting:**

**Did you know...**

**More humans are born in 2 months in the UK than there are chimpanzees in the wild. Twycross Zoo**

On the page headed: **'From the origin to the future of species'** is the blunt statement **"Dr Knapp said humans could be described as an extremely successful 'invasive alien mammal weed'".**

On the same page, again in a green box:

**Did you know...**

**There are fewer mountain gorillas in the wild than footballers in the Premier League. FoE/IUCN**

**Let us applaud those who have recognised the fundamental problem, including:**

"Professor Short, of the Departments of Obstetrics and Gynaecology and Zoology is a long-time champion of the world's 'megafauna', including elephants, gorillas and chimpanzees, whose future is threatened by human overpopulation and consequent habitat destruction. "Working on elephant populations in Zambia, I was visited by Sir Peter Scott, founder of the World Wildlife Fund," says Professor Short. "He said, **'You know, I have often thought that at the end of the day, we would have saved more wildlife if we had spent all WWF's money on buying condoms.'** He was right, and human overpopulation is ultimately the greatest threat to wildlife." - **Prof. Roger Short & Sir Peter Scott, founder of the World Wildlife Fund (WWF)"**

Implementing policies advocated on the following two web-sites will have more long-term impact on biodiversity conservation than any alternative!

<http://www.population.org.au>

<http://www.populationmedia.org>

**Who are the Field Naturalists?**

The Field Naturalists' Association of Canberra (FNAC) was formed in 1981. Our aim is to foster interest in natural history by means of meetings and regular field outings. Meetings are usually held on the first Thursday of each month. Outings range from weekend rambles to long weekends away. Activities are advertised in our monthly newsletter. We emphasise informality and the enjoyment of nature. New members are always welcome. If you wish to join FNAC, please fill the member application below and send it with your subscription to the FNAC Treasurer, GPO Box 249 Canberra, ACT 2601:

**President:** Benj Whitworth, tel W mobile:

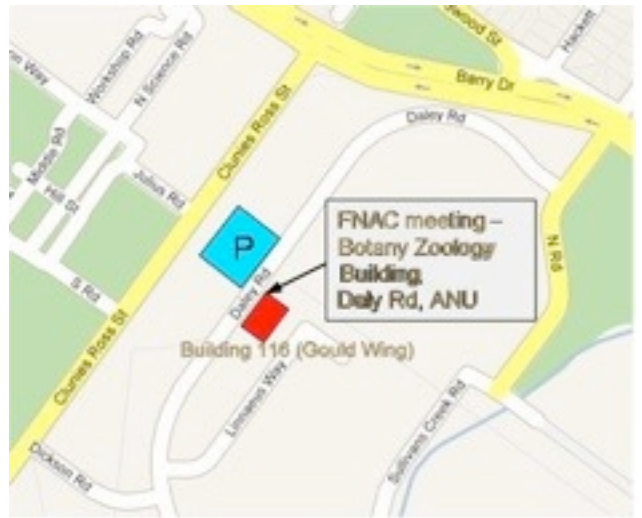
**Secretary:** Tony Lawson, tel [fieldnaturalist\(at\)yahoo.com.au](mailto:fieldnaturalist(at)yahoo.com.au)

**Website:** Under construction.

**Newsletter editor:** Margaret Kalms [margaret\(at\)ecospirit.com.au](mailto:margaret(at)ecospirit.com.au)

Tel:

Published and distributed by Bob Lehman.



**Monthly meeting venue:** Division of Botany and Zoology, Building 116, Daley Rd, Australian National University, Park (occasionally at the adjacent Building 44).

Meetings start at 7:30 pm and are followed by refreshments.

**Did you get what you wanted for Christmas?**

**DON'T FORGET THAT THE FNAC RAFFLE IS AN IDEAL OUTLET FOR "UNWANTED TREASURES"**

Please check your cupboards again & see if you can part with material possessions that might otherwise mean a special trip to an op. shop.

**IT'S ALL IN A GOOD CAUSE!!**

**MEMBERSHIP APPLICATION OR RENEWAL**

Family name: ..... First name: .....

If a family membership, please include the first names of other members of the family:

.....

Postal address: .....

Suburb: ..... State: ..... Postcode: ..... Home phone: .....

Work phone: ..... Email address: .....

Subscription enclosed: \$.....(Single/Family \$25) Donation: \$.....

How did you hear about FNAC? Please circle: FRIEND? OTHER? Please specify: