Patron - Dennis Morris

CNFN

Central North Field Naturalists

the **Natural News**

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Walks and Events

March- Fri 26/Sun 28–Federation at Paton Park. Bookings necessary for accomodation and meal. See Jim.

April- Sun 11, Meet at 9:30am in upper Liffey Falls carpark for walk in rainforest and sub-alpine habitats.

May- Sun 2, Meet 10am at Corin St. carpark W. L'ton for walk in Cataract Gorge

EDITORIAL INTRODUCTION TO THE FOLLOWING LEAD ARTICLE

We are publishing the following very important research article as our submission to the state government presenting the evidence for the management requirements for stream buffers that were established for *Astacopsis gouldi* in the Recovery Plan during the Regional Forest Agreement.

During the RFA, there was frequent mention that decisions had to be made on the basis of science. Thus, the Recovery Plan for the Giant Freshwater Crayfish, *A. gouldi*, was prepared on the available science. Where there are no direct scientific studies to use for management procedures, then we must refer to similar studies and to basic scientific principles if we are to take a prudent approach to the recovery of threatened species. Elsewhere in this publication you will read an axiom of ecology that states "*the greater the biological diversity, the healthier and more interesting the system*". The government departments cannot continue to hide behind a "lack of relevant studies" to continue insupportable practices that on the basis of all evidence and scientific principles will be detrimental to threatened species. Forestry Tasmania's stream buffers are a prime example, and the following research by Bill Thomas presents the arguments "on the basis of science" . We can accept no less.

Streamside Reserves, The Precautionary Principal and *Astacopsis gouldi*

by Bill Thomas

The Forest Practices Code (FPC) 1993 prescribes reserves on the following basis:

Class 1 (River and lakes) 40 meter reserve with 30% selective logging to within 10 metres

Class 2 (Watercourses with catchment greater than 100 ha.) 30 metre reserve with 30% selective logging to within 10 metres

Class 3 (Watercourses with catchment between 50 and 100 ha.) 20 metre reserve with 30% selective logging to stream channel

Class 4 (Watercourses with catchment less than 50 ha.) No machinery within 10 metres.

There have been no studies conducted in Tasmania to show that the current FPC prescriptions are effective in **maintaining the ecological integrity of streams,** or that they **prevent the decline of threatened or potentially threatened riparian and aquatic species**. Davies and Nelson 1994 showed that the short term effects of logging could be minimised using buffers equal to or greater than 30 metres. This study was conducted during summer base flows and it is noted that no study was made of water quality, only fish and invertebrate abundance. The study suggests riparian reserves greater than 30 metres to prevent enhanced sedimentation and/or nutrient loads during substantial storm events. This report notes the need to preserve the total integrity of the buffer as well as its extent and width. Vegetation characteristics were also seen to be important to the effectiveness of buffers in interception of surface run-off, maintenance of light climate and temperature of a stream.

What is still in question is how aquatic values in Class 3 and 4 streams are being protected (if at all) with buffers significantly less than 30 metres. With regard to Class 4 streams, the protection offered by 10 metre buffers has been shown to be inadequate in preventing sediment accession to higher order streams, and that such sediment fluxes take five or more years to return to background levels (Davies and Nelson 1993). Clinnick (1985) argued that the extent of buffers should be primarily determined by the location of spring heads or runoff confluence points of sub catchments. Dignan et al (1996) point out that *"Overland flow is most likely to occur in areas where subsurface flow converges such as at the head of a catchment, rather than at the flanks and increased buffering of these areas may be more effective than broad scale increases"*. The CSIRO Division of Forestry (CNR 1995) points out that there is no scientific data supporting varying buffer widths according to catchment size, and they recommend a minimum 30 meter buffer beside all permanent streams draining soils where surface run-off occurs after harvesting (permanent streams were defined as having a variable catchment area, but which flow more than 90% of the year). Dignan et al (1996) states that *"Little data are available regarding the protection of ephemeral streams. One study showed that a 10 m filter strip along ephemeral streams on steep slopes was not effective in preventing sediment accession to the stream system. Filter strips, however wide, provide little or no protection to stream values other than sediment levels and stream water chemistry.*

Protection of other values is likely to require similar buffers to those used for permanent streams."

Under the current Forest Practice Code selective logging within the stream-side reserve is allowed at the discretion of a Forest Practices Officer. This selective logging compromises the integrity of stream-side reserves. Penetration of the buffers during logging operations significantly increases the potential for surface water to drain through the buffer unimpeded, increasing the opportunity for sedimentation (Davies and Nelson 1994). Askey-Doran (1993) points out that such activities damage surrounding riparian vegetation and disturb soil, encouraging erosion and spread of weed species, and amount to a reduction of integrity of the reserve. Campbell and Doeg (1989) state that *"Removal of large trees from the riparian zone will reduce inputs of large woody debris over the long term, and eventually lead to simplification of the stream habitat"*. The use of fire also is a threat to the integrity of riparian zones and Askey-Doran (1993) recommends that burning be conducted in such a way as to not remove riparian vegetation, especially in the smaller streams. Clinnick (1985) proposed increasing buffer width for slopes greater than 30% (17 degrees) particularly if the hill slopes are convex in shape. Askey Doran (1993) also recommends wider buffer strips as the catchment slopes become steeper, even if the water course is Class 3 or Class 4. Dignan et al (1996) also stress the need for increased buffer widths for steep areas.

The Recovery plan for the Tasmanian giant freshwater lobster *Astacopsis gouldi* (Blühdorn 1997) requires the precautionary principle to apply and *"that no actions be taken which may substantially adversely impact on a species or habitat until corroborative scientific studies have been undertaken, their results examined, and strategies developed to counter the adverse impacts"*.

The Recovery Plan specifically states *"Taking a precautionary approach to the protection of A. gouldi habitat requires that all energy inputs, all light and temperature regimes and all structural components of the habitat should remain undisturbed. To achieve this, the minimum riparian buffer width for all stream classes in which A. gouldi occurs, or which are used at some stage of the lobster's life-history, should be one potential dominant tree height. All vegetation within this zone should remain undisturbed. Streams which are not utilized by A. gouldi, but which are upstream of ones that are, should be managed so that they do not undermine the integrity of the buffer system, for example by acting as conduits for sediment, nutrients or toxicants. this will require considerable care in the placement and construction of roading, culverts and stream crossings"*.

The Recovery Plan requires the discontinuance of the threatening process; with regard to forestry operations there should be no measurable adverse effects on *A.*

gouldi populations at the conclusion of logging activity in an area where *A. gouldi* is known to occur. With respect to the current prescriptive measures in the F.P.C. there seems little scientific basis for their application in terms of size and extent. It is essential with the recovery of *A. gouldi* to focus on the ecological processes involved in the habitat of the species; to this end protection of habitat areas of *A. gouldi* must be based on habitat specifics rather than arbitrary areas and measurements.

A. gouldi is generally accepted as being a detrivore, though it is also acknowledged as being an opportunistic consumer of animal flesh. Detrivores in forested streams are mostly dependent on allochthonous inputs for energy, i.e. organic matter from the surrounding terrestrial environment (Bunn 1986). Large woody debris in streams is known to be an important source of food for *A. gouldi*, as it has been observed by many researchers scraping away at the decaying layers of logs. Analysis of stomach contents of adult *A. gouldi* also confirms decaying wood being the main component of their diet (Hamr, P. 1990). Confirming also the use of logs as habitat, the bait line surveys conducted by Inland Fisheries show a strong correlation between choice of "best fishing spots" with large woody debris and intact riparian vegetation (pers. com. Tim Lynch).

Lynch & Blühdorn (1997) state *"There is evidence to suggest that the present riparian buffers required by the Forest Practices Code are not completely effective in preventing disturbance to stream systems in general, and A. gouldi habitat in particular"*. To find a solution we must focus on the process level of the ecosystem to ensure that such processes that are known to be essential to *A. gouldi* continue, and continue within natural parameters. *"A primary ecological unit linking riparian vegetation processes to stream processes is the presence of aging trees which will one day contribute to the stream's energetics and structure by falling into or across the stream"*(Lynch, T.P. & Blühdorn, D.R. 1997).

In the larger streams, Classes 1,2 and 3, large woody debris is seen as vital in maintaining stream channel structure, helping to form the pools and debris dams (Campbell and Doeg 1989) that are such important habitat areas. In the smaller streams, Class 3 and 4, large woody debris may not contribute so much to maintaining stream structure, but tends to form obstructions that retain *"the more refractile sources of detritus until they are suitably conditioned and thus rendered available to stream detrivores"* (Bunn 1986). These debris dams and litter packs also act as sediment filters (Dignan et al 1996).Bilby and Likens (1980) explain the functioning of these debris dams in the various stream classes much more clearly: *"In first order streams, debris dams contain nearly 75% of the standing stock of organic matter. The proportion of organic matter held by*

dams drops to 58% in second order streams and to 20% in third order streams". Note: first order streams are defined as having no tributaries, second order streams are formed by the confluence of two first order streams, third order streams from the confluence of two second order streams, etc. The higher frequency of debris dams in small streams and the consequential large standing stock of organic matter is due primarily to the smaller flows in these streams (Bilby and Likens 1980). Organic debris dams facilitate the processing of course particulate organic matter and are thus one of the most important structural components of small stream systems; any reduction in the ability to retain organic material ultimately decreases the effectiveness of the system to process leaf litter and greatly reduces the energy base of the system (Bilby and Likens 1980).

In a study of a Victorian mountain stream (Blackburn, Petr 1979), branches, bark and leaves at 40%, 22% and 29% respectively made up the majority of the allochthonous input. This energy input to the stream was measured at 2838 Kcal per square metre per year and supported 24 different kinds of invertebrates. There was little or no primary production from photosynthesis. Though the surrounding mature forest was estimated to yield 6 tons dry weight of litter per hectare per year to the forest floor, no measurement or estimate was made of the source distance of the litter reaching the stream channel.

Apart from facilitating the processing of organic matter, Bilby (1981) found that debris dams also moderate the flow of sediment in small streams. Bilby (1981) showed that removing debris dams in a second order stream produced a 500% increase in the export of both fine particulate and course particulate matter. The debris dams actually dissipate the kinetic energy of the water flow and thus reduce the energy available for carrying sediment; the energy dissipation due to debris dams in first, second and third order streams respectively was 68.3%, 74.5% and 38% (Bilby 1981). The low figure for third order streams was attributed to the lower incidence of debris dams in these faster flowing larger streams. Because a stream does not flow water all the year, this does not mean it is not part of the process of energy flows in stream systems. Large amounts of litter accumulate in temporary stream channels, and the first heavy rainfall causing overland flow moves the litter downstream where it becomes part of the organic matter in the benthos (Lake 1995). Whilst leaf litter inputs can be maintained at preharvest levels with buffers equal to one half the site potential tree height, large woody debris to be maintained at preharvest levels requires buffers of at least one

Continuing long-term recruitment of large woody debris can only be ensured with wide unharvested buffers.

site potential mean dominant tree height (Dignan et al 1996). Buffers narrower than the dominant tree height will result in trees falling across rather than into streams (Dignan et al 1996). Continuing long-term recruitment of large woody debris can only be ensured with wide unharvested buffers.

In the Tasmanian situation, Askey Doran (1993) has criticised the arbitrary nature of current F.P.C buffer strip prescriptions in failing to protect riparian vegetation from abiotic effects or to maintain an appropriate ecotone. Similarly Neyland (1991) has established the need for providing 40 metre buffers to protect relict rainforest patches; rainforest species commonly occur in the riparian zone of wet eucalypt forests often a feature in *A. gouldi* habitat. Dignan et al (1996) propose that *"protection of the riparian vegetation from biotic and abiotic edge effects may require buffers in excess of one site potential tree height"*. The distinctive riparian vegetation/habitat helps maintain a distinct microclimate along stream channels and also regulates the exchange of nutrients and materials from upland forests (Dignan et al 1996). *A. gouldi* is known to be fairly motile (pers. com. Jim Nelson, Tim Lynch) however as they are a gill breathing animal their motility on land may be dependent, especially for extended periods, on cool moist conditions. Class 4 streams were noted to be consistently cooler than the streams into which they were flowing; this was felt to be a significant factor in maintaining the habitat requirements of *A. gouldi* (Lynch and Blühdorn 1997). Certainly retaining all riparian vegetation to the width of mean site potential tree height would maintain temperature and light regimes at preharvest levels. Davies and Nelson (1994) showed that buffers greater than 10 metres were sufficient to maintain temperatures on Class 2 streams. However as Dignan et al (1996) point out, streams Class 3 and 4 are *"so narrow that a functionally continuous canopy usually exists. In this case, removal of upslope forest on both sides may have additive or possibly synergistic effects on microclimatic conditions."* This microclimate in small streams is certainly important for the distinctive riparian flora and it is bound to be inextricably linked to rates of litter processing and thus the energy flow through the whole stream system.

In the Growns (1994) study a number of *A. gouldi* with carapace length in the range of 10-20mm were found in Eel Hole and Garden of Eden creeks. Deloraine Field Naturalist members Bruce Worth and Jim Nelson have both confirmed that these small *A. gouldi* were found in the interstitial spaces in stream riffles. Jim Nelson also states that females both berried and dispersing young were found moving up the smaller streams indicating the probable importance of headwater streams. Whilst larger *A. gouldi* may be able to temporarily leave degraded habitat, it is doubtful whether smaller specimens have the same option and

without scientific evidence to the contrary, it would be reasonable to assume that small juveniles suffer similarly to other macro invertebrates as a result of increased sedimentation.

Growns(1994) noted that most crayfish from disturbed sites were large males; the inference from this is that juveniles cannot utilise degraded habitat. Lynch and Blühdorn (1997) also raise concerns that the crayfish require differing habitats for different stages of their life-cycle. It is important to recognize that sedimentation largely only occurs during significant storm events. Campbell and Doeg (1989) state that *"The overwhelming majority of sediment transport occurs in streams during periods of high flow, and studies which fail to sample intensively through such events, and analyse the data on an event basis, produce such gross underestimates of sediment load as to be almost worthless. Such studies should no longer be countenanced"*. Deposited sediment fills the interstitial spaces in the stream bed, degrading the habitat; *"redistribution and transport of deposited sediment within the stream may continue for many years, continuing to disturb the instream communities"* (Campbell and Doeg 1989).The application of buffers equal to the site mean tree height should prevent sedimentation occurring, as it would be anticipated that in most instances buffers would be greater than the 30 metres recognized by most authors as being sufficient to prevent sedimentation via overland flow. However Davies and Nelson (1994) noted that 30 metre buffers and larger may not be sufficient to prevent channellised flow of sediment from reaching the stream system.

It is well established that removal of forest vegetation will alter the hydrology of a catchment. Campbell and Doeg (1989) point out that there are many variables involved in these hydrology changes some of which are site specific. One Australian study indicated a doubling of water yield immediately following clearfelling; 12 years later it had declined to half the original water yield as the young regrowth increased its water demand (Campbell and Doeg 1989).

Leaching of the detritus of the whole catchment provides dissolved organic matter to the streams (Bunn 1986). Some of this dissolved organic matter is used by the microbial community on leaf surfaces and thus becomes an important source of food for instream detrivores (Bunn 1986). It is unlikely that any stream organism can be entirely isolated from any large scale changes (such as clearfelling, conversion to plantation or clearance for agriculture) in a catchment. It should be borne in mind that even with buffers of 100 metres, clearfelling can have impacts down to the species level (Growns and Davis 1991).

To summarize, as a **precautionary measure**, where timber harvesting is to occur, the essential part of protecting *A. gouldi* habitat should be to **maintain all energy inputs, all light and temperature regimes and all**

structural components of the habitat at preharvest levels. To this end reserves equal to or greater than the site specific mean dominant tree height as recommended by Lynch and Blühdorn (1997) and by the Recovery Plan, are seen as essential on all Class 1,2,3 and 4 streams where *A. gouldi* is known to occur. Additionally, roading , stream crossings, in-coupe management and the use of fire should be in accord with the recommendations of Lynch and Blühdorn (1997)

The Forest Practices Board has just released a new updated version of the Threatened Fauna Manual which prescribes the various management prescriptions for threatened or rare species. Unfortunately the Fauna Manual does not prescribe a precautionary approach to *A. gouldi* with management prescriptions that are only recommendations with discretional terms like "should" and "consideration". The Tasmanian Government has clearly agreed to apply relevant management prescriptions for Priority Species listed in Attachment 2 (Part A) of the Tasmanian Regional Forest Agreement.(RFA). There appears to be no discretional option allowed in this case and others under the RFA.

The Fauna Manual specifies the same streamside reserves as for native forests on second rotations of plantations planted prior to the establishment of the Forest Practices Code and this is over and above the current prescription in the Forest Practices Code and is seen as a definite improvement. However the recommendations for streamside reserves in native forests is barely changed with just the discretionary suggestion that there should be no selective logging of streamside reserves in key catchments and within 10 metres of class3 streams of non-key catchments, otherwise there is little change over and above the Forest Practices Code.

Unfortunately the Fauna Manual does not prescribe a precautionary approach to *A. gouldi*...

In conclusion, the latest Fauna Manual ignores the recommendation for stream buffers that are set out in the Recovery Plan for *A. gouldi* which was prepared under RFA objectives to protect and recover the species. Clearly, this is an unacceptable result that must be amended. The arguments for an appropriate and prudent approach to stream buffers is contained in the Recovery Plan, and the studies contained in this paper support those recommendations.

Additionally, it would appear that the prescriptions of the Forest Practices Code are inadequate in maintaining ecological processes in all streams where timber harvesting occurs and especially in the case of headwater streams. The forestry industry received a great deal from the RFA. The meager conservation trade-offs must not be held up or subjected to further compromise.

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Natural History & Calls of Tasmanian Frogs

A new run of our frog tape has arrived. The audio tape includes all the calls of our 11 frogs, plus a beginning and an advanced side detailing their natural history. Only $10, or $12 posted. Contact Jim or Bruce.

DICK YOUNG , ECOLOGIST

by Jim Nelson

I would like to introduce a man I met about a decade ago when I returned to my childhood haunts. His name is Dick Young. It turns out that Dick lived a few miles down the river from my family. I remember how we used to pile into the old chevy about once a week to take drives down the river to view water birds, autumn colours, etc., and we almost always passed a unique house with a sod roof set along a quiet section of the river with inviting natural vegetation. Thirty-odd years later I was amazed to find that this is Dick's house, and that just a few miles away lived this extraordinary man who could have answered the questions of my youth and could have been (at least in the speculative imagination of lost opportunities) an important mentor. However, he has indeed now become something of a mentor through a book he wrote called Wild Plants and Natural Areas of Kane County. I frequently leaf through this book stopping to read with rushes of nostalgia the recognised plants of my youth, and at last I know what some are called. (Where is that damn 'itch weed'?) But in an area where over 90% of the plants now growing are introduced (even discounting agricultural crops which occupy about two-thirds of the area), the last unspoiled remnants are vitally important. Critical to their retention and the future of the natural environment is the need to change attitudes, and in this Dick's words are also relevant to Tasmania. Here is part of a superb naturalist's preface to his book:

It is an ecological axiom that the greater the biological diversity, the healthier, and certainly more interesting the habitat.

..."However, plant identification is not the primary purpose of this book...Rather, our purpose is much larger in scope; it attempts to acquaint the reader with the Kane County flora and our few remaining natural areas; to urge the protection of our native plants wherever they are found, to commend the use of native material where appropriate in our plant communities and to encourage a much wider diversity of all plants in the environments we shape and influence. It is an ecological axiom that the greater the biological diversity, the

healthier, and certainly more interesting the habitat.

Nature, of course, is in a constant state of change, but within healthy change, stable life communities persist with species continuing and being mutually compatible in their interaction, and though positions may shift with generational succession, a complex stable balance remains. It is our hope that more people making land-use changes in the future will recognize the advantages and importance of protecting our heritage and establishing healthy ecosystems in the landscape.

Most land-use change occurring in Kane County, tends to simplify and degrade rather than enhance environmental richness. Landscaping, which is often relegated to an afterthought in project planning, definitely deserves more attention lest we seriously deplete our lovely countryside. All too many people destroy the very thing they are seeking by trying to beat nature into complete submission. Prodded by advertising hype and mistaken notions of neatness and order, they expend great effort and money to make expansive lawns look like putting greens and clutter their yards with sterile, ornamental exotics which offer so little in stability and interest now and pass on even less to the next generation. Instead of healthy, balanced plant communities we are gradually acquiring an herbicide dependency trying to maintain unnatural imbalances.

The culmination of this approach is seen at the local self-service gas station where plastic evergreens are perched atop stone chip mounds in an abortive effort to soften the harshness of our man-made world and its often incongruous and antagonistic land uses.

We sense that these events are heading in the wrong direction, but we fail to define the problem or its root causes, and we blame development generally, rather than the way we develop. ...Should all of our lawns and nooks and corners be mowed and manicured so there are no seeds for food and places for burrows and nests? And what of the woods nearby with the standing dead trees? Are we unkempt or slovenly to leave them standing as ..(habitat). There is still ample room in our neighborhoods for wetlands and Green Herons, ponds for frogs and turtles, woodlands for coons and squirrels and sunny meadows for Bobolinks and Red Admiral Butterflies. If these amenities are obliterated the quality of our life is diminished as surely as if a drag strip or sleazy Go-Go Bar were zoned nearby. However, they need not be diminished as an inevitable consequence of growth for in most cases we could improve and inrich the

We sense that these events are heading in the wrong direction, but we fail to define the problem or its root causes..

quality and balanced complexity of our landscape. And, if some habitats simply must be destroyed for a needed change we ought to think about compensatory replacement for plants and wildlife...

Finally, there is something uniquely compelling about our few unspoiled natural communities with their constituents and order substantially unmodified by the massive disruptions attending most of modern man's interventions. For, if there is indeed a natural habitat for humankind among the vast and divergent milieu of biological communities on the face of this planet, where the human organism is genetically attuned in homeostasis; then surely it is far removed from bleak high-rise apartment neighborhoods, and quite close to one of these. Moreover the human intellect and spirit still seek communion with a Natural Order as revealed throughout recorded history, and certainly as important as saving native parts is perpetuating these irreplaceable sanctuaries. If one treads softly here, she or he can meld into the ageless unfolding natural drama and find a measure of wisdom and contentment that transcends our feverish accomplishments."

What is there left to say?

FUTURE ISSUES

This is the first publication of the CNFN. We intend to publish a bi-monthly issue as we did with the DFNG BULLETIN. But we would like to make some changes, and we would like those changes to reflect what the membership wants in their publication. One of the problems we have had is too few people involved in providing material, and we have decided to have a system of sub-editors, each of whom will be responsible for providing material for a regular column, e.g. Birds. Therefore, we would like to hear from anyone out there who would like to be responsible for a bi-monthly column.

We would also like all kinds of other material, such as photos, artwork, relevant news items, observations, opinions, book reviews, poetry–you name it! The idea is to have the best natural history read in Tassie, and we need your enthusiasm and most of all your contributions. We would also like a snappy name. We will probably keep our logo, the giant crayfish, but we have already decided against calling the publication "Cray Bait". But we are willing to consider something equally outrageous, and you may well come up with a **prize** for a name that grabs us. Get Gnatural? Oh well, over to you!

If you have not paid your subs, please do so soon because they were due from March 1st. This publication chews up the large portion of your subs, so help us give you more for your money–contribute!!

CNFN MEMBERSHIPS now due

Individual–$15

Independent Young Adult 12-18 yrs–$5

Family–$20