CASE STUDY

THE WHITE-BELLIED FROG

Reversing the Trend:
Geocrinia alba – The White-Bellied Frog

PROJECT TITLE
Providing for *Geocrinia* Stage 1 (2011) and Stage 2 (2012)

PROJECT LEADER
Lorraine Duffy

PROJECT MANAGER
Lorraine Duffy

PROJECT DURATION
2011 – 2012. This project has continued into 2014

PROJECT AREA
Lower Blackwood River and tributaries

PARTNERSHIPS
Perth Zoo, Department of Parks and Wildlife (DPaW: formerly Department of Environment and Conservation (DEC)), Lower Blackwood Land Conservation District Committee (LBW LCDC)

SUMMARY
Geocrinia alba (White-bellied frog) is federally listed as endangered and critically endangered by the State. Natural populations have declined 30% in 20 years.

Geocrinia vitellina (Orange-bellied frog) is federally and state listed as vulnerable. The distribution is so restricted a single fire could render the species extinct.

Both *Geocrinia alba* and *G. vitellina* frog species have increased protection through off site (ex-situ) conservation at the Perth Zoo and restocking of natural populations through captive-rearing and translocation.

Wild populations were boosted with the translocation of 75 *G. alba* frogs in 2011/12, with an additional 74 young frogs awaiting translocation in 2013. Twenty-seven young *G. vitellina* were translocated in 2011/12 with an additional 98 young frogs awaiting translocation in 2013.

ABOVE: *Geocrinia alba* (Photo: Perth Zoo)
TOP LEFT: Re-vegetation at Chapman Brook (Photo: SWCC)
BOTTOM LEFT: *Geocrinia alba* (Photo: SWCC)

This project is supported by the South West Catchments Council, through funding from the Australian Government's Program, Caring for Our Country and the Government of Western Australia.

Reversing the Trend: the White-Bellied Frog (*Geocrinia alba*)

Once occurring in noisy abundance, White-bellied frog populations are now highly fragmented and marginalised. Sadly many creek lines have fallen silent, or only have one or two male frogs left calling for a mate.

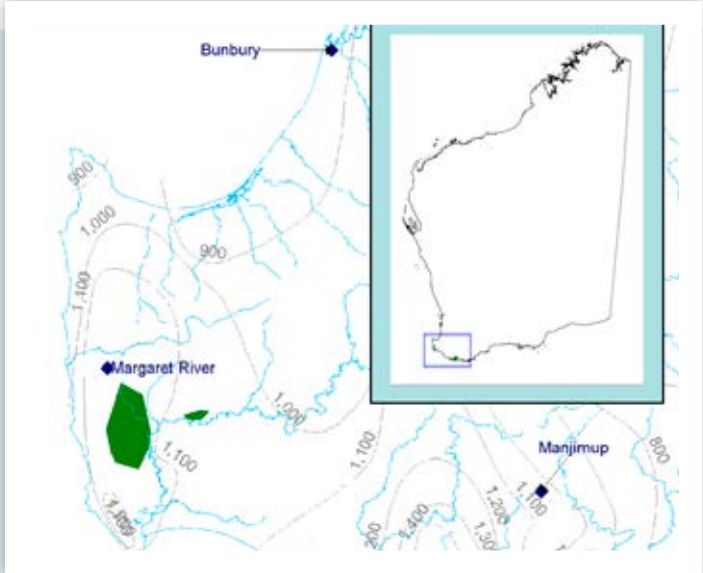
The White-bellied frog (*G. alba*) is on the edge of extinction. The species is listed as critically endangered by the State and endangered by the Australian Government. It is known only to creek lines of Margaret River and Witchcliffe and has recorded a population decline of 30% over the last 20 years (DEC, 2013).

Nearby in state forest, *G. alba*s' sister species, the Orange-bellied frog (*G. vitellina*) also hangs onto existence. Listed as vulnerable at a State and National level, this species is restricted to an area of habitat so narrow that a single fire event could render it extinct.

The South West Catchments Council (SWCC) has played an active role, working collaboratively with stakeholders, to implement recovery actions for *Geocrinia* under the Lower Blackwood Linkages project.

In particular, with 50% of all *G. alba* frogs occurring on private lands, it was clear from the outset that successful engagement of priority landholders would be necessary for the protection of *G. alba*.

SWCC has also contributed funding to a successful frog bred-for-release program in partnership with Perth Zoo and DPaW. This program rears *G. vitellina* for release into the wild and both breeds and rears juvenile *G. alba*, also for release into the wild.



"The fate of *Geocrinia alba* rests equally on the combined effort of private property landholders and conservation estate managers to protect remaining populations and their habitat."

Kim Williams, DPaW SW Regional Leader Nature Conservation

Restoring the Lower Blackwood Together for *Geocrinia*

As a collaborative, landscape scale project, the SWCC Lower Blackwood Linkages project has managed critical threats degrading ecological values of the lower Blackwood River and more specifically, an area known as the Lower Blackwood High Ecological Value Aquatic Ecosystem (HEVAE)*. The ecosystem is recognised as a significant environmental asset of importance to the environment, lifestyle and economy of the south-west region.

Approaching threat management strategically at a landscape scale has allowed threats; immediate (ie. stock trampling, feral pigs and fire) and longer term (i.e. water availability and quality) to *G. alba* to be addressed while also reducing threats to the HEVAE.

Threats have been addressed in a multi-faceted approach through collaboration with stakeholders including Perth Zoo, DPaW, Department of Water (DoW), LBW LCDC, Shire of Augusta-Margaret River and local landholders.

"The zoo's captive rear and breed-for-release program provides some hope that the amphibian, which is endemic to WA, could be brought back from the edge of extinction."

Bill Marmion, then Minister for Environment, Government of Western Australia – Media Release 7/9/2011.

RIGHT: Perth Zoo Captive Frog Breeding Laboratory. (Photo: SWCC)
ABOVE: White (left) and Orange-bellied (right) frog locations. (Map: SWCC)

Getting the frogs to breed

The program first started at the Perth Zoo in 2006, with development of rearing techniques using a more common, related species *Geocrinia rosea*. However, it was not until 2009 when the Zoo first collected *G. alba* and later *G. vitellina* (in 2010) to establish breeding colonies. In addition, eggs of the two *Geocrinia* species have been collected annually in the wild and reared in captivity. The majority of juvenile frogs raised from these egg masses have then been translocated into the wild, with some remaining at the Zoo to restock the breeding colony. In 2010 and 2011, in an Australian first, the *G. alba* breeding colony bred successfully in captivity. Despite repeated efforts however, captive breeding with *G. vitellina* has not yet been achieved, although female frogs have produced eggs.

Table 1 Numbers of *G. alba* and *G. vitellina* captive-reared or captive-bred and released into the wild.

Species	2010	2011	2012	Total
White-bellied Frog *G. alba*	70	31	44	145
Orange-bellied Frog *G. vitellina*	-	7	20	27

Translocation efforts

Translocation of *G. vitellina* was first undertaken by the then DEC between 2000 and 2006. The direct egg mass translocation technique first used involved collecting egg masses and relocating them directly to a nearby translocation site. More recent translocation has involved raising collected egg masses or egg masses bred in captivity at the Zoo and then releasing these young frogs into the wild.

Translocation site monitoring for both species in 2012 has been promising with an increased number of calling males recorded at both the *G. alba* sites. This confirms direct egg mass translocation and captive rearing for release are effective methods. It also confirms *G. alba* can persist but is highly dependent on careful selection of a release site with suitable microhabitat parameters.

Selecting the best release site can take two or more years and requires multiple visits in all seasons and conditions to ensure the site provides the right mix of parameters to maximise frog survival and translocation success.

In addition, the captive rearing method has been identified as a key method of improving survivorship in juvenile frogs which have been shown to suffer very high levels of mortality and predation in the first year after metamorphosing in the wild. Overall, the survival of the *G.alba* individuals bred in the laboratory have been outstanding and in comparison to the egg mass translocation technique appears to significantly shorten the timeframe and increase certainty to the translocation process.

Supporting the breeding program

Although the breeding program has successfully boosted numbers of *G. alba* in the wild, species survival is also threatened by key threats operating within the species habitat.

SWCC, together with project partners, have implemented a range of on-ground activities to address some of the manageable threats.

DPaW has been funded by SWCC to undertake a feral pig trapping and baiting program within the HEVAE. This has included monitoring at 37 sites, a feral pig trapping program and a series of bait trials to test the efficacy of the commercially available 1080 Pigout© feral pig bait. Through trapping from 2010 to 2012, over 50 pigs were removed from an area covering 37,500ha.

A range of other activities to reduce threats have been funded and or delivered by SWCC either directly or through project partners. These include;

SWCC & LBW LCDC: On ground works 2011-13

Blackberry and pasture weeds have been controlled to prevent encroachment on frog habitat. 65.5ha of the former and 37.5ha of the latter have been treated.

The impacts of stock and vehicle access on riparian areas have been addressed by installing over 28.2km of fencing, protecting over 1600ha of remnant vegetation. An off-stream water point and a concrete stock crossing have also been installed protecting over 4km of stream bank.

Over 6.5km of firebreaks on McLeod Creek and a conservation reserve have been re-established to improve fire vehicle access to key populations of *G. alba* and over 1500ha of remnant vegetation.

In addition, over 65,000 seedlings have been planted out to revegetate 28.8ha of stream bank.

A river action plan has also been developed for McLeod and Rushy Creeks to determine creek values and prioritise future on-ground activities.

Department of Water: Index of River Condition

Key reference sites have been monitored to establish baseline monitoring values for water quality and condition. This was completed through a SW Index of River condition assessment involving water quality sampling and identification of ecological values, including habitat types

LEFT & FAR RIGHT: Feral Pig Baiting Trial (Photo: SWCC)

(permanent pool, nurseries) and species present (vegetation, macro invertebrate assemblages, fauna and aquatic species). It also tested for presence of herbicide and fertiliser pollutants, known disruptors of growth and development in *Geocrinia*.

DPaW: Geocrinia monitoring

DPaW staff and volunteers conduct annual monitoring of wild and translocated *Geocrinia* populations. SWCC has contributed funding over the 2012 and 2013 monitoring periods to allow this program to continue.

Under the program, DPaW maintain and monitor a series of temperature, humidity and rainfall loggers at a number of key *Geocrinia* sites, which plot local environmental conditions across daily, seasonal and annual timescales to correlate with population monitoring results.

DPaW also undertake a weekly monitoring program of all *G. vitellina* and selected *G. alba* sites, patrolling for activities which disturb and destroy frog habitat.

Together project partners have also developed a brochure with advice for landholders and community groups on how they can help *Geocrinia*. The brochure 'On the Edge of Extinction' is available on the SWCC website.

What does the future hold?

The project has been successful and a number of key lessons learnt to improve future project management. The most important is the need for secure funding over a number of years to ensure captive rearing and breeding techniques can be optimised and wild populations stabilised.

Secondly, collaboration and development of partnerships has been key to strategic, long term management of threats across the HEVAE landscape. Collaboration has also provided greater flexibility to meet changing investment priorities of the State and Commonwealth Governments, yet still reach the broader goal of HEVAE protection.

Finally, working closely with landholders has been important for implementing best practice management practices on-ground and to drive lasting behavioural change.

Further Information

Reversing the Trend: Brochure http://swccnrm.org.au/wp-content/uploads/2011/09/SWCC-GeocriniaBrochureFinal.pdf

Captive Frog Breeding Program http://www.perthzoo.wa.gov.au/conservation/native-species-breeding-programs/frogs/perth-zoos-amphibian-breeding-andresearch-program/

Geocrinia Recovery Plan http://www.dec.wa.gov.au/pdf/plants_animals/threatened_species/frps/geocrinias_wmp19.pdf

The Lower Blackwood HEVAE – a south-west arc*

The Lower Blackwood HEAVE includes the lower Blackwood River and all significant tributaries from Poison Gully near Nannup to Molloy Island in Augusta. It is the largest river in south-western Australia and an excellent example of the lower reaches of a river with tributaries in near-pristine condition.

Reaches provide a diversity of habitats from peat swamps to permanent freshwater pools, providing a diversity of aquatic and micro-aquatic habitats vital to fish (7 of the 8 south-west freshwater species) and invertebrate species. They also provide refuge and breeding areas for over 1300 flora and fauna species, including the threatened species; White-bellied and Orange-bellied frogs, *Reedia* (a sedge species), Quokka, Red-tailed black cockatoo, Western Ring-tail Possum, Western Mud Minnow, Woylie, Brush-tail Phascogale and Western Quoll.

Things the public and landholders can do to help *Geocrinia* include:

- Keep your fences in good condition and stock out of creeks.
- Install off-stream stock watering points and stock crossings.
- Ensure adequate buffers and appropriate wind conditions when spraying chemicals near watercourses. Never spray over standing water or before rainfall.
- Use frog friendly organic fertilisers and low toxicity, biodegradable herbicides such as Fusilade® and Glyphosate Bioactive® and avoid using surfactants.
- Do soil testing before adding fertiliser as there may be sufficient amounts in the soil.
- Ensure environmental flows from upstream dams are maintained all year and prevent construction of any fish barriers.
- Prevent fire from entering creek and watercourse vegetation, by maintaining firebreaks.
- Retain remnant vegetation, and healthy stock grazing rates to prevent erosion and sediment entering creeks and watercourses.
- Investigate funding eligibility for on-ground works including revegetation, fencing and weed control from SWCC and other sources.
- Enhance and protect the values of your land with a conservation covenant.
- Report any illegal drug growing activity to police as plantations threaten frogs through disturbance and fertiliser pollutants.

CARING FOR OUR COUNTRY

SWCC
south west catchments council
working together to make a difference today and develop a sustainable environment for tomorrow.

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