Are biodiversity offsets an appropriate way to conserve grassy ecosystems?+

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Abstract: Whether you like them or not, biodiversity offsets are now an established instrument for conserving Natural Temperate Grasslands and grassy woodlands in our region, and Australia generally. In this talk I would like to step through the arguments for and against biodiversity offsets, and critique the way biodiversity offsets are applied in this region.

Do you think biodiversity offsets are an appropriate way to manage grassy ecosystems in regions facing increasing population and development?

I ask this question in the context of habitat loss being recognised as an important factor affecting biodiversity loss. In 2011, Megan Evans and colleagues compared factors that are threats to Australian species, and found that habitat loss was the factor that had most effect on endangered species. As we know, habitat loss is often a consequence of development.

In the ACT, population projections for 2007–2056 suggest that by 2050 the population here will have increased by 53%, the economy will have tripled and globally there will be a 70% greater demand for food.

Given a choice, which of these three options would you choose to manage grassland habitat and biodiversity loss, if you were an ACT resident?

(a) Stem population and economic growth.

(b) Permit high-density housing in your street.

(c) Allow some clearing if impacts can be offset.

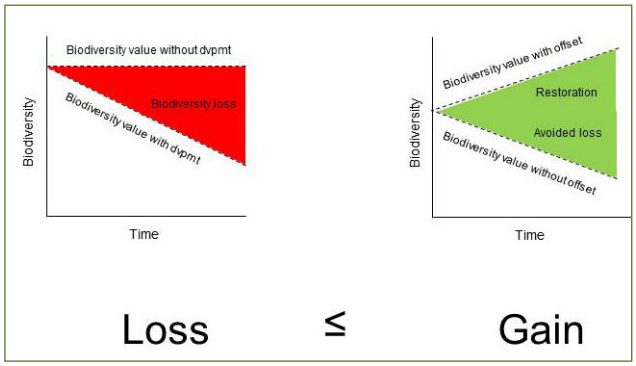
I would expect there would be a range of opinions and responses.

Stemming population growth and economic growth could be seen as a useful policy response, but our policy makers and our politicians tend not to go down that route. Conversely, to counteract habitat loss in Australia, use of biodiversity offsets has become a popular policy instrument. It is being applied in ACT in an attempt to decouple habitat loss from the ongoing demand for housing and general development. The ACT policy-makers have also, to some extent, chosen option (b) – that is, urban infill – but they have really grasped onto biodiversity offsets, option (c).

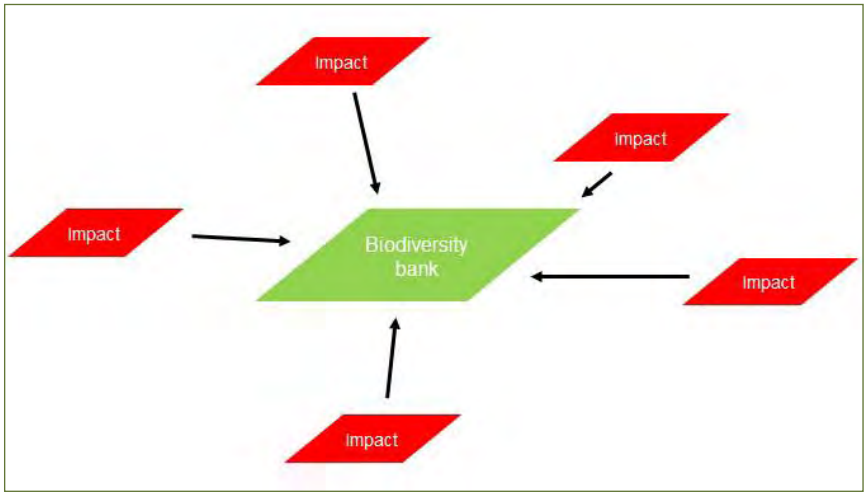
Biodiversity offsets and how they work

The definition of biodiversity offsets by an international group called the Business and Biodiversity Offsets Programme is: 'measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development...'.

Biodiversity offsets are shown diagramatically in the equation and graphs (at right). In these, biodiversity is on the vertical axis and time on the horizontal axis. On the 'loss' side, the top of the red wedge shape is the biodiversity value of a site without development; when it is developed there is biodiversity loss.



It might be urban development as in the photo (at right), where Box–Gum grassy woodland has been cleared for the new suburb of Moncrieff in Gungahlin ACT. It might be agricultural development. The aim is to try to offset that loss with equivalent gain elsewhere at another site somewhere else. In the loss–gain diagram biodiversity is declining over time, but it is assumed that action can actually improve the biodiversity on that site. So theoretically there are two components of potential gain with biodiversity offsets. Loss is avoided by stopping a loss that might otherwise have occurred under business as usual, and restoration provides gain. The idea is that there is enough restoration so that the loss is less than or equal to the gain.



Often, biodiversity offsets are introduced as 'mitigation banking' or 'biodiversity banking' (diagram at right), where a series of impacts are offset by a consolidated biodiversity 'bank', in dedicated areas that take in losses from a range of sites.

There are biodiversity offsets in 72 countries now, either accepted as policy or in development. The concept has been embraced by a series of development banks globally and at least 38 companies (at last review) that voluntarily use offsets, including Rio Tinto, and Walmart in the United States.

One of the problems with biodiversity offsets is that offsets sound so logical and easy and win–win: that you can develop and just offset that impact elsewhere, or in other words 'have your cake and eat it too'. For instance, Owen Patterson, the Secretary for Environment in the United Kingdom where they are really embracing biodiversity offsets, is reported as approving: 'Developers can build on nature reserves – if they "offset" the damage elsewhere'. That would be taking it to the worst extent.

Politicians and policy makers in Australia have been lured by offsets and their apparent simplicity and win–win outcomes, and offsets have been adopted at the Commonwealth level, and in Victoria, ACT, New South Wales – in fact, most states have offset policies now.

Advantages of offsetting

Offsetting has some advantages. From the viewpoint of economics, offsetting puts a price on biodiversity, solving the longstanding problem that biodiversity has been seen as an 'externality' with no value. Under biodiversity offsetting, a developer can clear or develop an area without paying for the biodiversity loss there, but in offsetting the impact they pay a cost elsewhere. Offsetting internalises the cost into the development; and theoretically that means there is greater incentive to avoid the loss of biodiversity. A developer is expected to say, 'Well I want

to minimise my cost, so I am going to avoid more biodiversity loss'. However, inquiries into offsets, in the Senate for example, have found some big developers do not really care because the cost is not high enough at the moment to have a big influence on their development decisions.

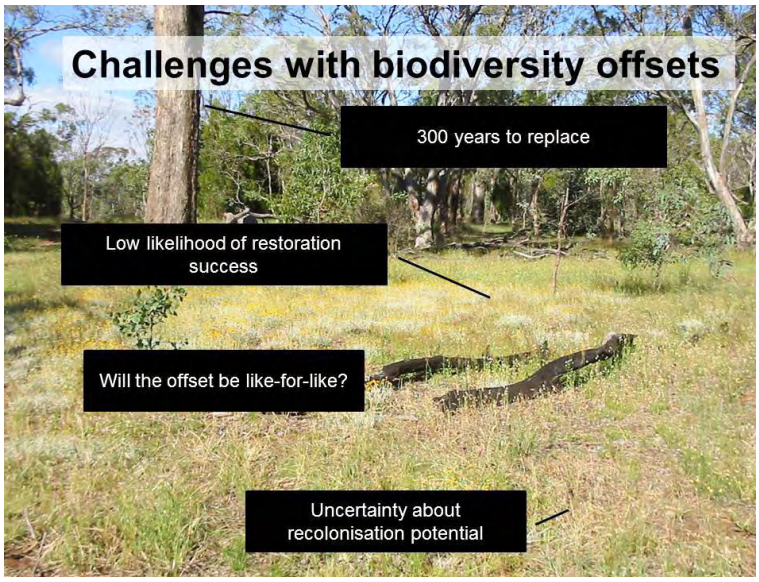
Another advantage of biodiversity offsetting is that it provides additional funding for biodiversity conservation, which otherwise is very small: the Commonwealth environment portfolio budget is approximately 12 days' worth of the budget of the Department of Defence (calculated from Budget Paper No. 4, 2014–2015). Biodiversity offsetting brings in money from people who are having a negative impact on biodiversity and puts it into conservation. It seems like a good thing, at face value.

A third advantage is transparency. We might argue that biodiversity offsets are not very transparent, but they are much more transparent than traditional impact assessments. Biodiversity offsetting is like a balance: to try to create a balance between loss and gain you have to report on the amount you are losing, and on the amount you expect you are gaining. That is better for transparency than much of the decision-making that has gone on in the past.

Fourthly, biodiversity offsetting results in no net loss of biodiversity … theoretically.

Challenges

These arguments in favour of biodiversity offsets often convince policy makers or politicians that it is something that they should embrace. However, there are also many challenges with biodiversity offsets. Some of the challenges can be demonstrated with my photo below, of a grassy woodland with Yellow Box *Eucalyptus melliodora* and groundstorey vegetation.



Yellow Box can live for about 500 years and start producing hollows from about 150 years onwards. Darren Le Roux, a PhD student, found that in the ACT the big old trees support about one-third of Canberra's woodland birds including some species that rely entirely on old trees. It might take 300 years to replace those old-tree values. That is one problem with offsets – the time lags.

Second, there is a low likelihood that the flora and herb community in the groundstorey can be successfully restored, especially at sites with nutrient-enriched soils. It can be very difficult to take a relatively intact site and replicate it elsewhere. There is a very low probability of success, even if plenty of money is available.

Third, there are threatened species in these ecosystems, and we still do not know much about translocation and whether that can build new populations in the habitat we have currently – into which dispersal is often difficult.

Finally, will offsets be like for like? Grassy ecosystems have many different components and for offsets they are combined together into one set of requirements and then that set is taken elsewhere. The complexity of these systems gets lost in the trades that occur in offset policies.

How offsetting is done

There are three types of offsets: restoration offsets, advanced offsets, and avoided-loss offsets.

With ***restoration offsets***, recognising that losses caused by development over time reduce biodiversity value, there is an intention to restore the site to achieve a gain that is greater than or equal to the loss. But there is a problem. If the delay between loss and gain is longer than approximately 55 years then offsets based on restoration are not generally feasible (Gibbons et al. 2015). This means that the range of biodiversity attributes you could offset with restoration offsets is fairly limited. A review by Martine Maron and colleagues on the success of restoration says restoration projects typically have success rates between about 20% and 50% (Maron et al. 2012). Another study (Curran et al. 2014) reports that only 19–50% of cases of ecological restoration achieve no net loss of species diversity within 100 years. That is, fewer than 50% of restoration programs replicate the diversity of species lost, within 100 years. It takes a long time for restoration programs to really start to replicate the systems that they are intended to replicate. The take-home message is that restoration is hard to do.

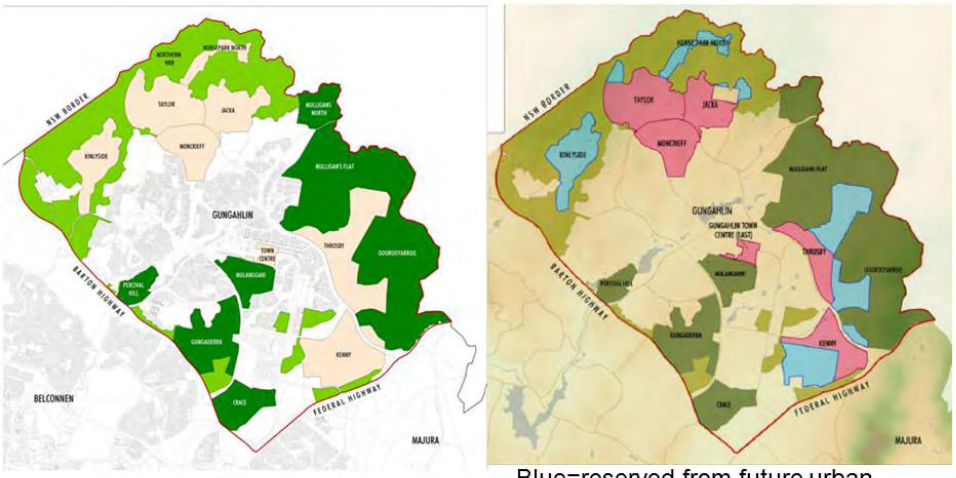
I am proposing that we need to use ***advanced offsets*** more often. With typical offsets for restoration, the habitats are cleared before the attempt is made to find a biodiversity offset. A site is identified and put aside and restoration is begun, but this sequence brings much uncertainty, and many time lags. I propose that the offset needs to be set up first – in *advance*. That way, we know what biodiversity has actually been restored and that guides what development can be done. I suggest this removes both the delay between loss and gain and the uncertainty.

As an example, the ACT Government applied an advanced offset under the EPBC Act. They used a site (Watson Woodlands) that had been improved by volunteers and put aside before offsets were even thought of, and that gave immediately 10 years of gains. This is really not good, because the concept of *additionality* is important; it means that offsets should be additional to the habitats that are there in the first place. More information on additionality is given on the 'Background Briefing' program (16 March 2014, ABC TV, photo at right), which talks about the trouble with offsets, and Watson Woodlands features in that.

The third alternative approach to offsets uses ***avoided loss***. In this approach you know the loss that will occur because of development, and you achieve gain by stopping the loss that would have occurred under the status quo of business as usual. For example, if a place is going to be developed for housing, you set part of that area aside from housing. That way you can secure really high quality habitat – old trees, and other aspects that are hard to restore.

Avoided loss is a useful component of the offset arsenal. This approach was used in North Canberra (see maps below): all the blue areas that would have been developed under the status quo (the Territory Plan) were put aside. However, it also has problems.

The problem with avoided-loss offsets is that there is still loss. It is less net loss, not no net loss, and it is only slowing the rate of loss of biodiversity. It does not reverse biodiversity loss completely.



Beige=proposed suburbs

Blue=reserved from future urban development as offsets

Finally, a comment on ***permanence***. Offsets are supposed to be permanent. They are supposed to be put in place for as long as the impact occurs – that is, in perpetuity. The problem is that there have already been breaks in that; for example, the mining industry in the Hunter Valley (NSW) has said it now wants to mine in an offset, and the responsible Commonwealth office has allowed the offset to be moved. Impermanence is less likely to be an issue in the ACT, where many offset sites are being placed in formal reserves such as Kama Nature Reserve.

In summary:

- offsets can reduce the rate of loss of grassy ecosystems if they are established in advance of impacts;
- avoided-loss offsets can avoid some loss of biodiversity, and slow the rate of loss, but cannot avoid all loss; and
- offset actions must be genuinely additional; we cannot use previous restoration.

Overall, offsets are not a silver bullet.

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