Enhancing biodiversity on working agricultural lands through environmental mitigation and offsets: Opportunities in Australia and the United States

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Abstract

Australia has extensive experience in managing working agricultural lands to enhance biodiversity. State and Commonwealth agencies are increasingly using environmental offsets as a tool to manage the impacts of development. However, working agricultural lands are generally not considered a source of potential environmental offsets, as agencies prefer that land used for offsets be wholly set aside for environmental management purposes with limited or no agricultural activities. This contrasts with the United States, where efforts are underway to use working agricultural lands for mitigation.

This paper proposes that working agricultural lands can be used for environmental offsets under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act). There are no significant legal barriers to this occurring, and the increased use of working agricultural land for offsets could achieve long-term environmental gains, address the shortage of land available for environmental offsets in Australia, provide landowners with additional income, and improve our collective expertise at sustainable agriculture.

Keywords: working agricultural lands, environmental offsets, biodiversity, Environment Protection and Biodiversity Conservation Act 1999 (Cth), Australian federal environmental law

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1. Introduction

1.1. Australia’s degraded agricultural landscapes

Australia is one of twelve biologically mega-diverse nations, but has a poor record of conserving biological diversity.\(^1\) Over half of Australia’s land area is used for agriculture,\(^2\) and agriculture is commonly associated with increased mortality and loss of habitat for native species, and overall biodiversity decline.\(^3\)

Agriculture has led to habitat fragmentation, reduced landscape heterogeneity, and in some cases, complete collapse of ecological processes, through impacts such as salinization and exotic plant invasion.\(^4\)

In addition, some ecological consequences of past land uses changes to agriculture are not yet fully played out. For example, populations of long-lived trees may persist in agricultural areas, giving the impression of reasonable population sizes, but are declining over time because agricultural practices prevent recruitment. This affects not only the trees, but also any understorey and animals dependent on the vegetation. Under a business-as-usual scenario, species already in decline are likely to be lost.\(^5\)

Figure 1 and Table 2 show land use in Australia, illustrating the large extent of Australia’s overall land mass that is used for agriculture.

1.2. Environmental offsets under the EPBC Act

Environmental offsets involve compensating for impacts on the environment or biodiversity at one site through activities at another site.\(^6\) In some jurisdictions, including the US, environmental offsets are more commonly referred to as compensatory mitigation.\(^7\)

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\(^{3}\) Refer to the literature review concerning agriculture and biodiversity decline in Suzanne M. Prober & F. Patrick Smith, *Enhancing biodiversity persistence in intensively used agricultural landscapes: A synthesis of 30 years of research in the Western Australian wheatbelt* Agriculture, Ecosystems and Environment 173 (2009).

\(^{4}\) Suzanne M. Prober & F. Patrick Smith, *Enhancing biodiversity persistence in intensively used agricultural landscapes: A synthesis of 30 years of research in the Western Australian wheatbelt* Agriculture, Ecosystems and Environment 173 (2009).

\(^{5}\) Peter A. Vesk & Ralph Mac Nally, *The clock is ticking - Revegetation and habitat for birds and arboreal mammals in rural landscapes of southern Australia* 112 Agriculture, Ecosystems and Environment 356 (2005).

\(^{6}\) Martine Maron et al. *Faustian bargains? Restoration realities in the context of biodiversity offset policies* 155 Biological Conservation 141 (2012). This paper does not seek to critique the underlying rationale for offsets or judge whether or not they are good for the environment, although this is a matter that is often contested. For example see Environmental Defenders Office, *Reforming native vegetation offset rules in Victoria* (2013).

\(^{7}\) See for example the section 404(b)(1) guidelines made under the Clean Water Act, available at [www.epa.gov/wetlandsmitigation/](http://www.epa.gov/wetlandsmitigation/).
Figure 1: National scale land use map for Australia based on 2005-2006 agricultural census data (ABARES 2010).

Figure 2: Land use in Australia based on 2005-2006 agricultural census data (ABARES 2010).
Under the EPBC Act, offsets are used to generate benefits through compensatory activities that “offset” the residual impacts of development after all reasonable efforts have been made to reduce, avoid and mitigate environmental impacts. Offsets are intended to achieve “no-net-loss” of the protected environmental matter.

The Commonwealth Department of Environment regularly imposes offset conditions on approvals under the EPBC Act and Offsets Policy.8

1.3. Demand for offsets, and the potential of working agricultural lands

There is enormous demand for offsets, and only a limited supply of suitable land. In 2010 it was estimated that the global demand for offset lands was at least 86,000 hectares per year.9 EPBC Act offset conditions generally require that land be permanently reserved for conservation purposes and not be used for agriculture on an economic scale, in what might be described as a “conservation estate” approach to offsets. Typically, approvals will permit agricultural uses of land only for fire, weed or pest management purposes.10 The exclusion of such a large proportion of Australia’s land area as a potential source of offsets has contributed to a shortage of land available to satisfy EPBC Act offset conditions.11

The use of private land and the participation of landowners are critical parts of any effort to reduce biodiversity decline. To give an example of the importance of private land as a source of biological diversity, in Victoria private landowners own 65% of the total land area and it is estimated that 29% of native vegetation relies on private land, supporting 30% of Victoria’s threatened species populations.12 And in terms of who is best placed to manage land

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8 To see examples of EPBC Act approvals with offset conditions, search the list of referrals made under the EPBC Act (and their approval documentation, where relevant) at [www.environment.gov.au](http://www.environment.gov.au).


10 See for example the Biodiversity Offset Management plan submitted by Investa for EPBC Act approval number 2013/7074.

11 The University of Queensland, Centre for Conservation Biology, Brisbane. Terry Bailey, CEO of the Office of Environment and Heritage NSW has recently commented that reserved areas such as national parks are not enough to address biodiversity declines and promoted efforts by the NSW government to encourage private landowners to undertake conservation actions on their own lands, Terry Bailey, Emerging Approaches to Improving Biodiversity in NSW, Australian Env. Law Digest, December 2014, [http://www.nela.org.au/NELA/Documents/Terry-Bailey.pdf](http://www.nela.org.au/NELA/Documents/Terry-Bailey.pdf). Other authors have also argued that reserve lands cannot solve agriculture’s impacts on biodiversity, see Peter A. Vesk & Ralph Mac Nally, *The clock is ticking - Revegetation and habitat for birds and arboreal mammals in rural landscapes of southern Australia* 112 Agriculture, Ecosystems and Environment 356 (2005).

for environmental purposes, as John Fenton writes in his account of restoring environmental balance on his sheep property “Lanark”:

It all comes down to this: farmers are the only people capable of conserving and improving the environment...for the simple reason that they are the people on the ground. They occupy and control the land; they own and operate machinery that would be needed for environmental work; and they sit on local councils.\textsuperscript{13}

Not using working agricultural lands for offsets also increases pressure to convert agricultural land to the conservation estate, reducing the viability of Australian agriculture.\textsuperscript{14}

Numerous studies have shown that working agricultural lands can be managed for environmental purposes, in a way that improves ecosystem services and prevents biodiversity decline.\textsuperscript{15} The biodiversity values of agricultural lands are particularly notable when compared to those of the land uses which typically generate requirements for offsets, such as urban development or mining.\textsuperscript{16}

Agricultural producers often have choices available between practices that have lesser or greater environmental impacts. One example of this is the environmental impacts of different pasture grasses. About 36\%, or 129 million hectares of Australia are used for grazing.\textsuperscript{17} Some pasture grasses are native, some exotic, some support significant biodiversity values and some are noxious and damaging weeds.\textsuperscript{18} Choosing and managing pasture grasses according to their capacity to enhance biodiversity is an opportunity to enhance the biodiversity values of working agricultural lands. Other examples of land management

\textsuperscript{13} John Fenton The Untrained Environmentalist (2010).
\textsuperscript{14} Refer to National Farmers Federation Submission to EPBC Act Offsets and Cost Recovery, 2011., which noted the loss of agricultural land to conservation estate and asked that “multiple uses of the one piece of land must be acknowledged and supported” in the development of the EPBC Act Offsets Policy.
\textsuperscript{15} Sara J. Scherr and Jeffrey A. McNeely, Biodiversity conservation and agricultural sustainability: toward a new paradigm of ‘ecoagriculture’ landscapes 363 Philosophical Transactions of the Royal Society 477, 481 (2008) note that “many ecosystem services can also be provided by non-native species, or by combinations of native and non-native species in heavily managed settings such as permanent farms”. Simon J. Attwood et al., Declining birds in Australian agricultural landscapes may benefit from aspects of the European agri-environment model 142 Biological Conservation 1981 (2009) discuss how agri-environment models can benefit Australian birds in agricultural landscapes. Suzanne M. Prober & F. Patrick Smith, Enhancing biodiversity persistence in intensively used agricultural landscapes: A synthesis of 30 years of research in the Western Australian wheatbelt 132 Agriculture, Ecosystems and Environment 173, 179 (2009) analyze the biodiversity value of semi-natural grasslands used for grazing. See also the narrative of how one landowner has progressively restored environmental values of their farm over several decades in John Fenton The Untrained Environmentalist (2010).
\textsuperscript{18} Consider for example the research undertaken by the Commonwealth Department of Sustainability into the management of exotic pasture grasses in Northern Australia: Department of Sustainability, Threat abatement plan to reduce the impacts on northern Australia’s biodiversity by the five listed grasses (2012).
actions that can be undertaken on working agricultural lands to enhance biodiversity include:

- Undertaking activities which promote beneficial environmental services such as pollination, pest control, soil fertility and water quality.\textsuperscript{19}
- Protecting and expanding patches of high-quality natural habitat and retaining paddock trees.\textsuperscript{20}
- Whole farm planning, changes to tree planting and fencing and changing tillage regimes.\textsuperscript{21}

Environmental offsets provide a means to provide incentives and funding for activities such as these to take place.

1.4. \textit{Should we be promoting an “inferior” alternative to traditional offsets?}

Possible first reactions to using working agricultural lands for offsets include that:

- It is an inferior alternative to using land set aside entirely for conservation purposes.
- It will encourage the more frequent use of offsets, which were always intended to be an option of last resort when managing the environmental impacts of development.
- It will make it easier for proponents to “get away” with damaging Australia’s unique natural environment through providing greater access to offsets.

To these arguments, it may be said that:

- Offsets are already a ubiquitous part of development approvals in both Commonwealth and state and territory jurisdictions.
- The alternative approach of essentially creating conservation estate as an offset, is itself highly problematic. Many areas set aside for conservation and restoration purposes do not achieve the intended environmental goals.\textsuperscript{22}

\textsuperscript{19} Sara J. Scherr and Jeffrey A. McNeely, \textit{Biodiversity conservation and agricultural sustainability: toward a new paradigm of ‘ecoagriculture’ landscapes} 363 Philosophical Transactions of the Royal Society 477, 481 (2008).
\textsuperscript{21} Alistar Robertson and David Roshier, \textit{Scientific and social impediments to restoration ecology as applied to rural landscapes}, in Alistar Robertson and Robyn Watts (eds), \textit{Preserving Rural Australia: Issues and Solutions} (1999).
\textsuperscript{22} Martine Maron et al. \textit{Faustian bargains? Restoration realities in the context of biodiversity offset policies} 155 Biological Conservation 141 (2012).
If we accept that development will continue to be approved, and that the status quo offset regime is deficient for reasons including lack of available offset lands and the questionable effectiveness of a conservation estate approach, then we should at least consider the prospects for using working agricultural lands as offsets.

2. Australia’s experience in enhancing biodiversity values on working agricultural lands

The potential to achieve significant environmental gains through changing how we manage agricultural lands is shown by the significant success Australia has already had in developing and funding programs to restore and manage biodiversity values on working agricultural lands. As examples of such programs we will consider Landcare, Greening Australia, BiobBanking New South Wales, ecoMarkets Victoria, and conservation agreements under the EPBC Act. These are just examples of the programs being implemented across the country, and there are many others. A summary of these programs is in Table 1.

2.1. Landcare

Landcare is a community based program focusing on farming improvement and biodiversity protection which started in the mid-1980s as a joint initiative of the Victorian government and the Victorian Farmers Federation. It is estimated that there are now over 6,000 Landcare groups operating in Australia, and that the model has been applied in over 20 countries around the world.\textsuperscript{23} It is

Program Description

Landcare
Community based program focused on engaging private landowners in environmental education and local environment improvement programs.

Greening Australia
Not-for-profit organisation funding conservation efforts on private land.

BioBanking NSW
Enables landowners to generate tradeable biodiversity credits from enhancing biodiversity values on their land.

ecoMarkets
Competitive tendering by private landowners for funds for environmental improvement actions.

EBPC Act Conservation Agreements
Voluntary but legally binding agreements between landowners and the Commonwealth providing for actions benefiting biodiversity.

Table 1: Examples of Australian programs promoting the management of land for environmental gain.

difficult to say how many farmers participate in Landcare, because the level of involvement may vary greatly from farmer to farmer, and may be formal or informal.

Landcare groups typically consist of 30-50 farmer volunteers headed by a locally elected leader. Landcare activities include planting and soil conservation, mitigating salinization, forest destruction and biodiversity reduction and addressing pest issues. Landcare groups also meet to discuss and demonstrate best practice agricultural techniques,\(^\text{24}\) in recognition of the fact that many environmental impacts on agricultural land are caused by lack of knowledge or understanding, limited finances, attitude to risk or lack of skills.\(^\text{25}\)

On the effectiveness of Landcare in changing farmer behavior, surveys undertaken by the Australian Bureau of Agricultural and Resource Economics (ABARE) found that about 40% of farms in the pastoral zone preserve or enhance areas of conservation value on their properties, and that Landcare members were almost three times more likely than non-Landcare members to practice formal monitoring of pasture and vegetation conditions.\(^\text{26}\)

Landcare’s website provides a number of case studies of Landcare initiatives.\(^\text{27}\) One case study, in the Dumaresq Valley in Queensland, describes the outcomes as including both environmental gains, such as protecting remnant vegetation and wildlife, and productivity gains, such as better equipping farmers to manage drought conditions.\(^\text{28}\)

\(^{28}\) Landcare, *Inglewood and Texas Landcare Association Dumaresq Valley Sub-Catchment*
While the Landcare movement has been characterised as a community and volunteer led movement, it relies heavily on government funding. The Federal government’s funding of Landcare programs totalled approximately AUD $500 million from 1995-2000. The current National Landcare Program (which has a broader range of activities than the original Landcare concept) will receive AUD $454 million delivered through 56 natural resource management organisations over the next four years. Landcare also receives funding from other sources, including not-for-profit organisations and companies. Companies become involved in Landcare projects for reasons including corporate social responsibility, the ability to connect with Landcare groups (and therefore landowners) relevant to their business, and to enable employees to participate in Landcare group projects.

Some have questioned the effectiveness of programs such as Landcare, agreeing that while they increase community awareness of land management and environmental issues, they may not be cost-effective and may not “lead to broad scale long term landscape outcomes”.

2.2. Greening Australia

The not-for-profit organisation Greening Australia has number of programs seeking innovative solutions to conservation on agricultural lands. Once such project is the “Whole of Paddock Rehabilitation Scheme”, which rests paddocks from grazing while they are regenerated, then allows stock to be introduced once trees are mature. Stewardship payments are made to farmers to compensate for some loss of production during the regeneration period. It has been reported that in some cases the regeneration has also led to significant agricultural productivity gains.

2.3. BioBanking (NSW)

BioBanking is a government-led scheme that allows private landowners to gain income from biodiversity enhancement through generating tradeable biodiversity credits on land secured for conservation purposes in perpetuity. As at 2012, almost 5,000 ha of native vegetation had been set aside under the BioBanking Program. A 2014 statutory review of the program found that its

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strengths included “a standardised, consistent, scientific approach to measuring biodiversity impacts at development sites and biodiversity gains at offset sites.”

2.4. ecoMarkets (Victoria)

Another government-led approach to enhancing biodiversity values on private land is the ecoMarkets program in Victoria. One program within ecoMarkets, ecoTender, allows competitive bidding by landholders for agreements with the Victorian government, where the landowner agrees to undertake specified conservation actions at their bid price.

Behind ecoMarkets is software called EnSym (Environmental Systems Modelling Framework), which estimates the impact of actions in the landscape, to a dollar value if required. EnSym provides a means for quantifying the environmental benefits delivered through on-ground conservation and revegetation works. A key part of this is the Site Assessment Tool, which is “designed to ensure the consistent and objective calculation of the change in environmental service expected as a result of management actions (like weeding and revegetation) across a landscape.” The tool can be used by attending a site and undertaking a field assessment with hand-held field computers. The tool can model the change in environmental service as a result of management actions and scores the overall change as an “Environmental Benefits Index”.

The Victorian Department of Sustainability and Environment has provided a number of case studies of the operation of ecoMarkets. One farmer participating in ecoMarkets, Jim Seabrook, considers that the funding he received to enhance environmental values on his property also improves agricultural productivity, commenting that:

It will help us to advance the whole cell grazing system. We’ll have better fencing and are looking to building soil and building animal health. In time, I expect to see productivity gains with more shelter and biodiversity. Already, we’re seeing a lot more birdlife feeding in the grass and on the soil.

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34 Previously called BushBroker and BushTender.
2.5. EPBC Act conservation agreements

EPBC Act conservation agreements are voluntary but legally binding agreements between landowners and the Commonwealth Minister for the Environment. They provide for actions having a net benefit to the conservation of biodiversity, sometimes in return for financial and technical assistance.\textsuperscript{39} Conservation agreements are a flexible tool, and demonstrate the Commonwealth’s experience in engaging directly with landholders to obtain a conservation gain for EPBC Act protected matters on private land.

3. Using working agricultural lands as offsets: An example from the United States

While the Australian programs discussed in section 2 involve the management of private land for environmental gain, they do not explicitly make the link to using working agricultural lands as environmental offsets.

An example of where this link has been made is in the Central Valley Habitat Exchange (CVHE), in the Central Valley in California.\textsuperscript{40}

The Central Valley contains the single richest agricultural region in the world, and substantially contributes to California being the United States’ most productive agricultural state, with an agricultural industry worth approximately USD $35 billion.\textsuperscript{41} The area covered by CVHE is shown in Figure 4.

The CVHE is a working group comprising a number of government and non-government entities. The objective of the CVHE is to enable farmers to generate income from improving the habitat value of their land. The program was triggered by the realisation that mitigation requirements in the state vastly exceed the amount of available land. The CVHE has estimated that more than 1.4 million acres (approximately 566,000 ha) in the state are required to be protected or restored under current or proposed plans. A key issue identified in satisfying these mitigation obligations is the lack of involvement by private landowners in mitigation efforts.

The CVHE aims to empower private landowners through quantifying management actions they take on their land and then allowing these gains to be traded as credits with developers seeking offsets.

The essential elements of the CVHE are:

- A habitat quantification tool. This enables habitat quality to be measured and given a standardized score across “impact” and “offset” sites. The measure used is a “functional acre” of habitat. This basically treats one acre of very good habitat as a “functional acre”, and lower quality habitat

\textsuperscript{39} EPBC Act, Chapter 5, Part 14.
\textsuperscript{40} See the program’s webpage at https://www.enviro accounting.com/cvhe/Program/Home, last visited May 7 2015. A factsheet overview of the program is available here.
Figure 4: Geographic scope of the CVHE.
as proportionately less (eg. one acre of low quality habitat may only equal
0.2 of a functional acre).

- A credit exchange. This will enable farmers to generate credits through
improving the habitat score of their land, and sell these credits to pro-
ponents who are causing a proportional impact to the habitat value of other
land.  

The CVHE is currently developing these tools and programs for the Chinook
salmon, Swainson’s hawk and Riparian songbird.

For Swainson’s hawk for example, the CVHE has given different agricultural
land cover types an initial habitat suitability rating. These ratings are shown
in Figure 5.

Farmers can increase their habitat score through undertaking management
actions that enhance prey accessibility and prey availability for Swainson’s hawk.
This may including managing agricultural practices such as flood irrigation,
grazing, mowing, harvesting and rodenticide application to maximize habitat
value. The management actions prescribed follow research by the CVHE and
others which shows that farming management actions can substantially increase
habitat suitability for Swainson’s hawk. The extent to which habitat scores
(and therefore the value of tradeable credits) under CVHE can be increased by
management practices is shown in Figure 6.

An example of the type of joint production envisaged by the Central Valley
Habitat exchange is a project being implemented at a rice farm owned by Knaggs
Ranch LLC in the Yolo Bypass, near Sacramento in California. This is a pilot
project designed to determine which agricultural practices maximize benefits to
salmon. The project involves intentionally flooding the farms at times during
winter outside the normal flooding regime for rice, in order to intentionally cater
to the habitat requirements of Delta salmon.

The Knaggs Ranch project has reported dramatic increases in the size and
viability of juvenile salmon without reducing agricultural productivity. The
unprecedented growth rates of these salmon are illustrated in Figure 7.

CVHE is using projects such as Knaggs Ranch to help develop its habi-
tat quantification tool for salmon. The CVHE is also currently meeting with
landowners, cities and agencies to see how its program will fit in with land use
management regulations throughout the Central Valley, and to determine the
requirements of the various land use planning documents and environmental
statutes. It is currently planned that credits will be exchanged by mid-2016.

Although the CVHE has not yet commenced its credit exchange, it provides
an example of government and non-governmental agencies recognising the po-

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43 A detailed description of the project is at California Trout, The Nigiri Concept: Salmon Habitat on Rice Fields, available at http://tinyurl.com/caltroutnigiri, last visited May 29 2015. The author obtained further information from the project from a tour of the farm on March 6 2015.
Figure 5: Swainson’s hawk habitat rankings of various agricultural land types under CVHE’s Habitat Quantification Tool (CVHE 2014).
Figure 6: Foraging habitat value for Swainson’s hawk with/without management under CVHE’s Habitat Quantification Tool (CVHE 2014).
Figure 7: Floodplain-raised salmon are far bigger than their counterparts (Photo and caption Caltrout and J. Katz).

tential value of working agricultural lands for offsets. It also shows the types of tools that are necessary to implement such a scheme.

4. Bridging the gap: Linking experience in managing working agricultural lands to the offsets regime under the EPBC Act

To date, Australian initiatives to improve the environmental values of working agricultural land have not significantly extended into the field of environmental offsets.44

The following sections 5 to 7 discuss the legislative and policy framework governing offsets under the EPBC Act, the potential benefits, and potential legal and practical barriers to implementing offsets on working agricultural land. A summary of the benefits and barriers is in Table 2.

44 ABARE has suggested the possibility of achieving net environmental gain in a single farm setting, through clearing areas of land for intensive crop cultivation while offsetting other areas of the farm - see Thilak Mallawaarachchi and Stephanie Szakiel, ABARE Research Report 07.2 Economic issues in managing native vegetation on farm land (2007). The use of agricultural landscape as offset areas has been proposed by David Goldney in James Gleeson and Deborah Gleeson, Reducing the Impacts of Development on Wildlife (2012) pp 193-194.
Using working agricultural lands for offsets

**Benefits**
- Enhance the biodiversity values of working agricultural lands
- Achieve long-term environmental gains
- Give farmers financial incentives to manage their land better
- Improve knowledge about sustainable land management
- Increase the amount of land available for environmental offsets

**Barriers**
- Not directly supported by the EPBC Act Offsets Policy
- Would require changes to some underlying assumptions about what offsets should look like (eg. introduction of dynamic permanent offsets)
- May be resisted by those who view conservation estate as better
- Incomplete scientific knowledge about how to manage working agricultural lands for specific protected matters

Table 2: Benefits and barriers to using working agricultural lands for offsets under the EPBC Act.

5. **The legislative and policy framework under the EPBC Act**

The EPBC Act does not specifically address offsets, but gives the Minister the power to impose conditions on approvals.\(^{45}\) This conditioning power has been used to impose offsets. There is nothing in the EPBC Act that would prevent the Minister from imposing offset conditions which allow offsets to be delivered on working agricultural lands.

In practice, the Department of Environment determines the content of offset conditions under the EPBC Act Offsets Policy.\(^{46}\) How suitable offsets are determined under the Offsets Policy is shown in Figure 8.

The EPBC Act offsets policy does not directly contemplate offsets being provided on working agricultural lands, but is generally supportive of the concept in the following respects:

- The Offsets Policy is flexible in how a proponent can deliver an offset, so long as the proponent satisfies the Minister that the offset adequately and effectively compensates for the impacts of the proposed development on a protected matter.
- The Offsets Policy encourages offsets that deliver social and economic co-benefits.\(^{47}\) These include offsets that enable rural landowners to diversify

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\(^{45}\) EPBC Act s 134.


Figure 8: Determining suitable offsets under the EPBC Act (Department of the Environment 2012).
their income for the management of biodiversity.

- The Offsets Policy permits proponents to give funding directly to farmers for conservation activities.48

6. Benefits of using working agricultural lands

Using working agricultural lands for offsets should increase the supply of land available for proponents to satisfy offset obligations under the EPBC Act.

It should also increase financial incentives for better land management. A key issue currently preventing further investment in biodiversity actions on agricultural lands is the lack of financial incentives.49 In fact, surveys indicate that most farmers have a strong environmental stewardship ethic, and that barriers to the adoption of better agricultural practices such as Landcare are caused more by concerns about resource availability and economic risk than the absence of a desire by farmers to address environmental issues.50 The Australian environmental programs discussed earlier in this paper have all relied on external funding, whether from government, not-for-profits or corporates. As ABARE has noted:

Unlike farm products, such as beef or milk, which are sold in the marketplace, most environmental goods arising from farm land do not have a market price and land owners are not able to recover payment for their efforts that result in public good environmental benefits.

and consequently:

Farmers will generally conserve native vegetation on their property to the extent that it delivers private benefits - for example, in the form of shelter for livestock and windbreaks - but have little incentive to conserve vegetation beyond that level.51

ABARE summarised the economic issue of “joint production” between agriculture and ecosystem services in the following terms:

...while agricultural goods and environmental outcomes may be jointly produced, in some situations certain environmental outcomes are complementary while in others they are competitive. In the absence of incentives encouraging environmental protection, however, the level of agricultural production is the main determinant of the level of environmental outcomes that is achieved.

48 These aspects of the Offsets Policy were highlighted for the author by Paul Keighley, Assistant Director, Policy and Reform Branch, Department of the Environment, pers comm. May 7 2015.


51 Thilak Mallawaarachchi and Stephanie Szakiel, ABARE Research Report 07.2 Economic issues in managing native vegetation on farm land (2007).
whether these environmental outcomes enhance (complementary in production) or reduce (competitive in production) agricultural production.\textsuperscript{52}

The Offsets Policy notes the potential for rural landholders to gain income from offsets: “rural landholders may wish to diversify their income streams by investing in conservation activities that benefit specific threatened species with a view to providing these as offsets”.\textsuperscript{53} The Offsets Policy also encourages the use of market based mechanisms to deliver offsets, indicating support for flexible ways of financially incentivising offsets:

\textit{Use of market-based mechanisms for delivering offsets is supported as a means of determining the conservation value of both the proposed action site and the proposed offset, where such mechanisms are based on reproducible and scientifically robust information.}\textsuperscript{54}

Further, some studies have indicated that managing land for biodiversity can also increase agricultural productivity, and so in some cases farmers may receive a double economic benefit. ABARE drew the following conclusion in its report on vegetation management in South Australian agricultural lands:

\textit{The case studies examined in this report suggest that in many cases, nonbroad-scale native vegetation management offers net benefits to landholders, with operational costs being offset by increased productivity, increased asset value and improved aesthetics. Some of these benefits also accrue to the wider community as complementary benefits of sustainable farm production.}\textsuperscript{55}

Another benefit of using working agricultural lands for offsets is the long-term nature of the environmental gains. Unlike other environmental programs reliant on government funding which may be exhausted, or subject to changing priorities, land management tied to an offset condition in an EPBC Act approval is required to be long-term.

Use of working agricultural land for offsets may also have other indirect benefits. Offset agreements between farmers and proponents are an opportunity for groups whose interests are often in conflict to work together. Presently, when proponents require offsets, they generally have to acquire land either through purchase or some other long-term tenure arrangement and take it out of agricultural production.

This approach of “locking land away” offers little opportunity for a proponent to increase their involvement in a community, or contribute positively to their social licence to operate. Using working agricultural land for offsets offers the potential for new proponent/community interactions and relationships. This may improve relationships between different groups in communities, and

\textsuperscript{52} Thilak Mallawaarachchi and Stephanie Szakiel, \textit{ABARE Research Report 07.2 Economic issues in managing native vegetation on farm land} (2007).
\textsuperscript{55} Thilak Mallawaarachchi and Stephanie Szakiel, \textit{ABARE Research Report 07.2 Economic issues in managing native vegetation on farm land} (2007).
different industry sectors.

There is also potential for the use of working agricultural lands as offsets to be a tool for education. It has been observed that there are major gaps between the understanding of ecological processes in Australian landscapes by land and water managers and scientists, and that land managers are much more likely than scientists to think that current land management practices are sustainable.\footnote{Alistar Robertson and David Roshier, \textit{Scientific and social impediments to restoration ecology as applied to rural landscapes}, in Alistar Robertson and Robyn Watts (eds), \textit{Preserving Rural Australia: Issues and Solutions} (1999).} As has been one of the benefits of Landcare, participation in an offset regime would have the benefit of educating land managers on the current science of land management.

It also seems to follow that the more experience we get in managing land for environmental purposes, the better we will get at it. Therefore, even if offsets are relevant only to a small proportion of working agricultural lands, the experience gained from this may be able to offer lessons to the management of agricultural land generally.

7. Barriers to using working agricultural lands

This section discusses legal and practical barriers to using working agricultural lands for offsets.

7.1. Legal barriers to implementation

The EPBC Act Offsets Policy does not prohibit offsets being provided on working agricultural lands, but contains a number of provisions which could act as barriers to using working agricultural lands for this purpose.

The Offsets Policy requires “like for like” habitat replacement:

\textit{For impacts on habitat for threatened species, migratory species and threatened ecological communities, any direct offset must meet, as a minimum, the quality of the habitat at the impact site. Where a proposed offset site has a lower habitat quality than that of the impact site, the offset must be managed and resourced over a defined period of time so that its habitat quality is improved to meet the quality of habitat originally impacted.}\footnote{Commonwealth Department of the Environment, \textit{EPBC Act 1999 Environmental Offsets Policy} (2012).}

This provision requires the offset area to have the same habitat quality as the area impacted (see also “Additional key considerations” in Figure 8). This provision would limit the ability to use working agricultural lands for offsets. It would prevent the use of working agricultural lands to offset impacts occurring on land that has higher biodiversity values than the working agricultural land (even after actions to enhance biodiversity have been implemented). A policy decision needs to be made whether a greater area of lower quality habitat is an adequate substitute for “like for like” habitat. This is possible under the CVHE’s concept of “functional acre”.

\textit{56 Alistar Robertson and David Roshier, Scientific and social impediments to restoration ecology as applied to rural landscapes, in Alistar Robertson and Robyn Watts (eds), Preserving Rural Australia: Issues and Solutions} (1999).

The Offsets Policy also requires offsets to have the same duration as the impact:

For direct offsets, the securing of existing unprotected habitat as an offset only provides a conservation gain if that habitat was under some level of threat of being destroyed or degraded, and as a result of offsetting will instead be protected in an enduring way and actively managed to maintain or improve the viability of the protected matter. In these cases, the tenure of the offset should be secured for at least the same duration as the impact on the protected matter arising from the action, not necessarily the action itself.

And to be legally secured for that term:

Offsets on private lands should be legally secured for conservation purposes for at least the duration of the impact [and] the securing scheme should actively monitor for compliance, with covenant requirements enforced...

...Legal mechanisms, such as conservation covenants, exist in each state and territory to enable the protection of land that is set aside for environmental purposes on a permanent or long-term basis.\(^\text{58}\)

Historically, this has required that the offset be provided continuously on the same land for the life of the offset. However, the dynamic nature of land use for agriculture means that greater flexibility would be needed if offsets were to be provided on working agricultural lands. Offset conditions may need to be developed which require the conservation gain of the offset to be equal to the term of the impact, but permit the conservation gain to be delivered over different properties using different management actions over time. Therefore, in a manner consistent with species requirements, areas of high habitat may be relocated over a property over time in a way that is complementary to changing agricultural land uses. The CVHE has explored this issue in the United States and describes it as “dynamic permanent” conservation.

Although this paper does not consider state government offset requirements, Australia’s federalism also present a potential barrier to using agricultural lands for offsets. Many if not most projects which trigger an offset requirement under the EPBC Act will also trigger offset requirements under state legislation or policies. In some cases the resulting state and Commonwealth approvals may result in offsets for both jurisdictions being provided through a single offsets package, and if the state laws do not allow offsets on working agricultural lands then this may act as a barrier to the EPBC Act offset as well.

7.2. Practical barriers to implementation

There a number of practical issues which need to be resolved before working agricultural lands can be used as offsets.

Firstly, while it is known that economic agricultural land uses can be maintained while managing land for environmental gain, the relationship between

land management actions and specific protected matters under the EPBC Act requires further study.\textsuperscript{59}

Questions include: which threatened fauna species have habitat requirements that are consistent with agricultural uses, what specific management actions can improve habitat quality, and by how much?\textsuperscript{60}

Similar work needs to be done here as has been done for the CVHE in California, to attempt to quantify the extent to which management actions can improve habitat quality on working agricultural lands (as shown in Figure 6). This is a challenging task, because each management action needs to be related to the requirements of individual protected matters under the EPBC Act, not just some general indicia of biodiversity.\textsuperscript{61}

Programs such as BioBanking in New South Wales, Victoria’s ecoMarkets and the CVHE’s Habitat Quantification Tool show that it is possible to develop tools that quantify environmental benefits delivered through specified management actions, and provide a standardized and comparable score of biodiversity enhancement.

Secondly, using working agricultural lands for offsets is likely to require a creative approach to packaging various offset attributes into an overall offset package. Many offsets may consist of packaging management actions and biodiversity outcomes across multiple properties into a single offset. This is not explicitly contemplated by the current Offsets Policy and would require flexibility from the Department. For example, attributes such as time over which loss is averted, the time until ecological benefit, the risk of loss and the confi-

\textsuperscript{59} Suzanne M. Prober \& F. Patrick Smith, \textit{Enhancing biodiversity persistence in intensively used agricultural landscapes: A synthesis of 30 years of research in the Western Australian wheatbelt} 132 Agriculture, Ecosystems and Environment 173, 182 (2009) note that even simple biodiversity management actions such as fencing to exclude or reduce livestock grazing have been poorly studied. Malika Virah-Sawmy et al., \textit{Mining and biodiversity offsets: A transparent and science-based approach to measure “no-net-loss”} 143 Journal of Environmental Management 61 (2014) note the complexity of environmental offsets and the difficulties of obtaining scientific certainty that any offsets will address risk, effectiveness and permanence of biodiversity gains.

\textsuperscript{60} See for example, Simon J. Attwood et al., \textit{Declining birds in Australian agricultural landscapes may benefit from aspects of the European agri-environment model} 142 Biological Conservation 181 (2009), which provides a number of examples of how management actions on agricultural lands could support Australian bird species. Suzanne M. Prober \& F. Patrick Smith, \textit{Enhancing biodiversity persistence in intensively used agricultural landscapes: A synthesis of 30 years of research in the Western Australian wheatbelt} 132 Agriculture, Ecosystems and Environment 173, 178 (2009) note that the effects of management actions such as habitat corridors are highly species-specific. Malika Virah-Sawmy et al., \textit{Mining and biodiversity offsets: A transparent and science-based approach to measure “no-net-loss”} 143 Journal of Environmental Management 61 (2014) discuss mechanisms such as “habitat hectares” and “biodiversity conversion factors” as means of quantifying the precise extent of biodiversity losses and gains. Martine Maron et al. \textit{Can offsets really compensate for habitat removal? The case of the endangered red-tailed black-cockatoo} 47 Journal of Applied Ecology 348 (2010) discusses the need for species-specific work into establishing equivalence between habitat quality and quantity at impact and offset sites.

\textsuperscript{61} Refer to the Offset Policy requirements of level of improvement or level of averted loss delivered by the offset for the attribute being impacted, as shown in Figure 8.
dence in the result might need to be averaged or otherwise moderated across multiple “mini” offsets in order to achieve the desired outcome for the overall offset. There are numerous strategies that have been developed in the offsets field to facilitate offset transactions, including using brokers, offset aggregators and banks, and many of these tools may also be helpful to packaging offsets in working agricultural lands. Packaging offsets can spread the risk of offsets failing, and therefore satisfy Offset Policy requirements for confidence in the result of the offset (see Figure 8).

Thirdly, a persistent issue with environmental offsets has been the high transaction costs associated with delivering offsets. Programs such as NSW Biobanking and Victoria’s ecoMarkets have various strategies to reduce transaction costs. However, this is a critical part of the design of any program to working agricultural lands, and could be the subject of further study.

8. Conclusion

Environmental offsets that allow actions on private-land should be part of the solution for enhancing biodiversity in Australia. The legislative and policy framework under the EPBC Act is sufficiently flexible for this to occur. Further research needs to be done into the relationship between management actions on agricultural land and benefits to specific protected matters under the EPBC Act.

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62 These all being examples of relevant factors in determining an offset under the Offset Assessment Guide - Department of Environment, How to use the offsets assessment guide.

63 For a discussion of the possible tools available, see Anthea Coggan et al., Intermediaries in environmental offset markets: Actions and incentives 32 Land Use Policy 145 (2013).