



# Protecting nature on private land using revolving funds: Assessing property suitability

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## ABSTRACT

Protecting biodiversity on private land is an important and growing part of global conservation efforts. Revolving funds are used by conservation organisations to buy, resell and permanently protect private land with important ecological values. By reinvesting proceeds from sales in additional properties, revolving funds offer a potentially cost-effective way to protect biodiversity. Their success requires managers to choose properties that can be resold and recover costs, with resale outcomes having consequences for subsequent acquisitions. However, revolving fund property selection is a multi-dimensional decision, influenced by various ecological, social and financial considerations. In conjunction with revolving fund managers, we developed a Bayesian Belief Network (BBN) to understand which factors they consider to be the most influential on a property's suitability for acquisition, and how much to pay for it. Sensitivity analysis revealed that managers perceive property suitability to be heavily influenced by the threat to the property's ecological values, the acquisition and ongoing management costs, and finding alternative options for protection. Amenity values were seen to heavily influence property resale. Threat and alternative options influence how much to pay, but most influential was the balance of the fund when the purchasing decision is made. Our results suggest managers are taking a low risk approach to property selection. Opportunities may exist to apply revolving funds to higher risk properties otherwise difficult to conserve, provided the need for resale is still met. Ensuring revolving funds target properties with suitable attributes could increase the contribution of this tool to conserving biodiversity on private land.

## 1. Introduction

Protecting biodiversity on private land is an important and growing part of global conservation efforts. A number of policy approaches exist to permanently protect private land, some of which can be classified as Privately Protected Areas (PPAs) (Stolton et al., 2014). The dominant approaches currently used include acquisition (whereby private land is acquired and managed for biodiversity by a conservation organisation), and voluntary protection agreements that legally bind landowners to manage their land for biodiversity – such as conservation covenants or easements (Kamal et al., 2015).

In some countries, conservation organisations use ‘revolving funds’

to acquire private land with high conservation value and then resell it to new owners, in the process adding an in-perpetuity conservation covenant or easement (Brewer, 2003; Fitzsimons, 2015). The agreement permanently restricts activities harmful to biodiversity, whilst any proceeds from the sale are re-invested to acquire and protect additional properties, continuing the cycle of protection (Cowell and Williams, 2006). A conceptually simple model, revolving funds provide a potentially cost-effective way to achieve permanent protection by recouping costs through resale. They can be used to intervene in the property market to protect ecological values at a time when properties are under threat of development (Armsworth and Sanchirico, 2008), and are presumably at their most effective when turning over properties with

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**Table 1**  
Key statistics for the major revolving fund programs currently operating in Australia<sup>a</sup>.

Organisation	Australian State	Years operating	Total fund size (AUD approx.)	Properties “revolved”	Area protected (hectares)
Nature Conservation Trust of NSW	New South Wales	15	\$10 m	34	23,424
Queensland Trust for Nature	Queensland	13	\$7 m	17	104,000
Nature Foundation SA	South Australia	15	\$1.4 m	28	12,242
Tasmanian Land Conservancy	Tasmania	13	\$6.5 m	28	2928
Trust for Nature (Victoria)	Victoria	28	\$4 m	57	6852
		Total	\$28.9 m	164	149,446

<sup>a</sup> As of June 2017.

conservation value quickly and maintaining fund capital. The revolving fund approach is similar to acquiring land with conservation value and transferring it to government ownership (‘pre-acquisition’), except the new landowner is typically a private party (Brewer, 2003). Revolving funds currently operate in Australia, Canada, Chile and the USA, with a combined capital pool of at least US\$384 m, which to date has protected over 684,000 ha (Hardy et al., 2018b).

A mix of approaches (e.g. acquisition, permanent agreements, non-binding agreements) is thought to be an effective way to implement conservation on private land (Doremus, 2003). Part of ensuring the efficient implementation of the mix involves identifying the situations and properties to which these approaches are best suited. Because of their capacity for continuing reinvestment, revolving funds have a unique and potentially important role in private land conservation, including the protection of land that may not be available via other approaches. Yet decision-making regarding property purchase is highly complex. A first step to helping with more strategic selection of revolving fund properties and increasing their contribution to private land conservation is understanding how decisions are currently made.

### 1.1. Revolving fund property selection

A series of interviews with revolving fund practitioners in Australia revealed a range of influences on property selection, foremost amongst these being the ability to resell acquired properties to new owners (Hardy et al., 2018a). This work revealed that each potential property has multiple attributes that could affect its suitability for acquisition, with decision variables including: conservation values (e.g. threatened species or ecological communities, landscape connectivity); financial values (e.g. purchase price, sale price, likely time to resell); and social values (e.g. amenity values such as a house site, visual attractiveness). However, the process of evaluating these attributes can be resource-intensive for conservation organisations, and in general, the relative importance of these attributes, and how they interact to impact on suitability for revolving funds has received little research attention.

Beyond suitability, revolving fund managers face a second multi-dimensional decision over how much to pay for any given property. Acquiring conservation properties can require large capital investments, leading to difficult decisions amidst fluctuations in the property market (McDonald-Madden et al., 2008). Revolving fund programs would benefit considerably from purchasing at or below market value, but the willingness of landholders to sell can vary (Winter et al., 2005). Beyond purchase, managers need to consider the money likely to be returned to the fund upon resale (‘resale price’), accounting for any change in land value that might result from adding a permanent conservation easement or covenant, which can vary considerably between properties (Anderson and Weinhold, 2008). There is uncertainty over the time it will take to resell the property (‘resale time’) (Armsworth and Sanchirico, 2008), where long resale times can tie up capital and impact future purchases. Also relevant are the management costs whilst the property is in the organisation's possession (Hunter and Kohring, 2009), and the costs of providing ongoing stewardship support for landholders after resale (Adams et al., 2012). Finally, acquisition

decisions often have to be made rapidly when properties appear on the open market (Fitzsimons and Looker, 2012).

Probabilistic reasoning approaches to decision-making, such as Bayesian Belief Networks (BBNs), can be useful for these complex, uncertain problems. BBNs provide a structured way to integrate limited and disparate information sources, including both quantitative and qualitative information, and are useful for modelling systems characterised by inherent uncertainty (Aalders, 2008). They have been used to understand a range of conservation issues (see Aguilera et al., 2011), including the identification of suitable areas for conservation and development to avoid conflict (McCloskey et al., 2011), landholder participation in conservation (Torabi et al., 2016) and guiding reserve system acquisitions (Schapaugh and Tyre, 2012). Here we apply the BBN approach to assessing the suitability of properties for revolving fund purchase, based on current decision-making.

### 1.2. Revolving fund property selection in Australia

In Australia, there are five major revolving fund programs of various sizes operated by land trusts (Table 1), with the broadly similar purpose of increasing the amount of private land protected by conservation covenants. They operate in similar ways: identifying, assessing and purchasing private freehold land in rural landscapes with high conservation value, before then reselling it with the condition that the new owners enter into an in-perpetuity conservation covenant. The programs typically focus on lifestyle properties and in some programs, agricultural properties with conservation values. Before purchase, staff assess a property's suitability, negotiate a purchase price, and then make a recommendation to a board or governing committee who make the final purchasing decision. Often properties initially identified are not purchased, either because they are found unsuitable (ecologically or financially), or because they are sold before negotiations are finalised. Collectively, these programs have protected 164 properties covering almost 150,000 ha (Table 1). The similarity in operations between these programs, the number of properties revolved and area protected, as well as the breadth of operations, provides an opportunity to draw on the collective expertise of managers and gain insights into what makes a property suitable for the revolving fund approach.

Using the experience of revolving fund managers in Australia, we built a probabilistic reasoning model (a Bayesian Belief Network) to integrate and systematically explore the factors relevant to revolving fund property selection. From this model based on managers' reasoning we sought to answer: i) how do decision factors interact to affect the suitability of a property for purchase?; ii) which factors do managers consider to be most influential on property suitability?; and iii) which factors are most influential on how much managers are willing to pay for a given property? Understanding how decision-making happens can facilitate critical analysis of the strategies that are used, and furthermore generates an opportunity to explore current approaches with the view to increasing the efficacy of revolving fund programs.

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