

# Designing more effective conservation auctions: lessons from Queensland's Vegetation Incentives Program

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## Introduction

Biodiversity loss, water quality problems and decreased soil quality are continuing environmental problems in the Australian state of Queensland. Land clearing of native vegetation has been one of the major drivers of these problems. Although legislation was brought in to halt broadscale clearing of remnant vegetation in 2004, biodiversity decline continues as a result of the legacies of past clearing such as habitat loss and fragmentation and loss of seed supplies and natural regeneration (Cork *et al.* 2006). In addition, clearing of non-remnant vegetation (i.e. regrowth) continues under the current legislative regime.

As the majority of land is not protected in formal reserves, there is a need to persuade private landholders to protect and manage the ecosystems on their properties. Good land management practices include managing the intensity of grazing pressure, managing infestation of invasive plant species and maintaining riparian vegetation. Where these practices go beyond the duty of care expected of landholders there is scope to use public funds to purchase management change. However, in light of the limited amount of funding for natural resource management (NRM) programs, it is necessary to ensure efficient allocation of that funding. Auction theory can be adopted in NRM to create more efficient and cost-effective environmental programs. Despite the growing popularity of conservation auctions in the United States and Australia, there are still many aspects of the application of conservation auctions that remain to be investigated and subsequently enhanced. This paper is a summary of an evaluation of the Vegetation Incentives Program (VIP) a conservation auction that was run in Queensland, Australia, from 2004-2006. The key lessons for auction, process and contract design from the VIP are summarised.

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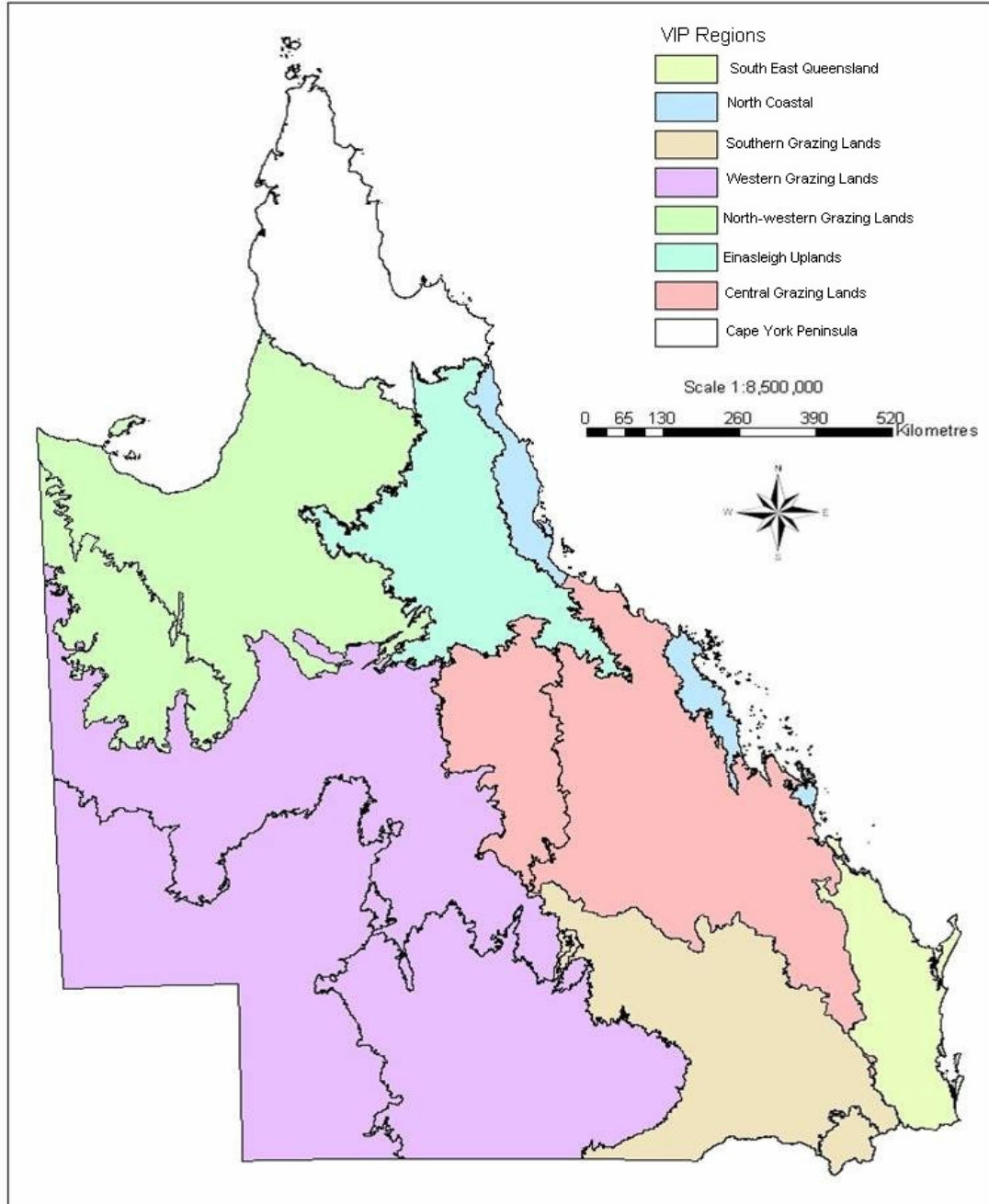
## **Background theory**

Auction theory can be applied to the problem of funding natural resource management on private properties. An adequate market for providing public goods from private land does not exist, which is why there is an under-provision of environmental goods and services. Auctions can help form a quasi-market for environmental public goods (Latacz-Lohmann and Van der Hamsvoort 1998:335). This market has several distinguishing characteristics, such as only having one buyer (usually the government) and many sellers with a wide range of opportunity costs (Latacz-Lohmann and Van der Hamsvoort 1998:335-37). As in standard procurement auctions, in conservation auction the bidders with the best tenders win the contracts. This means that price, the ecological significance of the property and sometimes the management actions offered (or the ecological change expected) are used to choose the winning bids. An auction encourages landholders to reveal their opportunity cost and the funder to reveal information on the best management actions. This leads to better coordination of demand to protect biodiversity and landholders willing to supply the services.

The most significant benefit to using an auction mechanism to distribute funds is the potential cost saving from using competition to encourage truthful cost revelation. A first best outcome for an auction is for bids to be based solely on opportunity costs (Stoneham *et al.* 2003:490). This means that the maximum amount of environmental improvement is achieved for the money spent. However, as there is information asymmetry present, landholders can still place a bid higher than their opportunity cost. This extra cost is known as the information rent, and is based on the perceived probability of the bid being accepted. As a result, competition should decrease information rent, and thus lower the cost of funding environmental services. An auction is likely to be more cost-effective than a flat-price scheme when opportunity costs are heterogeneous. This is because each participant can be paid close to their individual opportunity cost rather than a potentially higher flat fee. The groundbreaking Victorian BushTender trials led to an increased interest in the mechanism (see Stoneham *et al.* 2003 for information on BushTender) and on-ground pilots across Australia have reported promising results (see e.g. Bryan *et al.* 2005, Gole *et al.* 2005 and Windle and Rolfe 2006).

## **The VIP**

The Queensland Department of Natural Resources and Water (NRW) introduced the VIP, with a \$12 million budget, as part of a financial assistance package that accompanied extensive changes to the state's vegetation management legislation in 2004. The program was the first conservation auction in Australia to have a large budget or to be run across a large area. It trialled several new aspects of a conservation auction such as requiring participants to commit to perpetual protection for the vegetation in the form of a covenant (legal agreement) attached to the land title. The VIP was designed as a single round, sealed bid discriminatory-price auction to fund the protection and management of non-remnant vegetation in Queensland. Design time was limited to approximately one month, with no opportunities to consult with likely participants or develop a complex mechanism. Queensland was divided into amalgamated bioregions to assist with comparison of properties. These regions are shown in Figure One.



**Figure One: Map of VIP regions**

To simplify administration the program was run in three phases. The program commenced in the Southern Grazing Lands in September 2004. The second phase, for the rest of QLD excluding South East Queensland (SEQ), started in June 2005.

The SEQ phase started in late 2005 and finished in June 2006. An NGO, Greening Australia, was chosen through a tender process to deliver the VIP. Landholders received a site visit to help them develop a five year management plan, and also had to sign a permanent covenant that was attached to their land title. Design of the program changed over the three rounds, with the most significant change occurring in the type of permanent protection required of participants. A very restrictive covenant was designed for the use of the VIP in the first round. This was a main cause of the low participation rate and high bid levels for this phase. No tenders were funded as the bid prices were felt to be too high for the expected environmental gains. As a result, other, more flexible, permanent protection options were made available in the next two rounds. In all three rounds a reserve price was set to restrict the acceptance of overly high bids in the absence of sufficient competition.

The results of the program are summarised in the table below.

	<b>Southern</b> <i>Phase one</i>	<b>Far North/Coastal</b> <i>Phase Two</i>	<b>Central/Southern/Western</b> <i>Phase Two</i>	<b>South East</b> <i>Phase Three</i>	<b>Total</b>
<b>Date finished</b>	July 2005	December 2005	December 2005	June 2006	-
<b>Expressions of interest</b>	16	58	26	112	212
<b>Applications</b>	8	31	7	62 (51 people)*	108
<b>Approved</b>	0	13	2	22	37
<b>Average size property (ha)</b>	130	11.5	2441	130	-

*\*Some people put in more than one tender*

**Table One: Summary of the VIP**

In total, the successful tenders resulted in a commitment to protect, in perpetuity, 18 880 ha of high conservation value non remnant vegetation. Despite this achievement, there were a variety of problems with the VIP that meant that the potential benefits of conservation auctions were not fully realised. The first was the low participation across the state. Eighty-five percent of participants came from the Far North/Coastal part of phase two and SEQ in phase three. Given that 90% of the second phase

applicants were clustered in the Atherton Tablelands, it is clear that the VIP had limited participation across most of Queensland. The second problem was the submission of high bids, particularly in round one. This led to a low conversion rate between applications received and applications approved. The successful contracts only cost \$2.86 million in on-ground costs out of the \$12 million allocated to the program.<sup>2</sup>

Participants in the VIP were sent a questionnaire which asked landholders questions about influences on their participation and bid levels, socio-economic factors and their property. Participants overwhelmingly gave their main reason of participation as wanting to conserve the bush for wider environmental reasons. Responses to other statements indicated that participants were generally not motivated by financial considerations when joining the VIP. A case number assigned to each landholder allowed the questionnaire data to be matched to the bidding and property data gathered by NRW. This allowed the influences on bidding to be assessed.

Participants who chose to withdraw were also sent a questionnaire asking about the reasons behind their decision. The main causes for not continuing with the program were the requirement for permanent protection, not understanding the program and distrusting the government and the process. Concern over forming a bid and confusion over the operation of the mechanism were also widespread.

The applicants to the VIP were from a moderately homogenous sub-set of the community. Many of the VIP participants had previous experience with NRM programs. Perhaps worrying for a package initially designed for farmers is that many of the participants were generally not agricultural producers. Due to the high participation rate in semi-rural areas, only 58% of the respondents reported agricultural production on their land, with an average across all participants of 27% of land under agricultural production. Sixty-three percent of respondents reported over 60% of their income came from off-farm sources. The successful landholders were even less likely to be “farmers”. The average proportion of agricultural production amongst respondents who were successful applicants was 17%, while most indicated

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<sup>2</sup> Excluding administration costs.

that they had a high proportion of off-farm income. Landholders who chose to withdraw had more agricultural production on their properties, which indicates the importance of opportunity cost to the decision to participate. Participants consistently displayed a positive environmental attitude and were participating because of the chance to help the environment. They had a higher score on an ecological worldview scale than non-participants. Both participants and non-participants were far more educated than the average Queensland resident and had slightly higher income. The higher educated participants were likely to put in lower covenant bids. The majority of participants and non-participants had had experience with other NRM programs in the past, indicating that “new blood” hadn’t been attracted into the conservation auction.

In a conservation auction there are many possible influences on bid prices. Essentially a bid is made up of opportunity cost and information rent. The perceived risk of participation will also impact on bid prices. Analysis of the questionnaire responses and the tenders revealed that there was a wide range of factors that lay behind the differing bids in the VIP. As would be expected, facets of opportunity cost were the most likely to impact total bid prices. This included both incurred costs in the management plan and opportunity costs such as the potential loss of agricultural production on a property. The relationships with the covenant bids (as opposed to the total bids) more accurately reflect the non-management related opportunity cost of participation. For example, landholders who were concerned over property values decreasing as the result of the covenant were more likely to have submitted higher bids. The wide discrepancy between the average submitted bid and the average funded bid could indicate that there was information rent of some kind in the bids. The large budget was advertised widely, which would have increased the perceived likelihood of success and thus the information rent in bids. However, it was difficult to quantify information rent. It does not appear likely, however, that landholders conditioned their bids on their environmental scores. Length of residency also slightly decreased the total bid amount. Participation in the program to generate paid work for family members, not surprisingly, increased bids. Age was strongly and negatively correlated with total bid levels. Covenant bids were higher when landholders planned to keep their properties in their families, perhaps as a compensation for reduced options in the future. Support for the idea that landholders

increased their bids in response to uncertainty was provided by the negative correlation between bid levels and understanding the VIP's selection process. Earlier analysis suggested that the VIP participants were altruistic and it is likely this influenced bids, especially for the large number of participants who asked for nothing for the covenant payment.

Landholders were asked to separate their bids into two separate parts, one for the management plan and one for the covenant. The average covenant bid per hectare was 80% of the average total bid in SCGL, 24% in FNQ and 23% in SEQ. All of the participants in SCGL requested a covenant payment. In FNQ 70% applicants asked for a covenant payment. Only one-third of applicants in SEQ requested a covenant payment, which was the lowest proportion of all the regions. The difference between SCGL and the other regions may reflect the more restrictive covenant in SCGL, higher management costs in FNQ and SEQ, the greater foregone opportunity cost from agriculture in SCGL and the greater proportion of conservation-focused landholders in SEQ and FNQ.

## **LESSONS**

The VIP met its stated objectives and achieved the permanent protection of a significant amount of previously unprotected high quality non-remnant vegetation. However, there were aspects to the program that could have been improved, particularly the restricted participation and the high bids received. Evaluating the VIP provided recommendations for a number of important aspects of conservation auction, process and contract design.

### **Auction design**

Adequate time is crucial to good conservation auction design. Despite the already high program management transaction costs (estimated at approximately 75% of total costs) there is little doubt that the outcomes of the VIP would have been improved had there been more time spent on designing and developing the program. Conservation auction design needs to be adapted to the situation in order to avoid sub-optimal outcomes. Design time was particularly important for the VIP given that a

conservation auction had not been run on such a large geographical scale before and the limited amount of readily accessible ecological information in Queensland. Many of the problems that occurred in the VIP, such as the changing format, the uncertainty felt by many participants and the confused assessment process would have been alleviated by sufficient design time. Greater community consultation while designing the VIP might have highlighted some of the problems that caused low participation and high bid levels. For example, the most popular form of protection for the vegetation could have been offered from the beginning of the program had more consultation occurred before the first round commenced.

Uncertainty over the impact of participation and the tendering process itself is important to consider when designing a conservation auction. There was evidence for uncertainty over bidding causing some applicants to withdraw from the VIP and others to increase their bids. This uncertainty over appropriate bid amounts was compounded by the untested nature of the conservation auction mechanisms, the many changes introduced to the VIP throughout the program and the lack of adequate planning and information for GA staff and landholders. Uncertainty should be reduced to lower risk premiums in bids and to encourage greater participation. Greater information could be provided to participants in a variety of ways. Landholders could be informed of the potential impacts on agricultural production and land value so that they do not overestimate the impact and bid higher to avoid underestimating the cost. Positive stories from landholders who have participated in other similar schemes could be promoted. Practice bidding sessions could be run to allow landholders to build their confidence about the bidding process. Clear guidelines that remain the same for the whole program would increase the confidence of potential participants in the funder. Finally, an indication of the range of acceptable bids could be provided. This might decrease the number of very low bids as some landholders observe they can bid more than their opportunity costs but it might also lower the bids with high information rent components. This strategy should be reserved for situations where the market is uninformed and it seems probable landholders are likely to incorporate the risk into their bids or not apply due to concern over the lack of bidding guidance.

The VIP demonstrated that a program with a large budget is probably better off being run in more than one round in each region. The low participation rate and high bid levels meant that the budget for the program was not expended. If repeated auctions had been held, more landholders may have been attracted into the program as more people heard of it and became used to the idea of tendering environmental services. Uncertainty over the appropriate bidding strategies also might have fallen between rounds. Even if only one auction was held in a region, multiple rounds within that auction might have led to more confident bidding, which, in addition to decreasing the risk premiums in bids, may have encouraged more applicants to remain in the program. Multiple rounds present challenges for auction design in terms of avoiding collusion and landholders learning how to capitalise on their information rent. However, the advantages of using more than one round are likely to be significant when large amounts of money are being devolved to an uninformed market (Rolfe and Windle 2006).

The VIP experience confirmed that a reserve price is an important element to incorporate into a conservation auction design. If a reserve price had not been included in the auction design the large budget and low participation would have led to poor value bids being accepted. This message is particularly useful as conservation auctions become an established method of devolving funds for NRM and start to expend larger amounts of money. A reserve price is likely also to be useful in auctions with more than one round in a region, where funds can be held over from one round to another.

### **Process design**

There are lessons from the VIP for other conservation auction designers considering using a third party to deliver their program. The use of GA probably increased participation in areas where their presence is significant and helped provide a buffer between NRW and the distrustful rural population. However, it added another layer of decision making to the VIP and reduced the control of NRW over the process. The weak forward planning in the VIP meant that often there was confusion over what the program entailed and who was responsible for different activities. It is important to have already planned the program to its end and make sure the third party is aware of

the plan. The respective roles of the funder and the delivery organisation need to be carefully defined before the program commences. The funding organisation should also be aware that they will inevitably have less control over the process and will not build capacity within their own establishment (and thus capture longer term benefits from the investment). Finally, the VIP provides evidence for transaction costs being likely to be higher when a third party is involved in delivery.

### **Contract design**

Moral hazard in a conservation auction may be reduced by involving landholders who are already committed to environmental goals. For this reason, many of the experts involved in the VIP were satisfied that the weak contractual arrangements with landholders (in terms of monitoring) were counterbalanced with a prevalence of committed landholders. It is likely that these management plans will need less monitoring and enforcement. However, there is likely to be less additional environmental services generated from these “converted” landholders. The continued problems of environmental degradation in Queensland suggest that there is a need to encourage greater conservation activities on other properties. If the government wants to protect vegetation across the whole state, it is likely that at some stage the focus will need to shift from supporting conservation minded landholders, particularly in peri-urban areas, and look at providing encouragement for farmers to provide environmental public goods.

The evidence from the VIP may help program designers to decide whether or not to include a covenant in their conservation auction and whether or not to pay for such a covenant. As discussed, the inclusion of a covenant in the VIP discouraged participation and increased bids. The program designer needs to be aware of this possibility and spend more time consulting with landholders to ensure they feel knowledgeable about the impacts of the covenant and confident about signing one. For example, the importance of flexibility and follow up support in a covenant was confirmed by the overwhelming preference for Nature Refuge covenants in the VIP.

Landholders were more likely to ask for covenant bids when they thought their land value would fall and when they had agricultural production on their properties, and

less likely to ask for a covenant payment when they were highly educated. This suggests that a program that does not pay for covenants is more likely to attract this type of landholder, which is an important consideration when farmers are being targeted by a program. Lower covenant bids were associated with the characteristics of higher income, high off-farm income and higher education. This suggests that even if a program pays for covenants it may still be more likely to attract good value bids from a similar group of landholders. This narrow appeal may in turn reduce the scope of potential environmental service provision from the program. This suggests that other programs that use covenants may attract the same type of landholder, which restricts the possible environmental benefits.

## **CONCLUSION**

Many of the faults in the VIP related to the lack of time to design a robust program that was tailored for the Queensland situation, which resulted in a less effective outcome than could have been achieved. The evaluation of the program highlighted that careful choice and design of a market based instrument is crucial to ensuring high success. This is particularly true when untested mechanisms such as conservation covenants and conservation auctions are being used.

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