

Private native forest owner attitudinal survey - Northern NSW

UNDERSTANDING FOREST OWNERS VALUE AND USE OF
THEIR PRIVATE FOREST RESOURCE

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University of Canberra

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**UNIVERSITY OF
CANBERRA**

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Written by

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¹ At the time of the survey this project was administered by the NSW Department of Industry – Lands & Forestry

Executive Summary

New South Wales (NSW) is a major producer of forest and wood products, particularly in Northern NSW where the forest industry is an important contributor to the region's economy. Private native forests (PNF) make up a large proportion of the NSW native forest estate, with nearly 50% of native forest in Northern NSW privately owned. Timber sourced from privately owned forest in Northern NSW represents a vital contribution to the regions timber supply. As such there is a need to better understand private forest owner's forest management objectives, including their intent to harvest their native forest resource.

NSW is currently undertaking a land management reform process which includes the commitment of over \$240 million to support conservation on private land through the Biodiversity Conservation Trust which supports voluntary private land conservation agreements, many of which will be made on land with private native forest. Understanding the values landholders place on conserving biodiversity and their level of interest in entering conservation agreements, can help in the design and implementation of the Biodiversity Conservation Trust and associated land management reforms.

In this study a quantitative survey was undertaken from March to May 2017 by researchers from the University of Canberra. The survey had the following three objectives:

1. To understand how private forest managers currently use their forest and value those uses
2. To understand the interest of private forest owners in harvesting timber from their forest
3. To understand the interest of private forest owners in entering into conservation stewardship programs (where timber would not be available for harvesting).

This study is part of a larger project being undertaken by the NSW Department of Primary Industries (the Department) determining private native forest resources in Northern NSW.

Private forest timber harvesting

Key Findings:

Overall, three key findings were found from this study:

- 1) *Participation and interest in PNF is strong, particularly amongst larger landholders and in the North Coast LLS region.*

The 'Northern NSW Private native forest owner attitudinal survey' found that 20% of private forest owners intended to 'gain money from selling timber', managing 31% of the PNF area. Additionally 45% of landholders (managing 55% of the PNF) agreed that managing their forest for timber production was important. As to be expected PNF PVP holders were more likely to harvest their forest in the next 10 years, although some landholders without a PNF PVP (15.2%, managing 21% of the forest area) also indicated they were likely to harvest in the next 10 years – particularly those with larger areas of PNF. This intent highlights the potential increase in PNF available for harvest in the coming 10 years.

In contrast to previous studies, this survey found only three factors that significantly influenced harvest intent: having a PNF PVP, professional forestry experience and locality (North Coast LLS landholders more likely than other LLS regions). Previous forestry experience increases likelihood to harvest, potentially overcoming barriers to harvest through the development of forest industry knowledge and experience (i.e. nearly 50% of landholders with PNF areas 250-499 hectares found it difficult to get quality impartial advice).

The decision to harvest is driven by multiple motivations. For most landholders financial return was only one of multiple considerations which also included views about forest health, tree growth, and the availability and attitude of forest contractors, and the costs and benefits of timber harvesting for other forest, and property, management objectives.

Several barriers to harvest were identified, particularly issues with regulatory compliance, the need to formally interact with government, concerns about environmental impacts, and a lack of knowledge of timber industry and associated cost of harvesting costs likely to impact on landholder's intent to sell timber from their PNF.

2) *Northern NSW private native forest is used for a diversity of purposes and outcomes*

Landholders use their forests for multiple purposes, often providing environmental, social and economic benefits simultaneously. This integrated approach highlights that private forest management is complex and often opportunistic, with multiple values and objectives in play at any given time. Properties that were actively managed for commercial timber production were significantly more likely than others to also be managed for conservation purposes

Northern NSW private forest owners are quick to determine the trade-offs when considering the opportunities offered by timber harvesting or conservation agreements. Forest owners are willing to explore the potential contribution of various forest management arrangements within broader property management strategies. This holistic approach is potentially beneficial for increasing the intent of private native forest owners to undertake timber harvesting activities and/or enter into conservation agreements. Credible, transparent and salient information that outlines the potential benefits and costs of forest management alternatives is needed to encourage forest owners to undertake these opportunities.

3) *There are considerable barriers inhibiting Northern NSW private native forest owners entering into conservation agreements*

A large proportion of Northern NSW private forest owners are not interested in engaging in conservation agreements, particularly long term agreements. A substantial proportion of landholders, managing more than 65% of private native forest, would not consider entering a stewardship agreement of any length of time. Even at the highest level of payment (more than \$200 per hectare per year), only 21.2% (managing 24.3% of

forest area) of landholders were interested in entering into a conservation agreement for up to 10 years. Property owners managing large areas of PNF were significantly more interested in entering into a conservation agreement.

This lack of interest may be attributed to the large number of barriers inhibiting landholder's decisions to enter a conservation agreement. Over 50% of landholders identified multiple barriers, suggesting that entering into stewardship agreement highly challenging for many landholders. Barriers identified included the potential restrictions placed on land use, a lack of knowledge about conservation agreements, and a lack of confidence in available advice.

Given the strong positive values expressed by landholders towards the environmental services offered by their forest estates, conservation agreements are likely to be congruent with many private native forest landowners' values and beliefs. There is very little information currently available about the new Biodiversity Conservation Trust, as such there is a high level of uncertainty about the agreements and their relevance to property management objectives.

Further research is needed to develop a rich understanding of landholder concerns and needs, including their distrust of government agencies, and interaction with harvesting contractors. Such information would help to improve industry and government awareness of barriers to uptake of forest harvesting and/or conservation agreements, informing improved communications and engagement between landholders, government, industry and other stakeholders.

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1. Introduction

In New South Wales (NSW), private native forests make up a large proportion of the native forest estate, representing 39.7 per cent of the 22 million hectares of native forest (ABARES 2015). Private forest includes privately managed forest growing on privately owned freehold title (includes forest managed by Indigenous communities) (see ABARES 2013 p.39). There are multiple demands on these private native forests, with increasing emphasis given to their value for biodiversity conservation, timber production, and the provision of recreation and amenity benefits to landholders.

In this study we examine the forest values and management intentions of North Coast NSW private native forest owners, to better understand their important roles as forest managers, environmental stewards and timber producers (Jennings and van Putten 2006). The study region of North Coast NSW covers 9.7 million hectares. Of this the native forest area is 6.0 million hectares, nearly 50% of which is privately owned (2.9 million hectares). State forest amounts to 0.96 m ha (16%) of the native forest area, and National Parks and reserves 2.1 m ha (36%).

New South Wales (NSW) is a major producer of forest and wood products. In Northern NSW it is estimated that the 3,800 jobs depend on harvest of native forest and plantations in the region, which contributes \$184 million annually to the region's economy (ABARES 2013). Given this importance of the industry, there is interest in understanding the intentions of private native forest owners to harvest timber from their private native forest.

NSW landholders in many regions have been offered incentives to undertake activities to maintain and enhance the environmental values of their private native forests. A range of grant schemes have been offered through groups including Landcare, and government agencies (Local Land Services and, prior to 2015, Catchment Management Authorities). Continuing this, in 2016 the NSW government committed \$240 million over five years to support conservation on private land through the Biodiversity Conservation Trust. Under the Trust, landholders will be able to enter into voluntary private land conservation agreements, many of which will be made on land with private native forest and woodland, which often has important biodiversity values (NSW Government 2017). Understanding the values landholders place on conserving biodiversity, and their level of interest in entering conservation agreements, can help in identifying key factors likely to influence the uptake of this voluntary scheme by landholders in Northern NSW.

The area of native forest available for wood production has declined over recent decades in response to policy changes promoting conservation objectives (Aenishaenslin et al. 2007) which has resulted in a "progressive transfer of native forest into reserves" (ABARES 2013, p.6). Although private and leasehold native forests represent over 66 per cent of the national native forest estate they do not often contribute significantly to domestic wood supply (ABARES 2013). However, recent studies undertaken by the NSW Department of Primary Industries has found that on the NSW North Coast, the contribution of private forest resource to wood supply is substantial (NSW Government forthcoming). Having a better understanding about the extent to which timber supply from private native forests is likely to occur is important for

estimating likely future timber supply. This in turn requires understanding landholder views and values about harvesting their native forest for commercial timber sale.

A better understanding of the forest management objectives of private forest owners can inform the development of policy and programs aimed to assist private growers best manage their forests to achieve a range of forest management objectives that benefit not only the owner but the whole of society (Jennings and van Putten 2006; van Putten and Jennings 2010). There is considerable diversity of private forest owners in terms of their demographic and property characteristics and the environmental and social contexts in which they manage their forest: Emtage et al. (2007) identifies multiple types of landholders with differing approaches to valuing and managing the forest on their land. As such, the forest management objectives of private forest owners vary considerably (see Karppinen 1998; Jennings and van Putten 2001; van Putten and Jennings 2010) and their participation in timber production and/or land stewardship programs will also vary. There is an extensive existing literature regarding the forest owner intent to harvest timber, but this literature is predominantly based on studies undertaken in North America and Europe (see Gramann et al. 1985; Salkie et al. 1995; Kuuluvainen et al. 1996; Beach et al. 2005). There is less research examining Australian private forest owners, with the exceptions of studies in Tasmania (van Putten and Jennings 2006, 2010; Dare and Eversole 2013), and Northern NSW (Northern NSW Forestry Services 1999). The values and forest management intentions of Northern NSW landholders may differ to those in studies undertaken in other regions, or undertaken some years ago.

In this study a quantitative survey was undertaken to develop an understanding of Northern NSW private native forest owner's forest management objectives, uses and values for the native forest on their land. The objectives of the survey were threefold:

- a) To understand how private forest managers currently use their forest and value those uses
- b) To understand the interest of private forest owners in harvesting timber from their forest
- c) To understand the interest of private forest owners in entering into conservation stewardship programs (where timber would not be available for harvesting).

This is part of a larger project being undertaken by the NSW Department of Primary Industries (the Department) determining private native forest resources in Northern NSW. The survey was undertaken from March to May 2017 by researchers from the University of Canberra.

The following sections briefly review past studies examining private forest management. This is followed by a description of the methods used to collect and analyse data in this study. The results of the study are presented in Sections four to seven. Section eight discusses implications of the findings for those seeking to encourage landholders to engage in activities such as entering stewardship agreements or commercial harvest of timber.

2. Understanding the management of private native forest

Forests provide important economic, social and environmental values. In order to sustain and where possible enhance these benefits, a sound understanding is needed of the condition, use and management of Australia's forests (ABARES 2013) which are diverse in terms of species composition, tenure and forest management objectives. While considerable effort is placed into understanding the conditions and management of public multiple use forests (eg. ABARES State of the Forests Reports), comparatively little is known about Australia's privately owned and managed forest, despite their environmental, social and economic importance. This section reviews both the key findings of past studies examining private native forest owners, and the context in which private forest owners in NSW manage the forest on their land.

2.1. Private native forest owner behaviour, intentions and values

Forest management is shaped by a complex array of decision-making factors, including existing environmental conditions, domestic and international forest product markets, and the prevailing socio-political context driven by social values and forest policies (Beach et al. 2005). Numerous studies have examined the behaviour, decision-making processes, actions and values of private forest owners. The majority of these studies have examined private forest owners in Northern America and Europe, however some Australian studies provide important insights for the Australian context (e.g. Northern NSW Forestry Services 1999; Jennings and van Putten 2001, 2003, 2006; van Putten and Jennings 2010; Dare and Eversole 2013). Additionally, multiple studies have examined the factors that influence farmer adoption of conservation and environmental enhancement activities on the land they manage, a literature that includes adoption of activities such as tree planting, protecting existing shrub and tree areas on the farm, and improving habitat for key fauna species (see Pannell et al. 2006 for a synthesis of key findings across multiple studies).

Many of these studies have specifically examined the intent of private forest owners to harvest timber from their forests. These have identified a diverse range of factors that potentially influence intent to harvest, not all of which are consistent across different studies. For example, forest owner demographic characteristics are often identified as important, but have varying findings regarding which characteristics (e.g. age, gender, income, occupation) matter and why (see Binkley 1981; Clements and Jamnick 1989; MacFarlane 1994; Wear and Parks 1994; Salkie et al. 1995; Jennings and van Putten 2001, 2003, 2006; van Putten and Jennings 2010; Dare and Eversole 2013). Other factors identified as influencing harvest intent have included outcomes of previous commercial forest management activities (see Gramann et al. 1985; Young and Reichenbach 1987; Jennings and van Putten 2006; van Putten and Jennings 2010), and market price (see Adams and Haynes 1989; Newman and Wear 1993; Kuuluvainen et al. 1996; Karppinen 1998). Private forest owner's forest management objectives, including how they value their forest, have been identified as important explanatory variables for harvest intent in multiple studies (see Kurtz and Lewis 1981; Egan and Jones 1993; Bohlin and Roos

2002; Erickson et al. 2002; Jennings and van Putten 2003, 2006; van Putten and Jennings 2010; Dare and Eversole 2013).

In a review of studies on private forest owner management intent, Beach and colleagues identified four categories of factors that influence private forest owner behaviour (2005, pp. 268), including:

- a) Market drivers – factors that explicitly alters the costs and/or benefits of commercial forest management (e.g. price received, costs of harvesting including development of operational plans, harvest and transport)
- b) Policy variables – factors that depend on policies to influence forest management investment (e.g. Codes of Practice, tax incentives, provision of extension services)
- c) Owner characteristics – identifies the preference and resources of NIPFO (e.g. socio-demographic variable such as age, income, education)
- d) Forest conditions – relates to the physical characteristics of the forest area owned (e.g. soil, slope, species composition, productivity)

These categories have been supported by other studies, suggesting they provide a useful guide to the types of content that should be examined in northern NSW (see Kuuluvainen et al. 1996; Karppinen 1998; Jennings and van Putten 2006; Ni' Dhubha'in et al. 2007; van Putten and Jennings 2010). However, it is important to emphasise that the specific market, policy, owner and forest characteristics that matter will differ in different contexts, due to variation in the types of people managing forest, regulatory and market context and forest types (Beach et al. 2005).

Factors known to influence rural landholder adoption of conservation practices, meanwhile, have been extensively studied. In their seminal synthesis of the large number of studies in this field, Pannell et al. (2006) identified the following as important factors:

- Awareness of the problem or opportunity – in this case, awareness that engaging in actions such as entering stewardship agreements or timber harvest might have a practical or relevant outcome for the landholder such as earning income or increasing the quality of valued aspects of their forest.
- Evaluation – being able to access information from trusted sources and analyse it to help identify whether to engage in a practice. This can also include trial evaluation – trialling a new practice on a small area, something usually not possible in relation to timber harvest and stewardship agreements.
- Social, cultural and personal influences including the extent to which engaging in an action is consistent and congruent with the landholder's values and beliefs and those of the people they engage with.
- Perceived benefits and costs of engaging in particular actions, including the complexity of doing so, monetary cost and return, time required and other relevant impacts on lifestyle.

Previous studies in general highlight that understanding landholder intentions and behaviour requires examining a wide range of aspects related to their values, beliefs, socio-demographic

characteristics. The context in which they are making decisions, and is examined in the next sections.

2.2. Timber and other wood product harvesting in NSW private forests

Timber harvesting within private forests has faced increasing restrictions over the past decade (ABARES 2013). The availability of private forest timber is further restricted by private forest owners decisions, with only a small proportion of forest owners undertaking commercial wood production activities (ABARES 2013, see also van Putten 2006; van Putten and Jennings 2010; Dare and Eversole 2013). Nationally, NSW private native forests supply the highest proportion of sawlogs from the private sector with approximately 300,000 cubic metres of sawlog produced from privately owned native forests during the 2006 to 2011 period, down significantly from the previous five year period where nearly 600,000 cubic metres of sawlog was produced (ABARES 2013). A survey of private property harvesting contractors this year, show that private native forest in North Coast NSW are producing in excess of 250,000m³ per year, over 35% of the total native timber produced in the region (NSW Government, forthcoming).

While the focus of much private native forest production is sawlog, other wood products, such as low-quality sawlogs, pulplogs, girders, poles, split and round posts, bush sawn/hewn timber and sleepers are often harvested in association with high-quality sawlogs. A survey of NSW North Coast private property log harvesting contractors undertaken in 2017 shows that of the native timber harvested, 38% was high quality logs and girders, 2% piles and poles, 43% salvage or low quality logs, 2% fencing materials and 15% firewood (NSW Government, forthcoming).

2.3. Regulatory framework governing timber harvesting in NSW private native forests

In Australia, the States have principal responsibility for the management of forests. States have established a range of formal governance and management requirements for all forests, including private forests. The National Forest Policy Statement (NFPS) (Commonwealth of Australia 1992) helps to coordinating these responsibilities, encouraging States to comply with “the vision of the Australian government to manage private forests in close cooperation with public forest managers and to complement the conservation and commercial objectives of public forests” (Aenishaenslin et al. 2007, p.142)

In NSW the Environment Protection Authority (NSW EPA) is responsible for the regulation of native forestry operations, whether they occur on private and public (Crown) land (see <http://www.epa.nsw.gov.au/vegetation/nativeforestry.htm>). The NSW EPA regards private native forestry (PNF) as “the management of native vegetation on privately owned land to

obtain forest products – including sawlogs, veneer logs, poles, girders, piles and pulp logs – on a sustainable basis” (NSW EPA 2013, p.1).

PNF is regulated under the Native Vegetation Act 2003 and the Native Vegetation Regulation 2013 (NSW). At the time of writing NSW is undertaking a land management reform process that will see changes made to the private native forest regulatory framework (see Section 2.4). Prior to harvesting their native forest, forest owners are required to have an approved PNF Property Vegetation Plan (PNF PVP). A PNF PVP is an agreement up to 15 years in duration made between the landholder and the NSW EPA. The PNF PVP includes a declaration that PNF operations will be undertaken in compliance with the PNF Code of Practice (<http://www.epa.nsw.gov.au/pnf/CodeofPractice.htm>), and a detailed map of the property that shows the area subject to the PVP and the areas excluded from harvesting operations. Once a PNF PVP has been signed, it forms a legally binding agreement. The latest information from the EPA, indicates that 494,125² hectares of north coast native forest is subject to a PNF PVP allowing private owners to harvest their native forest for commercial purposes.

In NSW there are four Codes of Practice: Northern NSW, Southern NSW, River Red Gum Forests and Cypress and Western Hardwood Forests. The Code of Practices mitigate potential environmental impacts, setting out minimum operating standards for harvesting in private native forests. The Code of Practice aims to ensure that PNF operations improve or maintain environmental outcomes. It requires landholders to report to the EPA any harvest operations in the previous year and intended operations in the coming year.

2.4. Regulatory framework governing stewardship agreements over NSW private native forests

At the time of writing this report, draft Biodiversity Conservation Act Regulations, a draft Regulatory Impact Statement, draft Vegetation SEPP and a draft Sensitive Land Values Map had been released for public consultation. These instruments provide a regulatory framework for where and how private land conservation programs and PNF will operate in the future and detail the treatment of existing conservation agreements and PVPs.

² EPA area data contains lapsed or terminated PNF PVPV from 2007 to 2015, this area could be substantial - <http://www.epa.nsw.gov.au/pnf/approvedpnfpvps.htm>

3. Methods

Data were collected via a survey of northern NSW landholders with private native forest on their property. This section describes the sampling and survey process, response rates, potential for non-response bias, and methods used to weight and analyse the survey data.

3.1. Sample and sampling process

First, a sample frame of northern NSW landholders was developed (a list of all potential landholders from which a suitable sample could be selected to survey). As the aim of the survey was to understand views of northern NSW landholders with significant areas of private native forest on their property, the first step was identifying the parameters of the sample frame. Based on initial discussions with the Department, the sample frame was defined as all landholders with the following characteristics:

- Having properties in the following 34 local government areas: Armidale Dumaresq, Ballina, Bellingen, Byron, Cessnock, Clarence Valley, Coffs Harbour, Dungog, Glen Innes Severn, Gloucester, Gosford, Great Lakes, Greater Taree, Guyra, Hawkesbury, Kempsey, Kyogle, Lake Macquarie, Lismore, Maitland, Muswellbrook, Nambucca, Newcastle, Port Macquarie-Hastings, Port Stephens, Richmond Valley, Singleton, Tamworth, Tenterfield, Tweed, Upper Hunter, Uralla, Walcha and Wyong.
- Having 25 hectares or more native forest on an individual property that is potentially able to be used for timber harvest (this excluded all areas of mapped old growth, mapped rainforest, areas with a slope of greater than 30 degrees, and areas within riparian buffer zones). The 'timber harvest' criteria was important as a key goal was to identify the proportion of landholders likely to consider using their native forest for each of the purposes asked about: including forest that could not be used for one or more of these purposes would result in responses skewed away from the activities that could not be undertaken in some of the forest areas.
- Having a valid address.

The Department of Primary Industries provided a database of private landholders who met these characteristics, using NSW State government records. In total, 14,425 landholders were identified who lived in the specified region and had 25 hectares or more of native forest that could potentially be available for timber harvest on their property. This number is based on total number of landholders; as some of these landholders managed more than one property, the total number of properties identified in the region on which there was 25 hectares or more of potentially harvestable native forest was 16,133.

In addition, the sample needed to enable (i) comparison of landholders who had a PNF PVP versus those who did not, and (ii) comparison of landholders managing land differing areas of private native forest. As shown in Table 1, only 1,730 landholders who met the native forest area and location criteria had a PNF PVP, while 12,695 did not. This meant a stratified sample was required to ensure an adequate sample of PNF PVP holders was achieved. The proportion of landholders managing large areas of private native forest was much smaller than the proportion with smaller areas of native forest. This again required stratification of sampling.

In total, a sample of 1,800 landholders was selected, with an objective of achieving a sample size of 720 (40%). This sample size was selected as it had a high likelihood of achieving survey results in which there was 95% confidence that the findings were within $\pm 5\%$ of the population sampled. The sample was selected to include similar numbers of landholders with (i) no PNF PVP and (ii) a PNF PVP, and similar numbers of landholders managing native forest of five different size classes (25-49 hectares, 50-99 hectares, 100 to 250 hectares, 250 to 499 hectares, and 500 hectares or more). As very few landholders managed more than 250 hectares of forest and had a PNF PVP, almost all landholders with these characteristics were included in the sample (Table 1).

Table 1 Sample frame and stratified random sample criteria

Property size class	Sample frame – number of landholders			Stratified random sample – number of landholders randomly sampled from each group		
	No PVP	PVP of >25ha	All	No PVP	PVP of >25ha	All
25to49ha	6552	566	7118	172	181	353
50to99ha	3139	445	3584	172	182	354
100to250ha	2082	408	2490	192	181	373
250to499ha	640	197	837	212	182	394
500haandover	282	114	396	212	114	326
Total	12695	1730	14425	960	840	1800

The sample of 1,800 landholders was selected based on assigning random numbers to each landholder within the 10 stratified groups identified in Table 1 (PNF PVP/no PNF PVP by five native forest size classes), using the Microsoft Excel RANDBETWEEN function. The sample was then sorted based on the random numbers assigned, and the sample drawn starting from the smallest number. For example: each of the 6,552 landholders with no PNF PVP and a native forest area of 25 to 49 hectares was assigned a random number between 1 and 100,000. The 6,552 were sorted in order of the random number assigned from lowest to highest value, and the first 172 were then drawn as the random sample.

3.2. Survey instrument design and testing

The survey instrument was designed in a six step process:

1. Initial drafting of potential survey items was undertaken by the researchers, informed by previous studies of private forest owner intent (including those referred to in earlier sections of this report, and in particular Jennings and van Putten 2003, and Dare and Eversole 2013)
2. Draft survey items were discussed with Department of Primary Industries representatives, and revised based on input received to ensure they met the objectives of the study
3. The survey instrument was professionally formatted in both online and paper survey formats
4. The instrument was pilot tested by 11 people, including both researchers with expertise in understanding landholder views and attitudes, and a sample of 8 farmers with

native forest on their property. Pilot testers were asked to provide detailed feedback on the online survey form identifying areas where the survey could be improved.

Additionally, direct discussions were held with five pilot testers to further explore their comments on the pilot test, focused around identifying how to improve survey items these pilot testers had identified as of low interest or relevance, or as difficult to understand or answer.

5. The survey instrument was revised based on pilot test feedback.
6. The final instrument was reviewed by researchers and Department of Primary Industries representatives to check it addressed all project objectives prior to finalisation.

The final survey instrument asked about 11 key topics:

1. Total area and area of private native forest on the property the survey was sent to
2. Management history (length of ownership, future intentions regarding property ownership)
3. Property uses (e.g. agriculture, residential, conservation, timber harvest, recreation)
4. Activities currently undertaken in native forest on the property (including recreation, conservation, fire management, harvest of timber), importance of these activities, and future management intentions
5. Values and beliefs held about managing the native forest, for example whether the landholder viewed it as a fire hazard, important provider of habitat and environmental services, something requiring active or passive management
6. Factors reducing likelihood of landholder using native forest for timber harvest
7. Factors reducing likelihood of landholder entering into a conservation agreement for part or all of their forest area
8. Sources of advice and information on native forest management
9. Socio-demographic information including age, gender, occupation, household income, health and wellbeing
10. Landholders who had a PNF PVP were asked additional questions about:
 - a) Whether they had harvested timber
 - b) If they had harvested timber:
 - i) What approvals were required, their motivations for harvesting, the year of harvest and amount and type of timber harvested
 - ii) Their satisfaction with different aspects of the harvest
 - iii) Who managed and undertook the timber harvest (e.g. a forestry consultant, harvesting contractors, sawmill or other organisation)
11. Views about market certification of forests (these questions were optional, and were included by University of Canberra researchers; they did not form part of the Department of Primary Industries objectives for this project).

The final survey was designed to capture both positive and negative landholder experiences. To ensure this could be achieved both positive and negative statements about landholder experiences were included in the survey instrument, including response options that enabled respondents to agree, disagree or otherwise report they had either a poor or positive experience.

To ensure access to the comprehensive survey results detailed tables of analysed survey data are presented in Appendices A to E. Given these results may provide a summary of the analysis the full survey instrument is provided in Appendix F.

3.3. Survey delivery

The survey was delivered to landholders during February to May 2017. Survey delivery has two aspects: providing appropriate options for survey completion, and communicating with landholders to encourage them to take part in the survey.

Options for survey completion

In this study, landholder had the option of completing the survey either online or on a paper form. This enabled landholders to choose the option that was easiest for them:

- **Online survey:** The online survey was designed using Qualtrics, a secure online survey tool (see www.qualtrics.com). To enable landholders to easily access the online survey, the domain www.forestsurvey.net.au was purchased, and redirected participants directly to the survey form. This domain was provided in all materials sent to landholders. The online survey enabled participants to quickly access and complete the survey, with appropriate ‘piping’ of questions that lead participants to the next relevant question. If the participant needed a break or experienced an internet dropout, the survey form was automatically saved and they returned to the point they had reached by going back to the www.forestsurvey.net.au link.
- **Paper survey:** A paper survey was mailed to landholders at two points, described further below. The mailed survey pack included the survey form, an information sheet and a prepaid envelope to return the completed survey.

A Freecall telephone number was provided that participants could call to request assistance when completing the survey. However, participants could not complete the survey via phone interview as the budget available did not allow for staff time to support phone interview completion of the survey. This means the phone number was used to provide support in the form of answering questions about the project or about specific questions in the survey.

Communication with landholders

Many factors affect survey response rates. Factors known to have a large impact on response rates include (Schirmer 2009):

- **Survey salience:** How interesting and relevant do potential respondents find the survey topic? Surveys of lower salience will typically achieve lower response rates, and vice versa. Salience can vary depending on the context in which a survey is delivered: for example, a survey asking about drought is likely to be more salient if delivered during or close to a time when a person experiences drought, and less salient if delivered in a time of good rainfall. Salience can have a very large effect on response rates.

- **Survey incentives:** Offering incentives such as prize draws has been shown to increase survey response rates, but often by only a relatively small amount. The most effective incentive is provision of a cash payment to each person who completes the survey, a method that was not feasible in this study.
- **Effective communication with multiple reminders:** Using best practice communication and multiple reminders can substantially increase response rates.

To maximise response rates, survey salience was maximised through designing and testing survey items to ensure they were interesting and relevant to landholders. This was particularly assisted by the pilot testing process in which feedback was received from landholders about items they found less relevant or useful, and those they found more relevant and useful.

To achieve the highest response rate possible within the available resources, the Dillman Total Response Method (Dillman et al. 2014) was used to ensure best practice communication with landholders and use of multiple reminders. This method uses a process in which potential survey participants are contacted multiple times with a request to participate in the survey. It has been demonstrated to increase response rates substantially: surveys in which a person is contacted only one often has a 5-10% response rate, whereas surveys that use the Dillman approach often achieve responses of between 30% to 50% (Schirmer 2009).

The Dillman reminder process has been successfully used in multiple Australian studies to achieve high response rates from Australian landholders, including both farmers and rural residential landholders (see for example Curtis et al. 2001, Curtis et al. 2002, Greiner and Gregg 2011). Ethical aspects of its use have also been examined and a process of using multiple reminders ethically identified and used in practice (see Schirmer 2009).

Using this technique, landholders were contacted seven times, as described in Table 2. Each landholder was assigned a unique survey code which they entered when completing the survey; this enabled landholders to be removed from the survey mailing database as soon as they had completed the survey, reducing the burden of receiving multiple mailings. Additionally, landholders who did not wish to or could not participate were able to easily contact researchers by email or on the free phone number to request removal from the mailing list, ensuring they did not receive subsequent reminders. In total, 43 landholders requested removal from the database.

Survey communications were timed to arrive around one week apart, although it is important to recognise that postal services are often infrequent for many rural landholders, who either receive a mail delivery only once or twice a week at their property, or have a postal box in a nearby town that they check when in town.

The survey communication process was substantially affected by climatic conditions. March 2017 was the wettest March on record for many weather stations located within the study region (BOM 2017). Particularly heavy rainfall was experienced between 15-22nd March, affecting many parts of the study region (BOM 2017). This was followed by extensive flooding in the last two days of March, as remnants of tropical cyclone Debbie shifted to cause high rainfall in north-east NSW (BOM 2017), with substantial flooding of rural properties and some towns. Communication with landholders during this period (respondents using the 1800 free

call number) indicated the reduced ability for successful delivery of mail, and the likelihood of landholders checking postal boxes during this period. This heavy rainfall also likely reduced the salience of the survey, as landholders focused on land management activities such as fixing fences and addressing storm damage, with completion of the survey a lower priority than it would normally be.

Table 2 Landholder communication process used to encourage participation in the survey

	Date sent	Type of contact	Purpose of contact
1	22 Feb	Letter introducing the survey	Inform landholder they will receive a survey in coming weeks and provide background information on the purpose of the survey
2	28 Feb	Letter inviting online completion of survey, project information sheet	Provide landholder with instructions on completing survey online and explain a paper form will also be mailed
3	7 Mar	Letter encouraging completion of survey, paper survey form, pre-paid return envelope	Provide landholder with options of completing survey using paper form, and reminder about the survey
4	14 Mar	Reminder letter	Letter reminding landholder there is still time to complete the survey, how they can complete it, and encouraging completion
5	21 Mar	Reminder letter	Letter reminding landholder there is still time to complete the survey, how they can complete it, and encouraging completion
6	7 Apr	Reminder letter, paper survey form, pre-paid envelope	Letter reminding landholder they could still complete, and second copy of paper survey. This reminder was not sent to 160 landholders living in flood affected areas of the region.
7	17 Apr	Reminder letter	Letter reminding landholder there is still time to complete the survey, how they can complete it, and encouraging completion. This reminder was sent to all remaining landholders on the mailing list, including those in areas affected by flooding in March.

Given these adverse conditions to the distribution of the final reminders for the survey was delayed by two weeks, and reminders were not sent to 160 landholders living in areas known to have been flooded at the end of March. The seventh contact was sent 10 days later to all landholders. The end date of the survey was extended to attempt to reduce the impact of the weather on response rates, with surveys accepted until 15th May. However, the extended time frame was less effective than would normally be the case as it coincided with school holidays, Easter and the Anzac Day public holidays – periods during which survey responses rates are often lower than typical.

3.4. Survey responses and non-response bias analysis

Surveys were posted to a total of 1,800 landholders. In total, 106 of these surveys were removed from the sample frame as invalid due to either lack of a valid address (80 letters were returned

to sender, indicating postal address details in the database were incorrect), or changed circumstances meaning the landholder was not eligible to complete the survey (three landholders had died, six reported they had no native forest on their property, and 17 had sold their property). This resulted in a valid sample frame of 1,694 landholders.

A total of 515 valid survey responses were received, with 237 completed online and 278 completed using a paper survey form. This represents a response rate of 30.4%.

Survey responses were analysed to identify how representative the response was, and whether there was any identifiable non-response bias (in other words, whether some types of landholders were less likely to respond than others).

Analysing response bias requires having a benchmark data set that survey respondents can be compared to. In this case, the benchmark was the sample frame of 1694 landholders remaining in the sample frame after removing the 106 identified as not eligible to take part in the survey. The information available about these landholders included information on whether they had a PNF PVP or not, the area of private native forest on their property, their property location, and total area of property. Table 3 compares the distribution of survey respondents compared to the sample frame of 1,694 landholders. Of the 515 landholders who completed a survey, 486 provided details that enabled identification of their details in the original sample frame; the remaining 29 elected not to provide identifying details that would enable linking of their survey response to the data in the sample frame.

In all cases, the proportion of survey responses was within 4% of the distribution of the sample frame, and in the majority, there was a 2% difference or less. For example, 17% of survey responses were from landholders with no PNF PVP and a net native forest area of 25 to 49 hectares, compared to 18% of the sample frame. This indicates good representativeness of respondents based on the benchmark data available.

Table 3 Non-response bias analysis: Comparison of known characteristics of the survey respondents to the sample frame

	No PVP		PVP of 25ha or more		All	
	Survey responses (n=261)	Sample frame (n=899)	Survey responses (n=225)	Sample frame (n=795)	Survey responses (n=486)	Sample frame (n=1694)
25 to 49 hectares	17%	18%	24%	22%	21%	20%
50 to 99 hectares	20%	18%	26%	22%	22%	20%
100 to 249 hectares	16%	20%	19%	21%	17%	21%
250 to 499 hectares	23%	22%	20%	21%	22%	22%
500 hectares or more	24%	23%	11%	13%	18%	18%

Ideally, non-response bias analysis would also examine the representativeness of the sample in terms of key socio-demographic characteristics such as gender, age, household income. However, there are no reliable, current data available to enable this comparison: data from the Australian Bureau of Statistics *Census of Population and Housing* are available only for 2011, and do not separate people living in rural properties from those living in towns, meaning there

is no viable way to robustly compare Census data to characteristics of landholders in the survey sample. Table 4 summarises key demographic characteristics of the sample. Rural landholders are typically older than the rest of the population, particularly farmers. Across Australia, the average age of farmers is now 56, and in New South Wales the average farmer age in 2016 was slightly higher, at 57 (ABS 2017). This includes all farmers; the survey in this case was examining landowners, who are often older on average as this group excludes the many younger farmers who are leasing and share-farming or working as employees (Schirmer et al. 2015). It was therefore expected that the sample would be dominated by people aged 50 and over, however there was no exact benchmark data available to compare, as the ABS Census does not distinguish rural landowners from others living on rural properties. The sample was, as expected, dominated by older landowners, with only 14% aged under 50 years. One quarter of respondents were female and three quarters male: this is identical to the distribution of female and male names in the benchmark database where these were known (many of those in the database had names listed that were not able to be assigned a gender as they either had no first name listed, or had a first name common to both men and women. Note that where there were two contact people listed for a property, random number generation was used to identify which the survey would be addressed to).

Table 4 Demographic characteristics of survey respondents

Socio-demographic Characteristic		Percent respondents
LLS Regions (n=503) ¹	North Coast	48.7%
	Northern Tablelands	26.2%
	Hunter	25.0%
Gender (n=478)	Female	24.7%
	Male	75.3%
Age (n=471)	Under 50 years	14.0%
	50-59 years	26.1%
	60-69 years	37.2%
	70+ years	22.7%
Highest level of formal qualifications (n=365)	None of these	24.3%
	Year 12 of high school or equivalent	12.0%
	Certificate or diploma from TAFE	32.0%
	University degree (undergraduate or postgraduate)	31.7%
Employment status (n=451)	Retired	27.1%
	Currently unemployed	1.6%
	Employed	71.3%
Household income (n=350)	Under \$52,000	39.7%
	\$52,000-\$103,999	30.6%
	\$104,000+	29.7%
Forestry or agricultural background (n=490)	Past or present involvement in forestry operations	30.4%
	Past or present involvement in commercial farming (no forestry experience)	40.8%
	Others	28.8%

¹ There were 3 respondents from Greater Sydney LLS and 5 respondents from North West LLS. They were included in the Hunter LLS and Northern Tablelands LLS respectively.

To further assess potential non-response bias, we compared responses received earlier in the survey to those received later in the survey period. When examining this type of difference, some caution is needed: when using the Dillman method, the survey is deliberately open for a long period to ensure that people who take longer to respond and may have different views are still captured in the survey. This means that it is expected those who participate earlier versus later are expected to have some difference in views: the question is not whether they are different, but whether it is likely that some non-responders were still not captured in the survey responses despite the long period the survey was open. This means that it is only when there are large differences between early and late responders that the likelihood of an overall non-response bias should be considered.

Survey respondents were split into three groups:

1. Early responders were those who completed the survey before 18th March (for paper surveys, this was defined as data being entered by 2nd April, given that many returned surveys took up to one week to be delivered, and then another 2-3 working days to be entered into the online survey form). There were a total of 234 early responders.
2. 'Mid' responders were those who completed the survey between 19 March and 31 March (for paper surveys, data entered between 3 April and 15 April). There were 170 mid-responders.
3. Late responders were those who completed the survey after April 1st (for online surveys), or whose surveys were entered after April 15th (paper surveys). There were 109 late responders.

Those who responded later were slightly more likely to be female and to have a university degree, although the differences are relatively small (Table 5). None of these differences were statistically significant when examined using the Kruskal-Wallis H test and Pearson Chi Square tests (which identify if any of a number of groups are significantly different to others; test results are provided in the bottom row of the table).

Table 5 Socio-demographic characteristics of early versus later survey respondents – gender, age and educational attainment

	Gender (n=478)		Educational attainment (n=480)			Age (n=471)			
	Fem-ale	Male	Did not complete high school (n=480)	Highest level of education on Year 12 of high school (n=480)	Highest level of qualification a university degree (n=480)	Aged <50	Aged 50-59 (n=471)	Aged 60-69 (n=471)	Aged 70+ (n=471)
Early	23%	77%	26%	12%	29%	12%	26%	40%	22%
Mid	28%	72%	22%	14%	32%	21%	24%	37%	19%
Late	25%	75%	24%	8%	37%	13%	28%	33%	26%
Total	25%	75%	24%	12%	32%	14%	26%	37%	23%
Significant difference between groups?	No. Pearson Chi-Square value 1.14 (df=2), p=0.566		No. Pearson Chi-Square value 5.45 (df=6), p=0.487.			No. Kruskal-Wallis H = 3.532 (df=2), p=0.172. Note the Kruskal Wallis test was used with age categories which were recorded in 5-year groups and could be treated as continuous but non-normally distributed.			

It was considered likely that landholders who had an active interest in harvesting timber would be more likely to participate in the survey, as the survey asked specific questions about this activity and would therefore have higher salience for these landholders than some others. It was also considered possible landholders considering selling their property might find the survey less relevant and be less likely to complete it, and that those who found using their native forest for environmental benefit or stock grazing might similarly find the survey of higher salience. Table 6 compares early and late responders who had these characteristics. It shows that while those who responded earlier were more somewhat more likely to report finding commercial timber harvest important (32% of late responders compared to 46% of early responders) and somewhat less likely to report placing high importance on environmental benefit (76% of late responders compared to 68% of early responders), none of these differences were statistically significant.

Based on this analysis, the sample appears robust. However, despite not being significantly different, the higher proportion of early respondents with an interest in timber harvest suggests the survey may overall have had higher salience for this type of respondents, and therefore there is potential the survey is biased to those landholders. This bias is likely to be small overall, and largely addressed through the weighting process described in the next section, which weighted responses to be representative of the proportion of landholders in the study region who do and do not have PVPs (with presence of a PVP very strongly correlated with timber harvest importance and intention).

Table 6 Private native forest uses and timber harvest intentions of early versus later survey respondents

		Uses of private native forest considered important by landholders (n=455)			Timber harvest intentions and history	
	Likely to sell property in next 10 years (n=502)	Commercial timber harvesting (harvesting for sale off the property)	Stock grazing, shade and shelter	Environmental benefits	Has a PVP (n=384)	Likely to gain money from selling timber from property in next 10 years (n=465)
Early	17%	46%	64%	68%	53%	46%
Mid	21%	43%	58%	73%	49%	39%
Late	17%	32%	66%	76%	40%	38%
Total	18%	42%	63%	71%	49%	42%

Statistical significance tests:

- Likely to sell property: Kruskal Wallis H = 1.61 (df=2), p=0.447.
- Commercial timber harvest importance: Kruskal Wallis H = 2.76 (df=2), p=0.252.
 - Stock grazing importance Kruskal Wallis H = 0.45 (df=2), p=0.799
- Environmental benefit importance: Kruskal Wallis H = 2.71 (df=2), p=0.447
 - Presence/absence of PVP: Pearson chi-square = 5.73 (df=4), p=0.220.
- Future timber harvest intention: Kruskal Wallis H = 3.96 (df=2), p=0.138.

As weather events affected some parts of the region more than others, we also compared the sample achieved to the distribution of all landholders in the sample frame, by local government area (LGA). This identified some bias: there was some under sampling of landholders in the LGAs of Cessnock, Greater Taree, Great Lakes, Tweed, Lismore and Armidale-Dumaresq; and oversampling of landholders in Clarence Valley, Tenterfield, Richmond Valley, Walcha and Nambucca. While not substantial (see table in ‘Weighting’ section which provides data), this was considered to represent potential bias in the sample, and was addressed through data weighting.

3.5. Weighting and analysis

Weighting

The sampling process used a stratified random sample. As the sample deliberately over-represented some groups, the process of data weighting was applied when analysing data, to ensure that the analysis could produce results representative of the landholders living in the region. ‘Weighting’ refers to a statistical process in which known biases in the responses received are corrected for. Weights can be ‘design weights’, which correct for differences in selection probabilities, thereby making the sample more representative of a ‘true’ population of landholders in the survey. If the non-respondents are a random sample of total sample then the non-respondent’s adjustment is made using design weights. As the non-response analysis suggests the non-respondents were a random sample when examined based on (i) PNF PVP holders and (ii) area of forest managed, the design weights were relatively simple to apply. When conducting a survey, having a representative sample of the population is of paramount importance. But sometimes, despite best efforts, some sections of the population are over and some under sampled. In other words, the sample distribution by a certain

characteristic (such as the local government area they live in) may differ from that of the population. This would introduce a bias in the estimates as more weight is given to the land holders who are oversampled. If an unintentional sampling bias is identified – in this case, a small bias to landholders from some local government areas - these biases can be corrected mathematically with a post-stratification survey weight.

Weighting was used to correct for intentional over-sampling of PNF PVP holders, and of landholders with larger areas of private native forest on their properties. The weighting of responses involves adjusting the relative contribution each survey respondent makes to the whole when analysing survey results, so analysis of the sample more accurately represents the population from which it was drawn. Weighting doesn't change the answers people gave to survey items. In this report, two different weightings were developed, which give different types of insight into the findings:

- 'Landholder weight': The first weight corrected sampling bias to provide a representative sample of rural landholders living in northern NSW. This 'landholder weight' provides a representative view of the views and actions of landholders. This weight has been applied to all results that examine the proportion of landholders who have different views or have taken different types of action
- 'Native forest area weight': The second weight provides insight into the proportion of native forest area managed in different ways. This was important as a relatively small proportion of landholders manage a large proportion of the private native forest in NSW: this means that in some cases, it is possible that, for example, if 50% of landholders report they manage their forest a particular way, this involves only 25% of the actual forest area, as most of those landholders are managing smaller areas of forest.

The process used to develop each weight is described below:

The landholder weight was calculated based on correcting for under- and over-sampling of landholders who (i) did and did not have a PNF PVP, (ii) managed different areas of forest, and (iii) lived in different local government areas. In the case of the PNF PVP and forest area weights, the weighting was correcting for intentional over sampling, which is also termed 'design weighting' as it was intended that the sample be biased towards some groups. The LGA weighting then corrected for unintentional bias in sampling from different LGAs, also terms 'post-stratification weighting' as this corrects for unintentional bias identified after the survey responses have been collected and a non-response bias analysis completed.

Table 7 summarises the weighting applied to correct for intentional over-sampling of PNF PVP holders and landholders with larger areas of private native forest.

Table 7 Weighting adjustment for intentional over-sampling of PVP holders and landholders with larger areas of private native forest

Category (PVP and private native forest area)	% population (n=14,425)	% sample (n=503)	Weighting adjustment for PVP and net PNF area
No PVP, 25-49ha	45.4%	9.5%	4.76
No PVP, 50-99ha	21.8%	10.9%	1.99
No PVP, 100-249ha	14.4%	8.3%	1.73
No PVP, 250-499ha	4.4%	12.7%	0.35
No PVP, 500 ha or more	2.0%	12.7%	0.15
PVP, 25-49ha	3.9%	11.1%	0.35
PVP, 50-99ha	3.1%	12.5%	0.25
PVP, 100-249ha	2.8%	8.5%	0.33
PVP, 250-499ha	1.4%	8.7%	0.16
PVP, 500 ha or more	0.8%	4.8%	0.17

Table 8 summarises the weighting applied to correct for unintentional under sampling and oversampling in different LGAs within the study region.

Table 8 Weighting adjustment for unintentional over-sampling and under-sampling across different LGAs in the study region

Local government area	% population (n=14,411)	% sample (n=497)	Weighting adjustment for PVP and net PNF area
CESSNOCK	4.2%	2.2%	1.8843
GREATER TAREE	5.8%	3.8%	1.5066
GREAT LAKES	5.8%	4.0%	1.4450
TWEED	2.4%	1.0%	2.4348
LISMORE	1.6%	0.2%	8.1391
ARMIDALE DUMARESQ	2.8%	1.4%	1.9707
WYONG	1.2%	0.2%	5.9319
DUNGOG	3.0%	2.0%	1.4899
GUYRA	2.9%	2.0%	1.4243
LAKE MACQUARIE	1.0%	0.2%	5.0007
BYRON	0.8%	0.0%	0.0000
SINGLETON	3.8%	3.2%	1.1812
PORT STEPHENS	1.0%	0.4%	2.3969
GOSFORD	0.5%	0.0%	0.0000
MUSWELLBROOK	1.8%	1.4%	1.3007
BALLINA	0.3%	0.0%	0.0000
MAITLAND	0.2%	0.0%	0.0000
URALLA	2.2%	2.0%	1.0829
HAWKESBURY	0.5%	0.4%	1.3278
TAMWORTH REGIONAL	1.1%	1.0%	1.1243
NEWCASTLE	0.1%	0.0%	0.0000
KEMPSEY	5.0%	5.0%	1.0001
BELLINGEN	1.9%	2.0%	0.9519
KYOGLE	5.2%	5.4%	0.9516

COFFS HARBOUR	1.8%	2.2%	0.7963
PORT MACQUARIE- HASTINGS	4.9%	5.4%	0.9082
GLOUCESTER	2.9%	3.4%	0.8520
UPPER HUNTER	2.5%	3.4%	0.7263
GLEN INNES SEVERN SHIRE	3.8%	4.8%	0.7918
NAMBUCCA	3.0%	4.4%	0.6819
WALCHA	3.4%	4.8%	0.6969
RICHMOND VALLEY	4.2%	6.4%	0.6456
TENTERFIELD	7.0%	10.9%	0.6457
CLARENCE VALLEY	11.4%	16.1%	0.7087

Native forest area weight

The native forest area weight was calculated using a three step process:

Step 1: Design weights were calculated, meaning correcting for intended bias towards (i) PNF PVP holders and (ii) landholders managing larger areas of native forest. This is the same step as was used in the development of the landholder weight. They are computed as the inverse of the probability with which each unit has been selected. If n_h is the number of landholders who responded from h th strata with N_h number of landholders in the population from the strata, then N_h/n_h is the design weight adjusted for non- response for that strata.

Step 2: Post-stratification weighting was applied, based on merged local government areas (very similar to the post-stratification weighting used for the landholder weight, but with some LGAs with small areas of private native forest merged to improve robustness of the weight. If n_k is the number of landholders who responded from k th LGA (merged) with N_k number of landholders in the population from that LGA, then N_k/n_k is the post-stratification weight. It is called a post-stratification weight because this can only be computed after the survey data is collected. The stratification part comes from the fact that various known strata (such as merged LGAs) of the population are used to adjust the sample data to conform more to the population's parameters.

Step 3: The third step in calculating the native forest area weight was to deliberately adjust the weight to account for differences in the area of private native forest managed by landholders, and produce a weight that would reflect the overall proportion of native forest each managed. As noted earlier, weights based on forest area were used because some answers to survey questions would differ depending on the size of the forest area a landholder managed.

The three weights calculated from the above three steps are multiplied and then standardised to the sample size to give the final weights.

Weighting Formula

The weight for the h th strata is:

$$w_h = N_h/n_h$$

Where N_h is the population size in h th strata and n_h is the sample responded from strata h .

The post stratification weight for respondents from k th LGA is:

$$w_k = N_k/n_k$$

Where N_k is the population size in k th LGA and n_k is the number of respondents from that LGA.

The weight for each reporting unit i belonging to h th strata and k th LGA, adjusted for design and post-stratification is:

$$w_{i(hk)} = w_h * w_k$$

The final area adjusted weight for i th reporting unit is:

$$w_{i(hk)} = \left(\frac{w_{i(hk)} * w_i}{\sum_i w_{i(hk)} * w_i} \right) \times \sum_h n_h$$

Where w_i is the net private native forest area in hectares of the i th reporting unit and $\sum_h n_h$ is the total number of respondents.

Analysis

Survey data were cleaned prior to analysis, with invalid responses removed (for example, blank responses), coding of data, and inspection of data entered from paper surveys for error.

Survey data were then analysed using Microsoft Excel and the Statistical Package for Social Sciences (SPSS). Analysis included identification of descriptive statistics of the sample, and identification of whether the characteristics of some groups were significantly different to others. Analysis of difference was based on the use of confidence intervals. Detailed tables of findings were prepared which included mean scores and 95% confidence intervals, as well as description of the distribution of survey responses.

A confidence interval, put simply, is a measure of how confident we can be in the results. More accurately, it tells you the boundaries between which, statistically, the mean value of a given variable would be 95% likely to fall if the survey was repeated multiple times with a similar sample. In general, confidence is higher if there is a large sample size and little deviation in responses (for example, almost all people answered '4' on a scale of 1 to 7). Confidence is lower if there is a small sample size and high deviation (for example, equal numbers of people answered 1, 2, 3, 4, 5, 6 and 7 on the 7-point scale).

Throughout this report, if a particular group is described as being 'significantly different' to another, this means they had characteristics that differed even after taking into account the confidence interval. To assist in interpreting this, all confidence intervals are presented in the appendices, using the same measure the survey results are presented in (for example, if the results are describing hectares, the confidence intervals indicates the number of hectares within which there is 95% confidence the value would fall if the survey was repeated multiple times). To give an example of what a confidence interval means, if men on average managed properties of 100 hectares in size, with a confidence interval of ± 5 hectares, this means we are

95% confident that men manage properties with a mean area of 95-105 hectares. If women on average manage properties of 90 hectares with a confidence interval of ± 15 hectares, that means we are 95% confident women manage properties with a mean area of 75-105 hectares. As the confidence intervals overlap, there is not a significant difference between the average area of land managed by men and women, despite the mean area managed by women being lower.

Confidence intervals were calculated using the following formulae:

Mean scores: 95% confidence intervals were calculated using the classic formula. Using this formula, there is 95% confidence that, if multiple similar samples were taken, the true value of the mean would fall between $\pm 1.96 \times \frac{\sigma}{\sqrt{n}}$ where σ is the standard deviation, and $\frac{\sigma}{\sqrt{n}}$ is the standard error of the mean.

Proportions: In some cases, we report results by proportions – for example, we might report that 40% of people had a low level of wellbeing, and 20% a high level of wellbeing. A different approach is needed to calculate the confidence interval for a proportion, as it isn't possible to use the standard error of the mean in this case. There is debate in the literature about the most appropriate calculation for proportions and related quantities. The classically used 'Exact' confidence interval for proportions is widely agreed to be too conservative, while the alternative approach - the Wald interval - is considered not conservative enough. We therefore used the modified Wald confidence interval proposed by Agresti and Coull (1998), which has been shown to be appropriate for large sample sizes such as that available in the Regional Wellbeing Survey (Brown et al. 2001). Using the modified Wald, we are 95% confident the true value of the proportion being reported falls

between $p' \pm 2 \sqrt{\frac{p'(1-p')}{n+4}}$ where $p' \approx \frac{Pn+2}{n+4}$; P is the proportion (e.g. 20% of people responded 'yes') and n the sample size for the variable. Note that while this type of confidence interval is often graphed around p' , rather than p , for simplicity and ease of interpretation we present it as an interval around the percentage being reported.

While confidence intervals provide a useful way of understanding how reliable the results are likely to be, they are not perfect. Confidence interval calculations assume that data are normally distributed, and a representative sample has been achieved. If these conditions are not met, the confidence interval may not be an accurate representation of confidence. In this report, the weighting of data can amplify unknown biases in the dataset, reducing confidence intervals. Because of these limitations, confidence intervals are a useful indicator of confidence in the results, but will not be completely accurate in representing confidence in all cases.

3.6. Ethics

The *Survey of private native forest landowners* was approved by the University of Canberra Human Research Ethics Committee, protocol number HREC 17-17.

4. How private native forest owners value and use their forest

4.1. Presentation of findings

Findings in the following sections summarise key areas in which we identified differences in the management of private native forest, and in the characteristics, views and values of the landholders who manage this forest. The management of private native forest (including past, current and future intentions for using the forest) is examined in two ways. The first way examines the proportion of private native forest that has been, is being and may in future be used for different purposes. This provides an idea of how much of the forest estate is managed in different ways. The second way examines what proportion of landholders have been, are currently and may in future use their forest for different purposes, and also examines their values, views and socio-demographic characteristics.

When analysing the management of private native forest and the views of the landholders who manage this forest, we also cross-tabulate this information based on key characteristics such as whether there is a private native forest property vegetation plan (PNF PVP), the size class of forest managed by a landholder, and the overall property and private native forest management purposes. Table 9 summarises the different characteristics by which data were analysed, and whether these are analysed based on (i) area of private native forest and/or (ii) proportion of landholders. Detailed data showing results for all these groups are provided in the Appendices provided in Part 2 of this report.

Table 9 Landholder groupings used for analysis purposes

Group Name	Attributes	Description
Northern NSW	All landholders	Northern NSW landholders, based on analysing sample of respondents weighted to be representative of Northern NSW landholders.
Northern NSW	Net native forest area	Private native forest with a registered private native forest property vegetation plan.
PNF PVP	Landholders with PVP	Landholders who have a registered private native forest property vegetation plan for part or all of the forest on their property.
	Net native forest area with PVP	Private native forest without a registered private native forest property vegetation plan.
	Landholders without PVP	Landholders who do not have a registered private native forest property vegetation plan for part or all of the forest on their property.
Size of PNF	25-49ha	Area of private native forest on property. These groups are analysed based on the views of the landholders who manage each size class of private native forest.
	50-99ha	
	100-249ha	
	250-499ha	
	500 or more ha	
LLS Regions	North Coast - landholders	Region private native forest/landholder is located in (and which in most, but not all cases, the landowner lives in). Defined based on Local Land Services regions.
	North Coast - net native forest area	
	Northern Tablelands - landholders	

Group Name	Attributes	Description
	Northern Tablelands - net native forest area	
	Hunter - landholders	
	Hunter - net native forest area	
Forestry and agricultural background	Past or present involvement in forestry operations	Landholder currently works or has in the past worked in the forest industry (this refers to their occupation, not forestry operations on their property)
	Past or present involvement in commercial farming (no forestry experience)	Landholder currently works or has in the past worked in the agriculture industry (this refers to their occupation, not forestry operations on their property)
	Others	Landholders' occupation currently and in the past has been in an occupation or occupations other than forestry or agriculture
Gender	Female	Gender
	Male	
Age	Under 50 years	Age
	50-59 years	
	60-69 Years	
	70+ years	
Highest level of qualifications	Year 12 or equivalent	Highest level of formal education attained.
	Certificate or diploma	
	University degree	
Household Income	Under \$52,000	Annual household income in financial year 2015-16
	\$52,000-103,999	
	\$104,000+	
Years managing the property	5 or less years	Number of years landholder has owned and/or managed the property (whichever is longest).
	6-10 years	
	11-20 years	
	More than 20 years	
Property uses	Property used for non-commercial purposes only (e.g. rural residential)	Whole property (including native forest and other areas) is used only for non-commercial purposes, for example as a residence, for recreation, or for conservation
	Property used for agriculture or commercial purposes other than timber production	Whole or part of the property (including native forest and other areas) is used for agricultural purposes. This includes those who indicated using the property for any agricultural or other commercial business, as well as other non-commercial uses. It excludes any respondents who use any part of their property for forestry use.
	Property used for timber production (from native forest or plantation)	Property is used for commercial timber production through either native forest timber production or growing of timber plantations. This includes those who use any part of their property for forestry use, and includes those who may also use the property for agricultural or other commercial businesses, or non-commercial uses.
Native forest uses (1)	Native forest used for commercial timber harvest (and usually also other purposes e.g. recreation)	Private native forest is managed with the intent of timber harvest (note that this does not exclude other uses, and the majority of landholders who managed for timber harvest also managed for other purposes)
	Native forest used for non-commercial uses only (e.g. recreation, conservation)	Private native forest is managed only for non-commercial purposes, such as conservation, recreation or residential use.

Group Name	Attributes	Description
	Native forest used for commercial purposes other than timber production (and usually also for non-commercial purposes such as recreation)	Private native forest is managed for commercial purposes other than forestry (for example, grazing). Note that in most cases those in this category also used the forest for non-commercial uses such as residence, recreation.
Native forest uses (2)	Native forest used for commercial timber harvest (and usually also other purposes e.g. recreation)	Private native forest is managed with the intent of timber harvest (note that this does not exclude other uses, and the majority of landholders who managed for timber harvest also managed for other purposes)
	Native forest used for conservation/environmental purposes (includes all who reported this use even if they also used forest for other purposes)	Private native forest is managed for conservation/environment purposes (note this does not exclude other uses, and many who reported this also used the forest area for purposes such as recreation, however it does exclude those who manage the forest for current or future timber harvest as they are captured in the above category)
	Native forest not used for either commercial timber harvest or conservation/environmental purposes	Private native forest is managed for any other purpose, excluding conservation/environmental purposes or for current or future timber harvest. e.g. recreational, stock grazing

4.2. Characteristics of properties

Private native forest is managed by landholders who may own one property or multiple properties; who may or may not have registered a PNF property vegetation plan (PVP) for their private native forest; who may have managed the property for anything from a few months to several decades; and who use their properties in different ways. This section examines this background information. The next section then examines how private native forest is used and managed.

Uses of properties which have an area of private native forest

Rural properties are used for many purposes in northern NSW, including as a residence, for agriculture, for forestry, and other commercial uses such as tourism. This broader property use may influence how a landholder views their private native forest, and is briefly examined here.

When asked to nominate the different purposes for which their properties were used, as shown in Figure 1, 29% of landholders managed their properties for non-commercial purposes only (such as using their property as a rural residence, for recreation, or for conservation), but this 29% of landholders managed only 7% of the total area of private native forest. A further 52% of landholders, managing 44% of private native forest area, managed their property for agriculture or, in a small number of cases, for other commercial purposes (excluding timber production). A total of only 19% of landholders managed their property for timber production, but this 19% of landholders managed a total of 49% of the private native forest area.

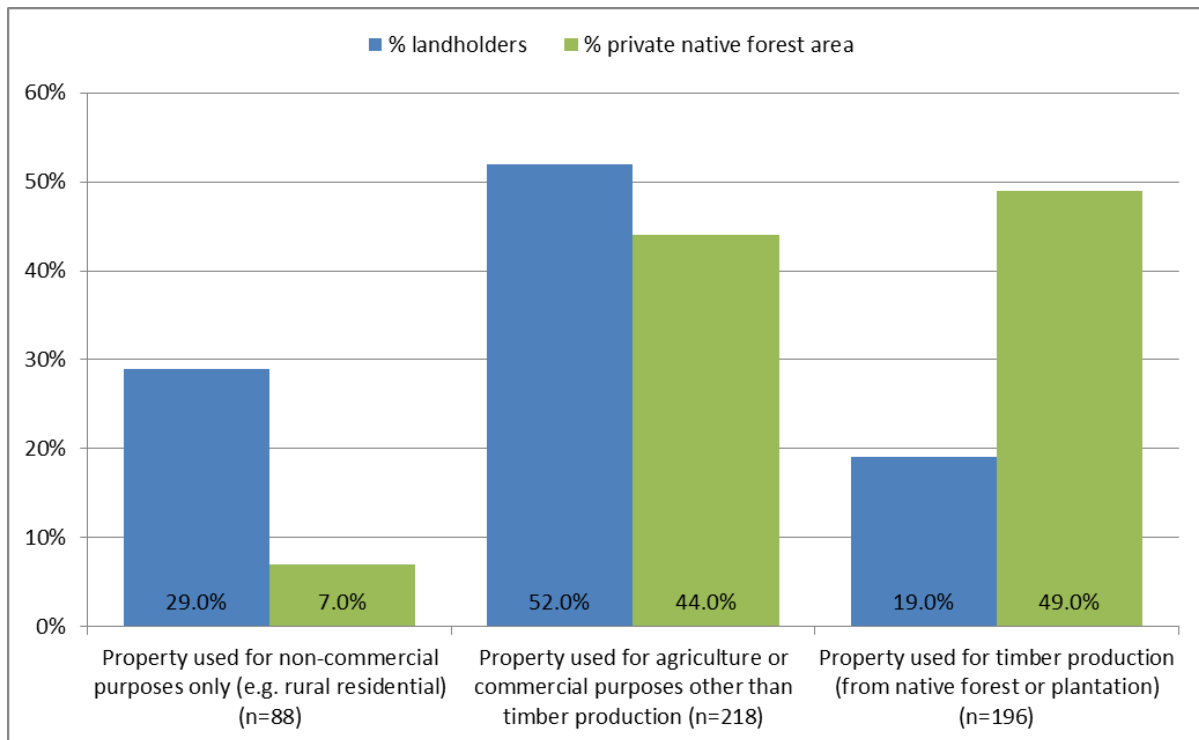


Figure 1 Property use, analysed by proportion of landholders, and proportion of native forest located on properties used for different purposes

Figure 2 shows the proportion of properties used for the top five most common uses reported by survey respondents (grazing, permanent residence, native forest timber production, recreation and conservation). It shows this in two ways: the proportion of native forest area located on properties managed for each of these purposes, and the proportion of properties managed for these purposes. As most properties were used for more than one purpose, the total uses add up to well over 100%. See Appendix A, Table A.3 for more detailed information.

Overall, across northern NSW, 58% of properties were used for grazing, and 68% of private native forest was located on these properties. Only 15% of properties were used for native forest timber production (a further 4% were used for timber production from plantations), but these properties contained 26% of the total native forest area. One in five properties (20%) were used for conservation, with 22% of native forest area located on these properties. When different regions were compared (Figure 2):

- Grazing was most common in the Northern Tablelands, where 72% of properties containing 81% of native forest area were managed for grazing, versus 54% of properties (60% of forest area) in the North Coast and 58% of properties (66% of properties) in the Hunter
- The 24% of properties in the North Coast managed for timber production contained 42% of total native forest area in that region, whereas in the Northern Tablelands and Hunter regions smaller proportions of both properties and native forest area were managed for timber production
- Use of properties for conservation was significantly less common in the Hunter, with 11% of properties (containing 19% of native forest area) managed for conservation, versus 29% of properties in the North Coast and Northern Tablelands (containing 26% and 23% of native forest area respectively).

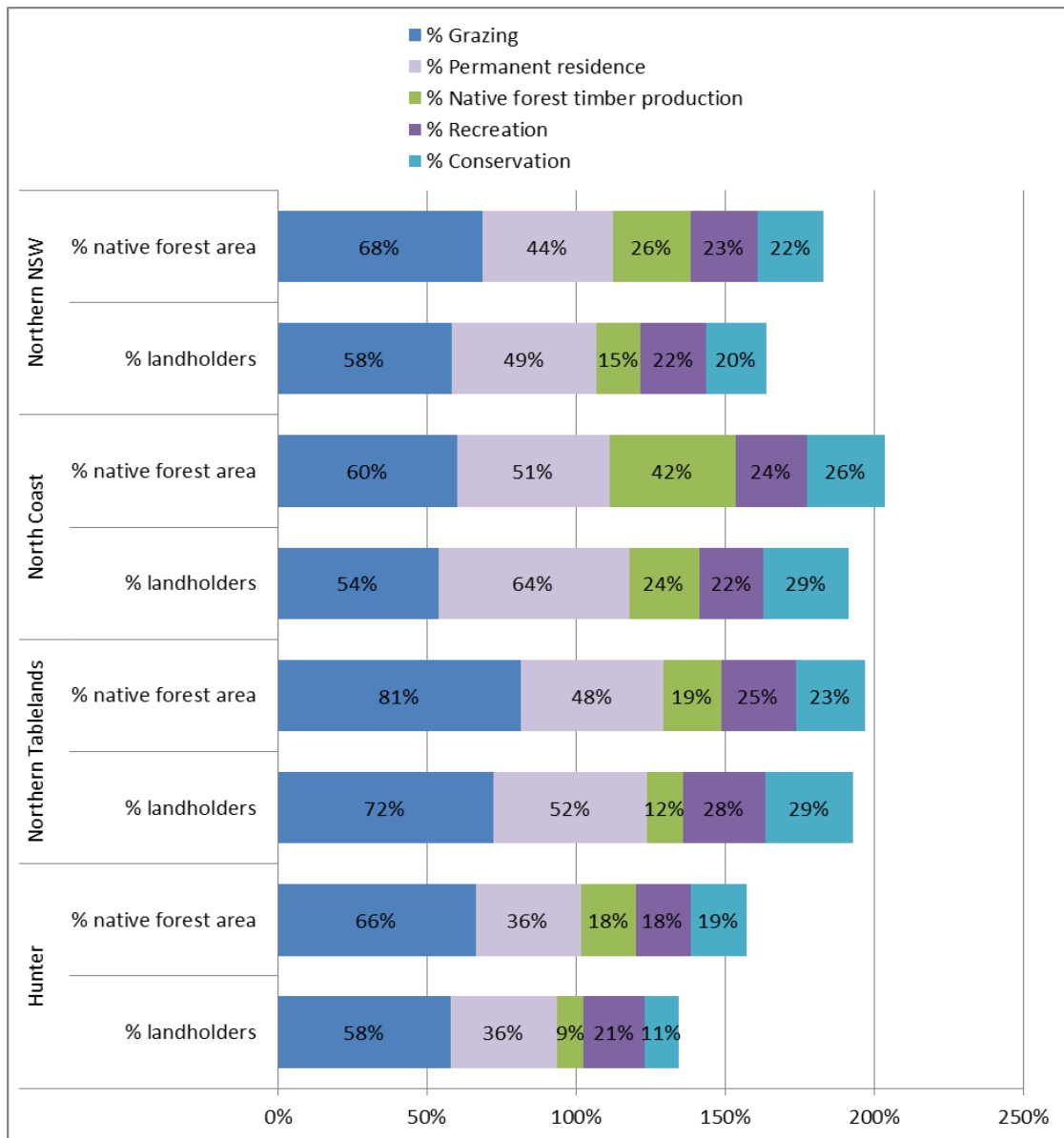


Figure 2 Property uses by LLS region

Most properties were used for multiple purposes. Properties that were actively managed for commercial timber production were significantly more likely than others to also be managed for conservation purposes, with 33.3% of owners who used their property for timber production reporting they managed their property to achieve conservation outcomes, compared with 18.3% of those who used the property for rural residential purposes only, and 16.4% of those who managed their property for agriculture or other non-timber commercial activities (see Figure 3, which shows this result based on the proportion of properties managed in different ways; results were almost identical when analysed by proportion of forest area). Landholders who used their properties for (i) timber production and (ii) rural residential purposes were significantly more likely to report that they used their property for recreation, compared to owners who used their property for agriculture (or other non-forestry commercial activities) (Figure 3).

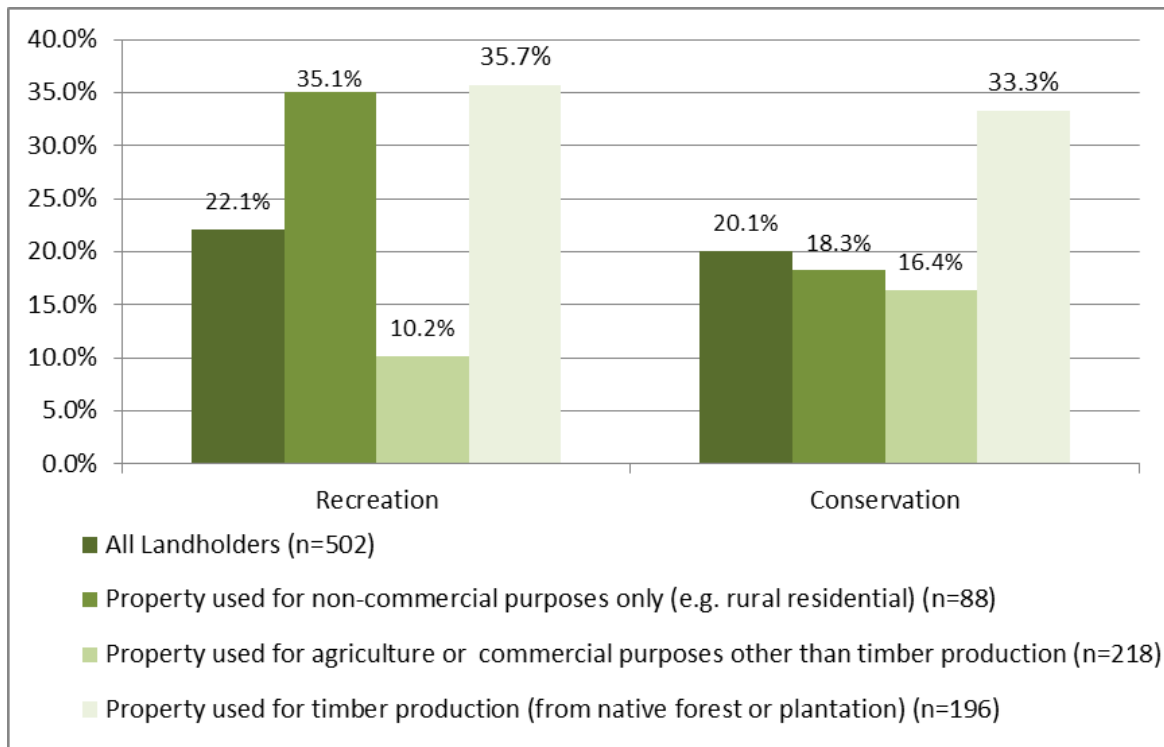


Figure 3 Property use by property management objectives

Area of land and private native forest managed

The management of private native forest differs substantially across northern NSW, and one of the key factors that varies is the area managed by different landholders. A large proportion of the overall private native forest estate is managed by a relatively small proportion of landholders. In total, 65% of the total area private native forest was managed by just over 25% of landholders, while the 50% of landholders who managed an area of private native forest of 50 hectares or less managed 17% of the total area of private native forest (Figure 4).

Landholders in the Northern Tablelands on average managed significantly larger properties than landholders in the Hunter and North Coast regions, with a median property area of 486 hectares in the Northern Tablelands, compared with 92 hectares on the North Coast and 100 hectares in the Hunter. The area of private native forest managed by landholders is also larger on average on properties in the Northern Tablelands compared to North Coast and Hunter Valley properties (Figure 5), although this difference was not statistically significant. The mean area of private native forest across all survey respondents was 101 hectares, with a median area of 50.8 hectares (see Appendix A, Table A2).

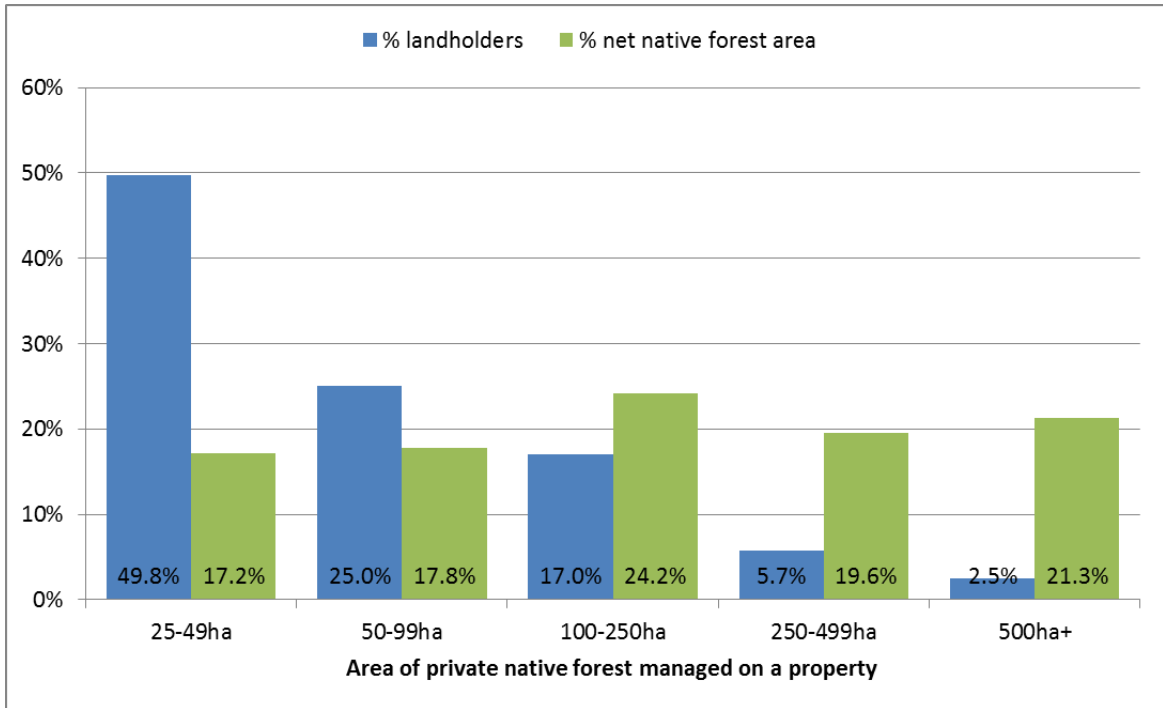


Figure 4 Proportion of landholders managing different areas of private native forest, and proportion of total private native forest area managed in different sized blocks

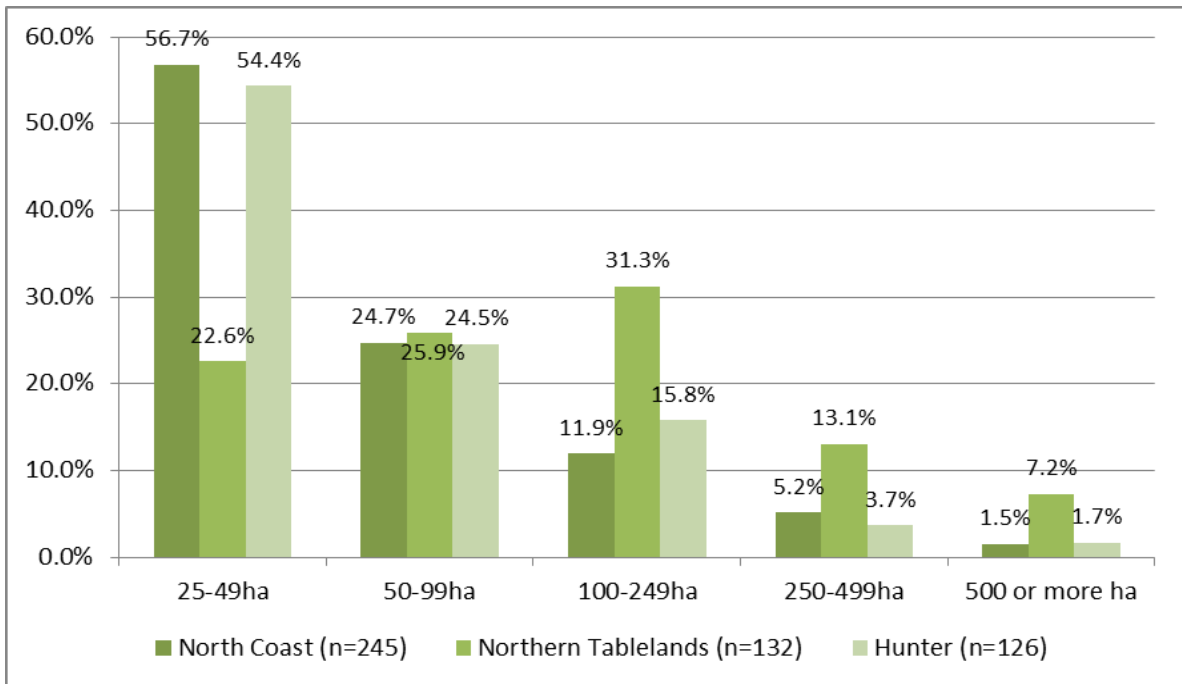


Figure 5 Proportion of landholders managing different sized area of native forest, by region

Private native forest property vegetation plans

Of the native forest area included in the survey sample (which contained only areas in which native forest was in a block of 25 hectares or larger), 45% of the private native forest area had a PNF property vegetation plan (PVP) registered on it. This 45% of forest was managed by just 10% of all landholders who have private native forest on their properties. Landowners with a PNF PVP typically managed a larger area of private native forest compared to those who did not have a PNF PVP, with 18.3% of landowners with a PNF PVP managing a forest area of 250 hectares or more, compared to 7.0% of landowners managing properties without a PNF PVP (Figure 6).

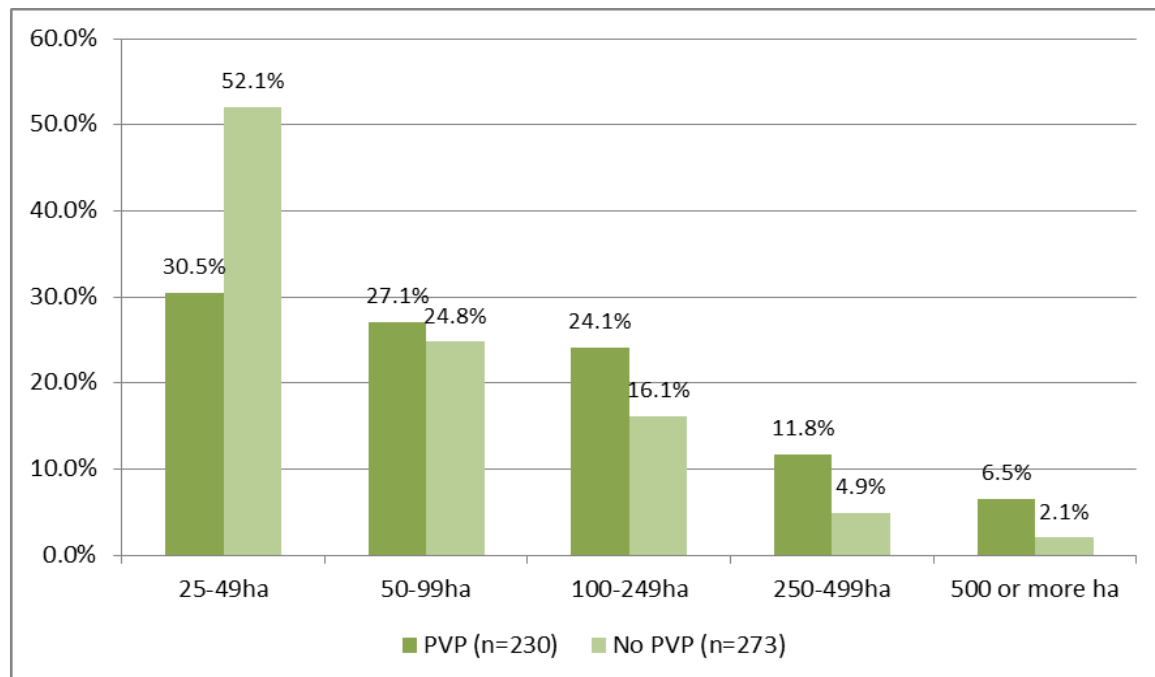


Figure 6 Proportion of landholders managing different sized area of native forest by PVP status

Property uses did not differ significantly between PNF PVP and non- PNF PVP holders, with the exception that PNF PVP holders (as expected) were much more likely to be engaging in commercial timber production (see Appendix A, Table A3).

Number of properties managed

Across northern NSW, 63.4% of private native forest area is managed by a landholder who has only one property, 17.3% of native forest area by a landholder who has two properties, and 19.3% of native forest area by a landholder who has three or more properties. In total, the 27.2% of landholders who have two or more properties manage 36.6% of the private native forest area, while the 72.8% who have a single property managed 63.4% of the total private native forest area (Appendix A, Table A1.1).

This same pattern is more pronounced when forest that has a private native forestry property vegetation plan (PVP) is examined: within the forest estate that has a PNF PVP over it (with PNF PVPs typically associated with intent to commercially harvest timber), 29.2% of forest area managed by landholders with three or more properties, 15.0% by landholders and two

properties and 55.7% by landholders with only a single property. This means that of private native forest with a PNF PVP, the 33.7% of landholders with two or more properties manage a total of 44.2% of the private native forest area that have a registered PNF PVP (Appendix A, Table A1.1).

Landholders who were managing their private native forest for current or future timber harvest were more likely to have two or more properties (36.6%) than those who managed their forest for conservation/environment objectives (23.1%), although this difference was not statistically significant (Table 10).

Landholders living in the Northern Tablelands were more likely to have two or more properties (41.0%) compared to those in the North Coast (18.6%) or the Hunter (29.3%). Similarly, landholders with past experience in commercial forestry or commercial farming operations were more likely to own or manage two or more properties (Table 10). Those landholders who used their property for non-commercial or rural residential use were significantly less likely to own multiple properties, with only 14.9% of landholders who used their property only for non-commercial purposes owning two or more properties. In contrast, 32.4% of landholders who used their property for agriculture or other commercial activities had more than one property (Table 10).

Table 10 Property ownership within region

		N	Mean No. properties	CI	1 property	2 properties	3 or more properties
NSW landholders	All respondents	498	1.5	.1	72.8%	16.6%	10.6%
LLS	North Coast	242	1.3	.1	81.4%	10.4%	8.2%
	Northern Tablelands	126	1.8	.3	59.0%	18.3%	22.6%
	Hunter	124	1.5	.1	70.7%	21.4%	7.9%
Experience	Forestry Professional	146	1.7	.3	63.8%	20.7%	15.5%
	Commercial farming	195	1.7	.2	62.5%	20.7%	16.9%
	Other	139	1.2	.1	81.8%	15.6%	2.6%
Use of property	Non-commercial / rural residential	87	1.2	.1	85.1%	12.0%	2.8%
	Agricultural and other commercial businesses	213	1.6	.1	67.6%	18.2%	14.2%
	Forestry use	192	1.6	.2	67.6%	19.7%	12.7%
Use of PNF	Manage for current or future timber harvest	189	1.6	.2	63.4%	21.0%	15.6%
	Conservation/ Environment (includes anyone who uses their forest for these values)	177	1.4	.1	76.9%	14.9%	8.2%
	Other use	112	1.5	.2	69.7%	20.9%	9.4%

Length of property management

Survey participants were asked how long they had managed their property. The number of years did not differ significantly between those who had differing areas of private native forest, or who did and did not have a PNF PVP (see Appendix A, Table A4). In total, the 15.5% of landholders who had been managing their property for five or less year managed a total of 13.7% of the private native forest estate, while the 43.3% of landholders who had managed their property for more than 20 years managed a total of 50.1% of the area of private native forest estate in northern NSW.

Landowners living in the Hunter LLS region had typically managed their property for a shorter period of time compared to the other LLS regions: nearly 38% of Hunter LLS landholders had managed their property for 10 years or less, compared with just under 20% in the Northern Tablelands LLS and 18% in the North Coast LLS (Figure 7).

Landholders who used their property for commercial timber production had on average managed their properties for more years than those who did not: 54.7% of respondents who used their property for commercial timber production had managed the property for 20 years or more, compared with 37.9% of respondents who used the property for non-commercial purposes including conservation, environmental and residential purposes (Figure 8, Appendix A, Table A4).

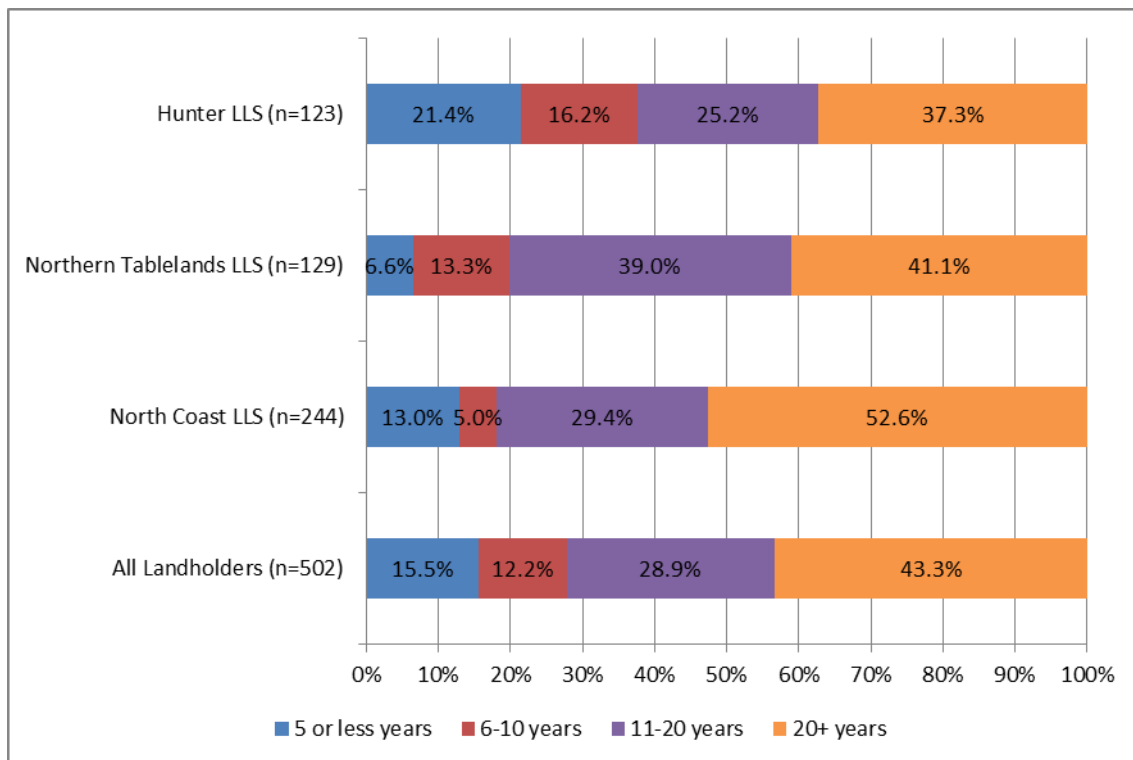


Figure 7 Duration of property management by LLS region

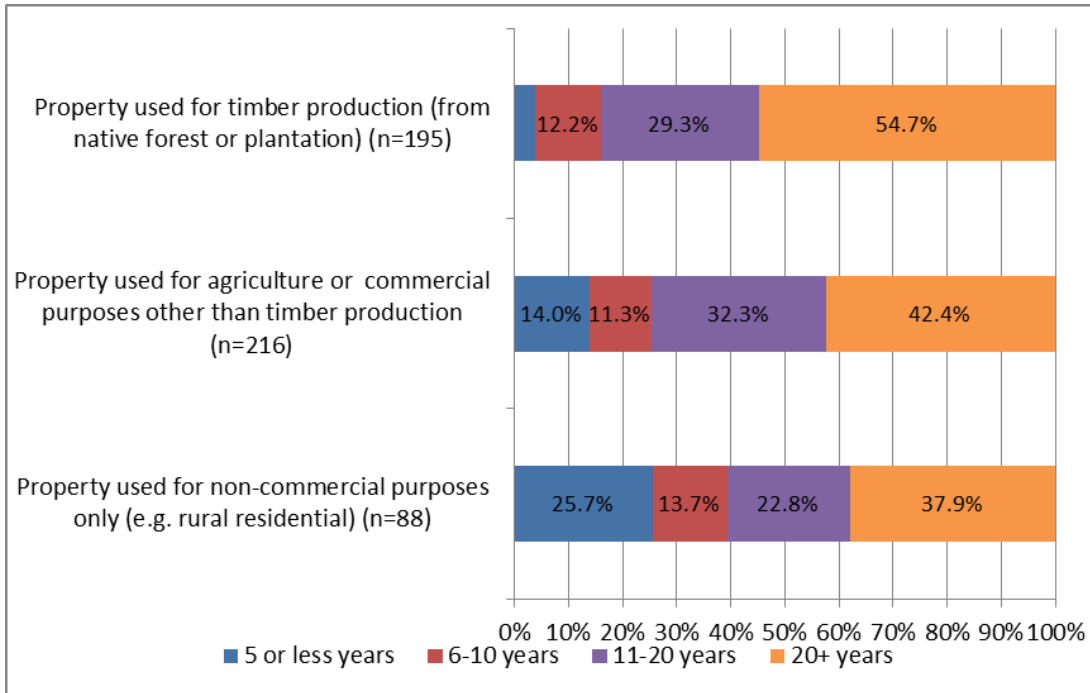


Figure 8 Duration of property management by use of property

Family history on property

Properties used for commercial timber production were more likely than other properties to have been owned for several generations by the family of the landholder currently managing them: 65% of properties used for commercial timber production had been owned for two or more generations by the same family, compared with 39% of properties used for agriculture/other non-timber commercial activity, and just under 26% of non-commercial and residential properties (Figure 9; see also Appendix A, Table A5).

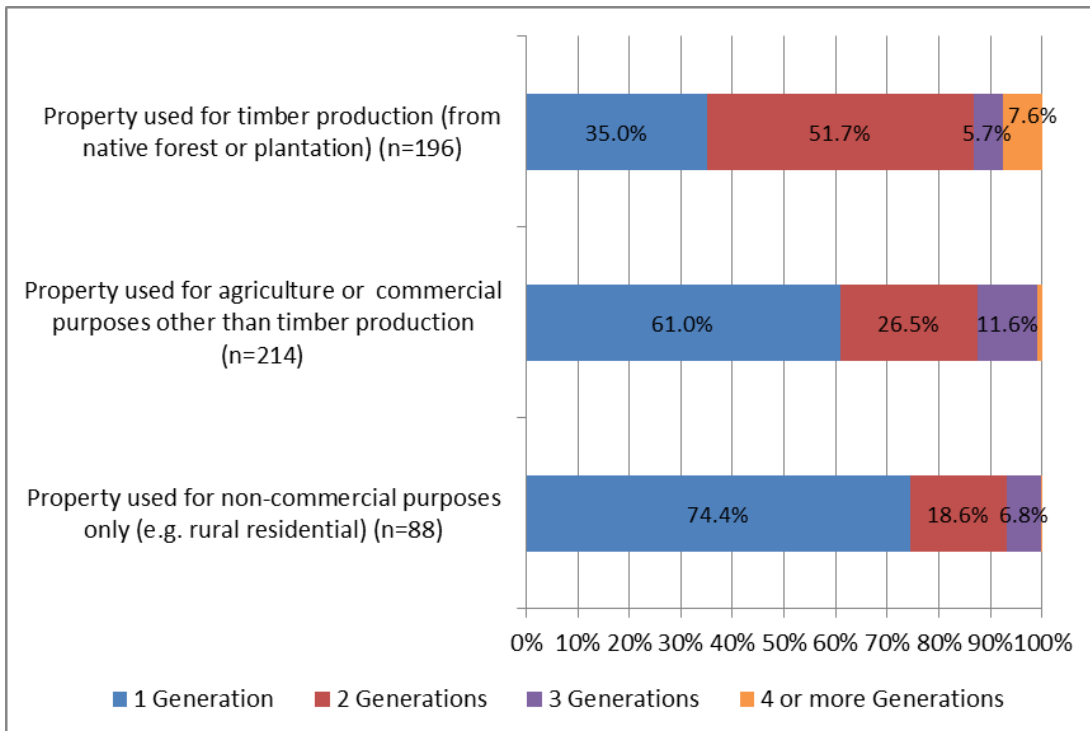


Figure 9 Generations on the property by use of property

Plans for sale of property

Only 20.4% of landholders (managing 19.0% of the total native forest estate) reported they were likely to sell their property in the next 10 years, while 53.7% of landholders (managing 56.3% of the total area of native forest) said sale was unlikely, and 25.9% of landholders (managing 24.7% of the native forest area) were unsure whether they were likely to sell in the next 10 years. Owners of properties used for commercial timber production were significantly less likely to be planning to sell their property in the next 10 years than those managing their property for other commercial purposes such as agriculture. Only 11.7% of those managing their property for commercial timber production reported being likely to sell their property in the next 10 years, compared to 27.3% of those managing their property for agriculture or other non-forestry commercial purposes (Figure 10, Appendix A Table A6).

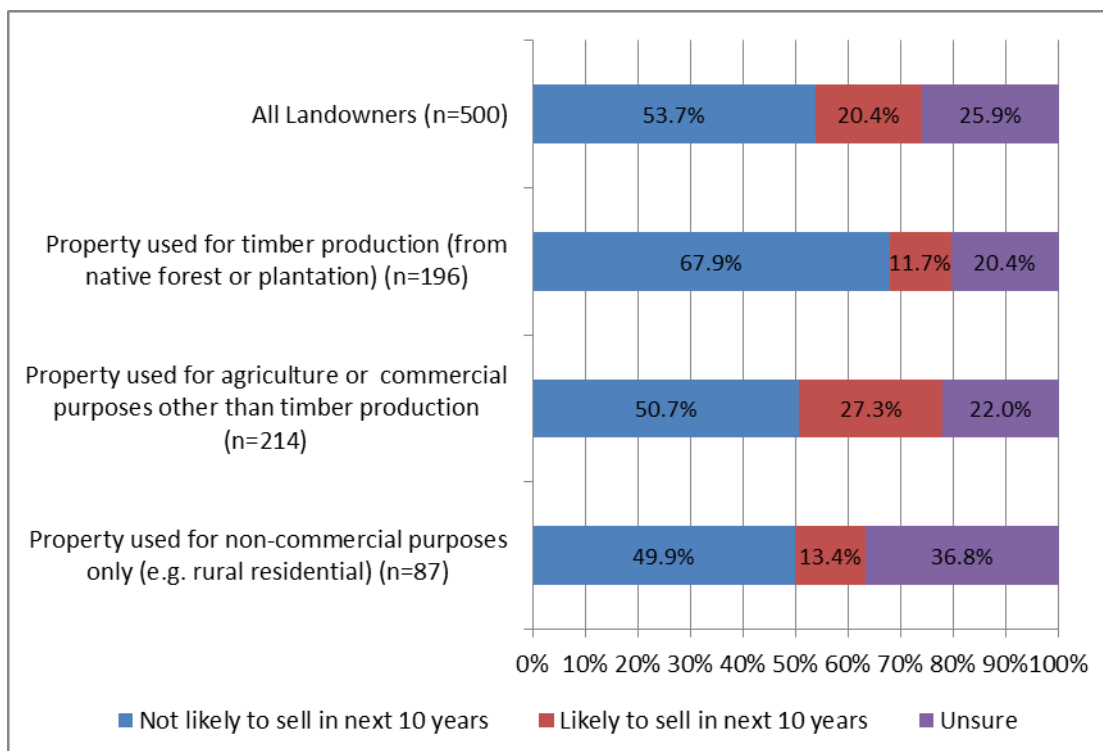


Figure 10 Likelihood of selling property within next 10 years by property use

These findings highlight important differences in the types of landholders considering managing their private native forest for different purposes. Those oriented to managing for predominantly environmental and conservation outcomes without additional commercial use had typically owned the property for fewer years and for only one generation, while those managing for timber production had typically managed the property for a larger number of years, were more likely to have had the property in their family for more than one generation, and were unlikely to be planning to sell the property in the next decade.

4.3. Managing and valuing the private native forest

The previous section examined differences in how the whole property was used. This section focuses on how the private native forest areas landholders manage on their properties are valued and managed, focusing on:

- The ways private native forest is currently used by the landholders that manage it
- Future intentions for using private native forests
- Attitudes held about private native forest, including the importance of different values
- Sources of advice used by landholders who manage private native forest.

Current uses of private native forest

Private native forest owners predominantly use their forest for stock grazing (66% of private native forest area is managed for grazing) firewood collection (60% of native forest area), timber for on-property use (65% of forest area), biodiversity habitat (53% area), aesthetic beauty (41%), reducing bushfire risk (48%), hunting to control pests (45%), timber harvest (30% of forest, managed by 19% of landholders) and recreation activities such as walking and watching birds and animals (Figure 11). Other activities were less commonly reported, with less than 20% of landholders (managing less than 25% of private native forest area in total) reporting that they used their forest area for camping, soil conservation, picnics/BBQs, 4WD or dirt bike riding, horse riding or a range of other purposes shown in Figure 12.

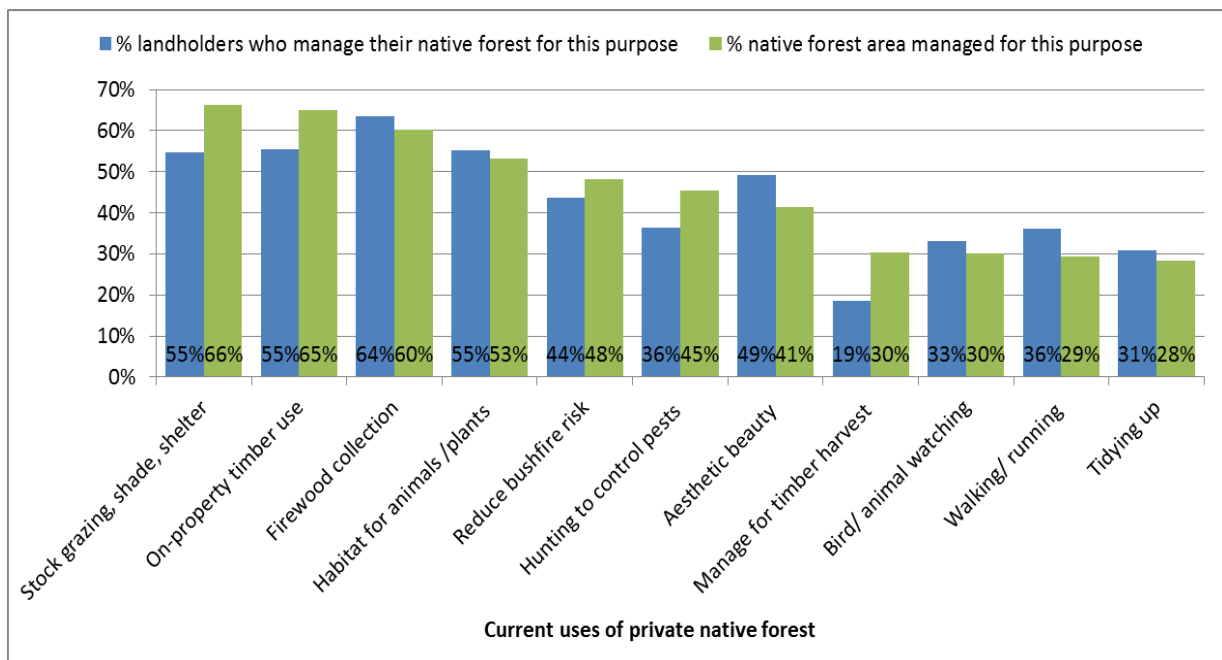


Figure 11 Current uses of private native forest: more common uses

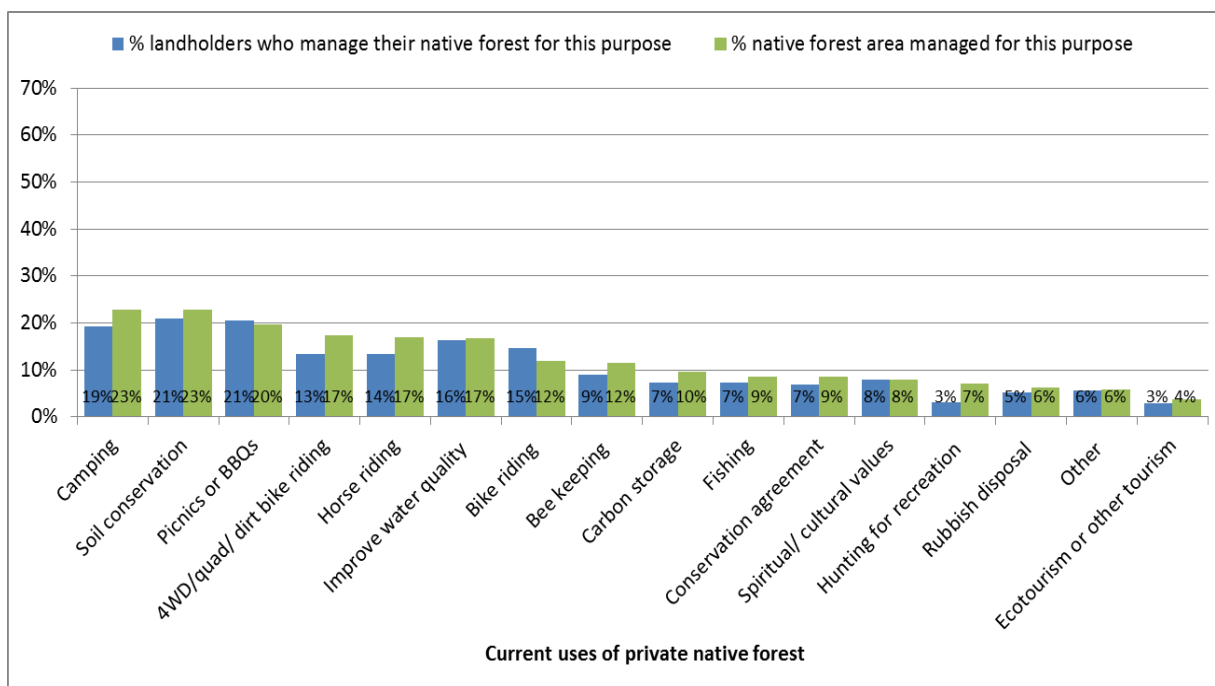


Figure 12 Current uses of private native forest: less common uses

Current native forest uses – by forest size

How private forest owners use their forest varies depending on the area of forest they manage. Those with a smaller area of forest (25-49 hectares) were significantly less likely than those with larger forest areas to use their forest for stock grazing, or on-property timber use or hunting to control pests. Those managing larger areas of native forest (>500 hectares) were significantly more likely than those with smaller forest areas to manage their forest for timber harvest, and significantly less likely to manage their forest to enhance aesthetic beauty (Table 11).

Table 11 Private forest use and management by PNF area (% landholders)

	Stock grazing, shade, shelter	CI	On-property timber use	CI	Manage for timber harvest	CI	Aesthetic beauty	CI	Hunting to control pests	CI
All landholders (n=486)	54.6%	4.5%	55.4%	4.5%	18.6%	3.5%	49.1%	4.5%	36.4%	4.3%
25-49ha (n=100)	39.3%	9.6%	44.7%	9.8%	11.3%	6.5%	53.1%	9.8%	29.0%	9.0%
50-99ha (n=115)	66.5%	8.7%	66.1%	8.7%	18.2%	7.2%	50.5%	9.2%	40.1%	9.0%
100-249ha (n=83)	69.7%	9.9%	62.3%	10.4%	31.1%	10.0%	41.2%	10.6%	41.8%	10.6%
250-499ha (n=103)	67.4%	9.1%	65.4%	9.2%	30.1%	8.9%	41.7%	9.5%	53.6%	9.6%
500 or more ha (n=85)	84.8%	7.9%	74.7%	9.3%	44.1%	10.5%	32.7%	10.0%	57.7%	10.5%

Current native forest uses – by PVP and non-PVP areas

There was considerable variation in how different types of landholders used their forest. When landholders with and without a PVP were examined (Appendix B, Table B1), 71.8% of landholder with a PNF PVP used their native forest for on-property timber use (e.g. harvesting fence posts), while 58.7% of PNF PVP holders (managing 72.4% of the private native forest with a PVP) managed their private native forest for timber harvest. Of landholders without a PNF PVP, 53.3% (who managed 61.3% of the native forest with no PVP) managed their forest for on-property timber use, and only 13.4% (who managed 19.6% of the native forest without a PVP) managed it for timber harvest.

Current native forest uses – by region

Private forest on properties in the North Coast LLS region was significantly more likely to be managed for current or future timber harvest than private forest in the Northern Tablelands and Hunter LLS regions (Table 12). Northern Tablelands private forest areas were less likely to be used solely for non-commercial purposes, and more likely to be used for mixed purposes (agriculture and forestry).

Private native forest in the Northern Tablelands was significantly more likely to be used for stock grazing than properties in either the North Coast or Hunter regions (Figure 13). One third (33.5%) of landowners with properties in the North Coast region managed their native forest for timber harvest, and these landholders managed 49.0% of the native forest area in this region. In the Northern Tablelands, only 11.9% of landholders managed their native forest for timber harvest, and this 11.9% managed 22.8% of the total forest area. In the Hunter region, 8.5% of landholders managed their native forest for timber harvest and these managed 20.4% of the native forest area in the Hunter region (Appendix B, Table B.1.1).

Table 12 Private forest use and management by LLS region (% landholders managing native forest for different purposes)

	N	Manage for current or future timber harvest	CI	Non-commercial use only	CI	Mixed use (other than timber production)	CI
All landholders	486	18.6%	3.5%	35.8%	4.3%	45.7%	4.5%
North Coast LLS	238	33.5%	6.1%	37.8%	6.2%	28.8%	5.8%
Northern Tablelands LLS	126	11.9%	5.9%	20.8%	7.2%	67.3%	8.3%
Hunter LLS	117	8.5%	5.4%	41.0%	9.0%	50.4%	9.1%

‘Tidying up’ – referring to activities such as clearing fallen branches and dead vegetation – was most common in the Northern Tablelands (44.5%) and significantly less common in the Hunter (23.1%). Property owners in the Northern Tablelands were also significantly more likely to use hunting to control pests in their forests compared to landholders in the other two regions, with 54% of property owners participating in pest control hunting activities (Figure 13). The types of recreation undertaken in private native forests also varied by region: for example, fishing was more commonly reported by landowners in the Northern Tablelands than other regions, and bike riding more commonly reported in the Hunter and North Coast (Figure 13, Appendix B Table B1).

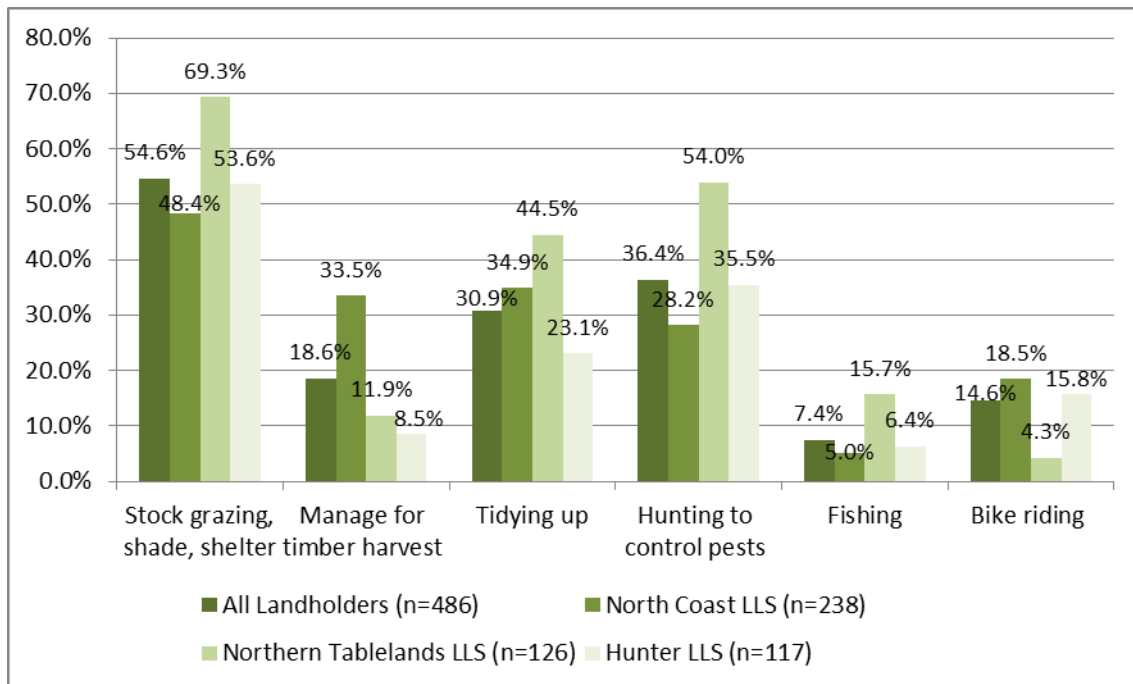


Figure 13 Activities undertaken or managed for in PNF by LLS region

Private native forest uses – by educational attainment

A person’s educational attainment is sometimes predictive of their forest management activities. Property owners with a university degree (or a high income, something often correlated with educational attainment), were significantly less likely to use their native forest to dispose of rubbish than other landholders (Appendix B Table B1), and more likely to use/value their forest for its aesthetic beauty (64.9% compared to 46.7% of those with a certificate/diploma), biodiversity habitat (65.9% compared to 49.8%) and spiritual and cultural values (15.2% compared to 4.2%). Those with a university degree were significantly less likely to use their PNF for some recreational pursuits than certificate or diploma holders, including 4wd/quad/dirt bike (7.4% compared with 23.9%) and bicycle riding (5.4% compared with 16.7%).

Those with a post-school certificate or diploma were more likely than those with a university degree to report that they engaged in ‘tidying up’ (37.1% compared to 19.8%) and stock grazing (64.1% compared to 44.2%). They were more likely to undertake activities to reduce bushfire risk (57.6%) than either those whose highest level of formal education was Year 12 or equivalent (32.1%) or a university degree (33.5%). Those private forest owners earning less than \$52,000 were significantly less likely to use their PNF for 4wd/quad/dirt bike riding than others, and those earning \$52,000 - \$103,999 were significantly more likely to bike ride in their forest.

Current native forest uses – common combinations of uses

Most private native forest was used for more than one purpose. Some common combinations of uses were identified. Landowners who used their properties for commercial timber production were significantly more likely than others to undertake activities in their native forest to reduce bushfire risk, carbon storage, and activities to improve water quality and soil conservation and hunting for pest control (Figure 14, Appendix B Table B1).

While 52.2% of those who used their private native forest for non-commercial purposes only reported collecting firewood from it, they did not typically use timber from their forest for other purposes such as fencing or other on-property use (19.6%), whereas on-property use of timber was common amongst those who managed their property for agriculture (63.2%) and timber production (82.8%).

Landholders who used their property only for non-commercial purposes such as conservation were also significantly less likely to undertake bee keeping or horse riding in their native forest (Appendix B Table B1), but were significantly more likely to participate in bird watching and walking or running (Figure 14).

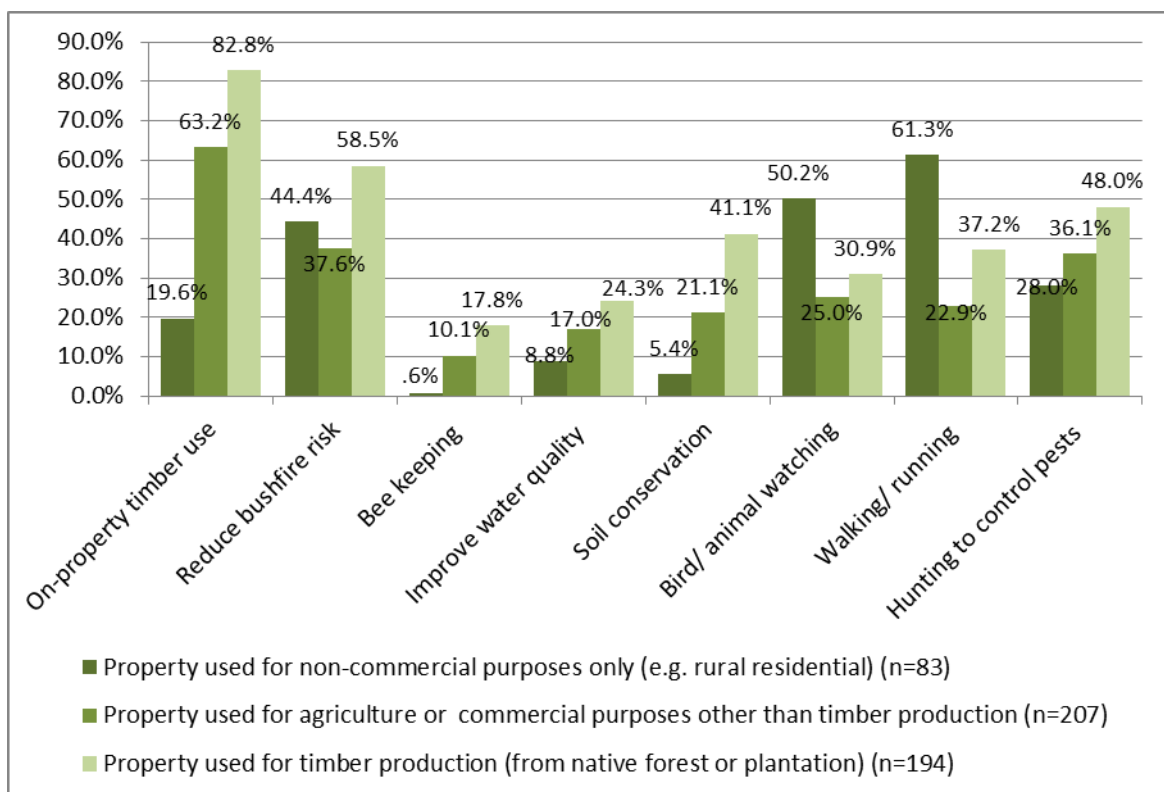


Figure 14 Use of PNF by property use

Importance of different uses of private native forest

Landholders were asked how important they found it to be able to use their native forest for the different purposes they currently used it for. This was asked because while using the forest in a particular way gives some indication that the use is considered relevant by the landholder, it does not provide an indication of the extent to which the landholder values that use and finds it highly important.

When all forest owners were examined (Figure 15), the uses rated most important overall were experiencing environmental benefits (75% of landholders, managing 72% of the private native forest estate), obtaining timber for on-property use (70% of landholders and forest area), reducing bushfire risk (65% of landholders managing 69% of forest area), and stock grazing (56% of landholders managing 65% of forest area). Half of landholders rated maintaining cultural, spiritual and aesthetic qualities as important. Commercial timber harvesting was

rated important by 20% of landholders, who managed 32% of the total private native forest estate. Fewer landholders rated recreational activities (33%), fishing or hunting (14%), and achieving other types of economic return (19%) as important uses of their forest.

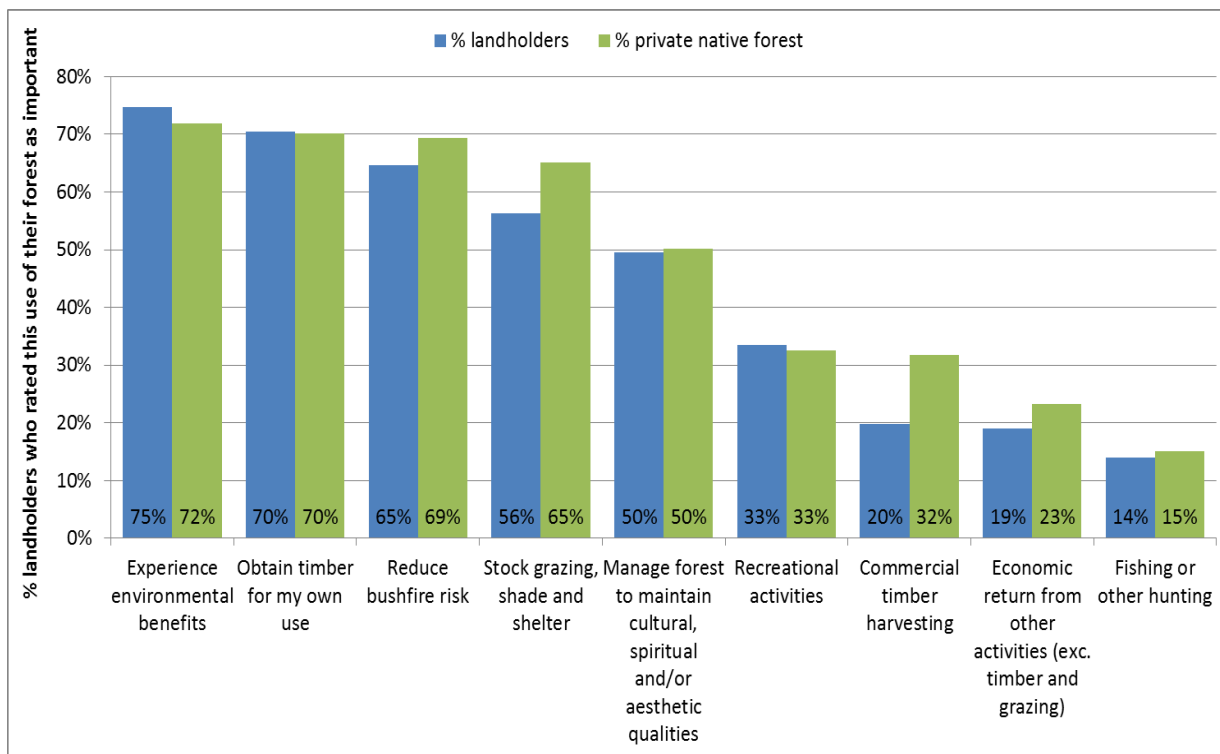


Figure 15 Importance of different private native forest uses/activities – Northern NSW landholders

PNF PVP holders were significantly more likely than other landowners to report that commercial timber harvest and other commercial activities were important uses of their forest (Table 13). Commercial timber harvesting was significantly more important to landowners in the North Coast, and least important to landholders in the Hunter region (Table 14). Stock grazing and shelter was more important to landholders in the Northern Tablelands compared with other regions, as were fishing and hunting (Table 14). Further data comparing uses by different groups of landholders is provided in Appendix B Table B2.

Table 13 Importance of different private native forest uses/activities - by PNF PVP status

How important is it to you to do each of the following in your native forest on this property (whether or not you are currently doing it)?....(Scale from 1 not at all important to 7 extremely important)	All NSW Landholders			PVP			No PVP		
	n	Mean score	CI	n	Mean score	CI	n	Mean score	CI
Obtain timber for my own use (eg firewood, on-property use)	477	5.3	.2	215	5.8	.5	262	5.2	.2
Stock grazing, shade or shelter	454	4.4	.2	207	4.8	.7	247	4.3	.3
Commercial timber harvesting (harvesting for sale off the property)	453	2.5	.2	215	4.9	.6	238	2.2	.2
Achieve an economic return from activities other than timber or grazing	429	2.4	.2	197	3.3	.6	232	2.3	.2
Experience environmental benefits (eg water quality, soil conservation, plants and animals)	446	5.5	.2	203	5.3	.5	243	5.5	.2
Manage your forest to maintain cultural, spiritual and/or aesthetic qualities of the forest	438	4.2	.2	200	4.3	.6	238	4.2	.2
Fishing or other hunting	413	2.1	.2	184	2.5	.6	229	2.1	.2
Recreational activities (eg camping, picnics, bike riding, horse riding)	428	3.5	.2	190	3.7	.6	238	3.5	.2
Reduce bushfire risk	473	5.1	.2	217	5.5	.5	256	5.1	.2

Table 14 Importance of different private native forest uses/activities – by LLS Region

How important is it to you to do each of the following in your native forest on this property (whether or not you are currently doing it)?....(Scale from 1 not at all important to 7 extremely important)	All NSW Landholders			North Coast LLS			Northern Tablelands LLS			Hunter LLS		
	n	Mean score	CI	n	Mean score	CI	n	Mean score	CI	n	Mean score	CI
Obtain timber for my own use (eg firewood, on-property use)	477	5.3	.2	230	5.2	.3	125	5.5	.4	117	5.2	.3
Stock grazing, shade or shelter	454	4.4	.2	213	4.3	.4	125	5.2	.5	111	4.1	.4
Commercial timber harvesting (harvesting for sale off the property)	453	2.5	.2	221	3.3	0.4	116	2.1	.4	111	2.0	.2
Achieve an economic return from activities other than timber or grazing	429	2.4	.2	200	2.6	.4	116	2.7	.5	109	2.1	.2
Experience environmental benefits (eg water quality, soil conservation, plants and animals)	446	5.5	.2	209	5.6	.3	119	5.3	.4	113	5.5	.2
Manage your forest to maintain cultural, spiritual and/or aesthetic qualities of the forest	438	4.2	.2	207	4.7	.4	115	3.8	.5	112	4.1	.3
Fishing or other hunting	413	2.1	.2	191	1.9	.2	112	2.8	.4	107	2.1	.2
Recreational activities (eg camping, picnics, bike riding, horse riding)	428	3.5	.2	199	3.7	.4	113	3.6	.5	111	3.4	.3
Reduce bushfire risk	473	5.1	.2	227	5.1	.3	125	5.0	.5	116	5.2	.3

Future intentions for managing private native forest

Landowners were asked how likely they were to use their native forest for a range of purposes in the next 10 years (Figure 16). The most common anticipated activities were weed control (64% of landholders managing 72% of the total forest estate intended to do this), harvesting timber for on-property use (66% of landholders, managing 71% of the forest estate), reducing bushfire risk (66% of landholders managing 69% of forest area), feral animal control (56% of landholders managing 68% of forest) and grazing livestock (50% of landholders managing 59% of forest area).

In total, 20% of landholders intended to engage in commercial sale of timber in the next 10 years, and this 20% managed 31% of the total private native forest area in northern NSW.

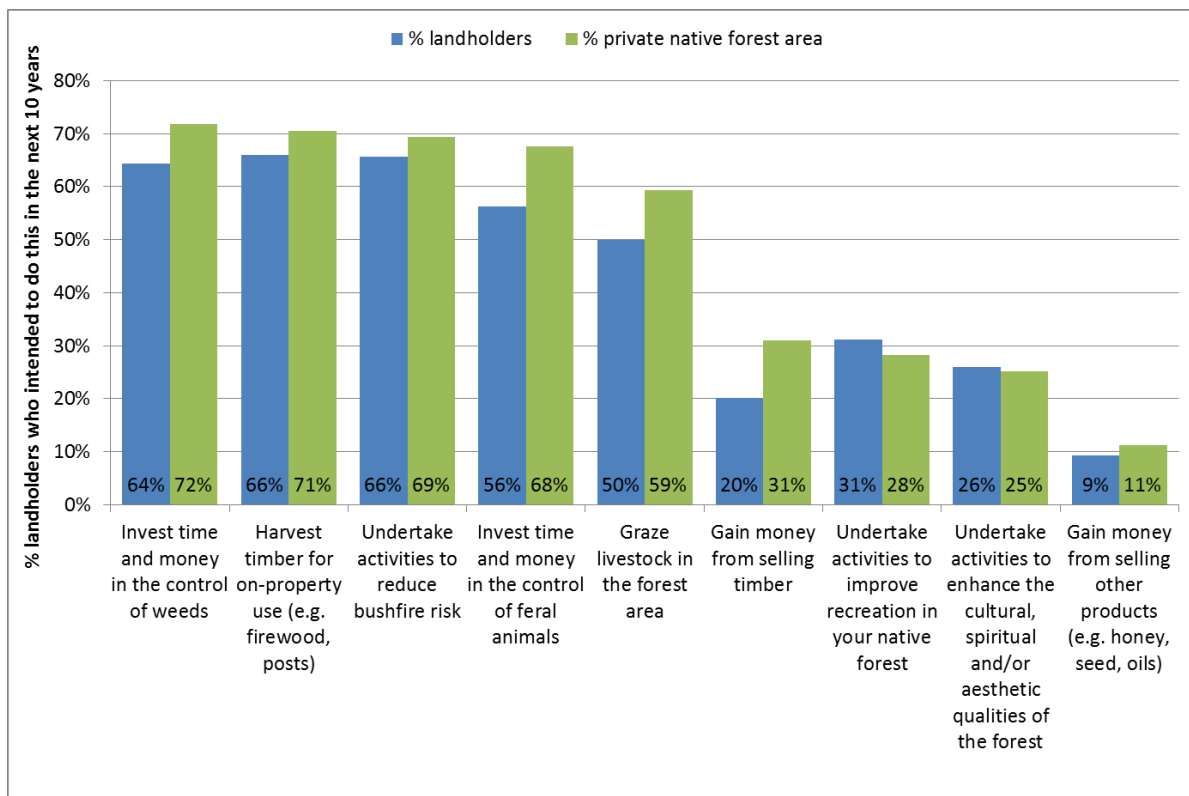


Figure 16 Future intentions for native forest management in next 10 years – Northern NSW landholders

As shown in Figure 17, PNF PVP holders were much more likely to expect to gain money from sale of timber (60.2% of landholders managing forest with a PVP, managing 73% of the native forest with a PVP) compared to non-PNF PVP holders (15.2%, managing 21% of the forest area with no PVP currently registered). If these non-PVP holders were to undertake harvesting operations in the next 10 years it would substantially increase the area of PNF PVPs therefore the potential volume of timber available from PNF in Northern NSW. There were no other significant differences between PNF PVP and non-PNF PVP holders in future intentions.

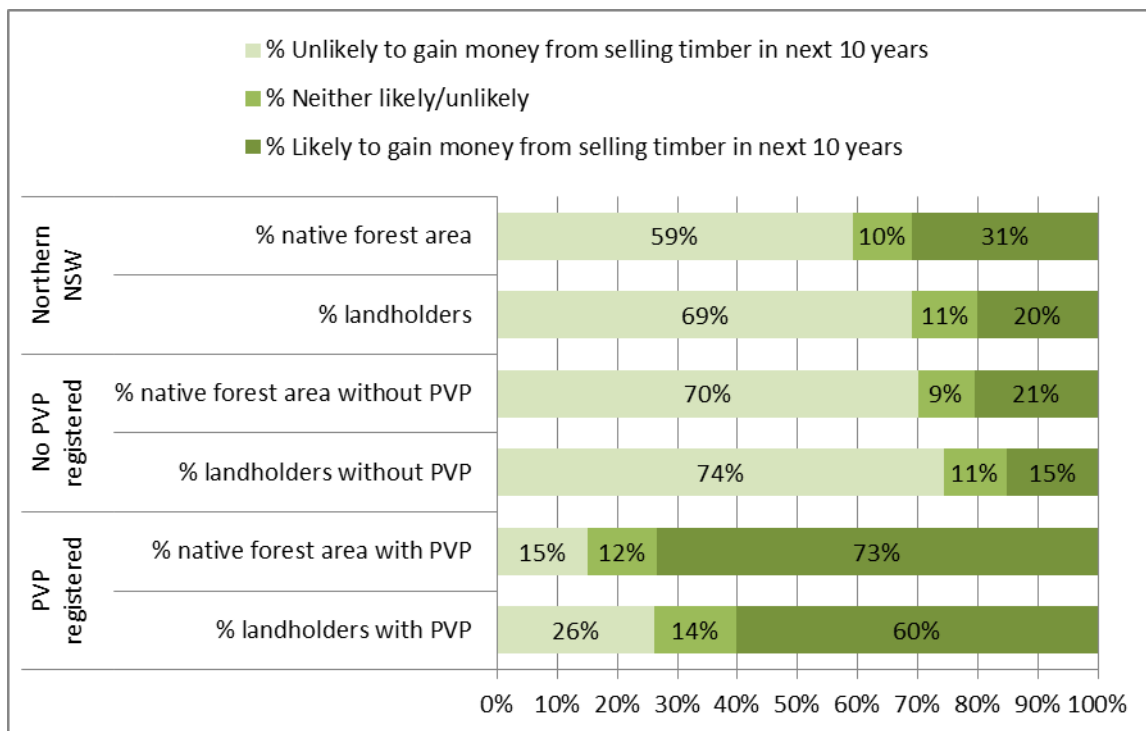


Figure 17 Intentions to engage in commercial sale of timber from native forest in next 10 years – comparison of PVP and non-PVP landholders and native forest area

When landholders managing different areas of native forest were compared, three key differences were observed (Figure 18):

- Landholders managing larger properties were significantly more likely to be intending to engage in commercial timber harvest (45% of landholders managing 500 hectares or more of native forest, compared to 13% of those managing less than 50 hectares)
- Landholders managing larger areas of native forest were significantly more likely to be intending to graze livestock compared to those managing smaller properties
- Landholders managing the smallest blocks of native forest examined (25-49 hectare blocks) were less likely than those managing larger areas of forest to be planning to engage in any of the activities asked about.

Private forest owners in the Northern Tablelands LLS were significantly more likely to be intending to graze livestock in their forest, and those in the Hunter significantly less likely to. Landholders with properties in the North Coast region were significantly more likely to be planning to sell timber for commercial return than those in other regions, and those in the Hunter least likely to be. Those living in the Northern Tablelands were most likely to be planning weed and pest control activities, and those in the Hunter least likely to (although a majority still planned to) (Table 15, see Appendix B Table B3 for more detailed data).

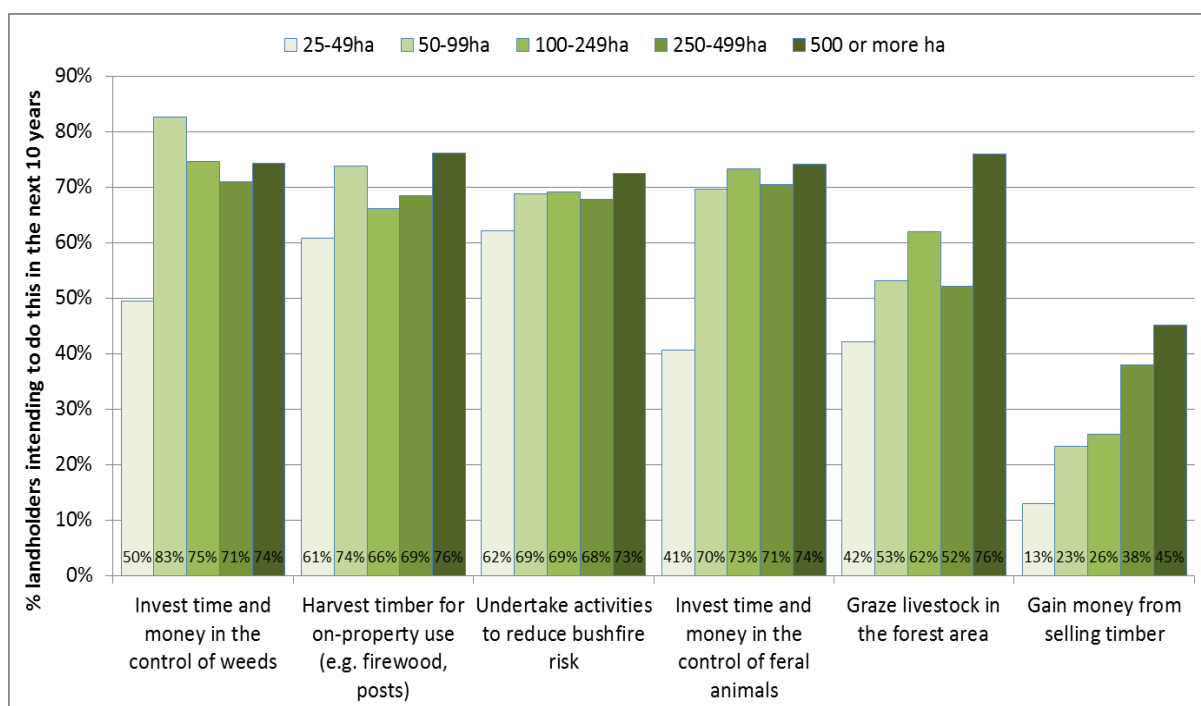


Figure 18 Future intentions for native forest management, by native forest area managed

Table 15 Likelihood of PNF activities by LLS Region

How likely are you to do the following in your native forest area in the next 10 years?... (Scale from 1 not at all likely to 7 extremely likely)	All NSW Landholders			North Coast LLS			Northern Tablelands LLS			Hunter LLS		
	n	Mean score	CI	n	Mean score	CI	n	Mean score	CI	n	Mean score	CI
Undertake activities to reduce bushfire risk	474	5.1	.2	232	5.2	.3	122	4.6	.5	115	5.2	.3
Graze livestock in the forest area	468	4.1	.2	220	4.1	.4	125	5.0	.5	117	3.8	.4
Gain money from selling timber	464	2.6	.2	224	3.5	.4	120	2.0	.4	114	2.1	.2
Harvest timber for on-property use (eg firewood, posts)	465	5.1	.2	220	4.9	.4	123	5.1	.5	116	5.2	.3
Gain money from selling other products (eg honey, seed, oils)	438	1.9	.1	208	1.9	.3	116	1.7	.3	109	1.9	.2
Invest time and money in the control of weeds	468	5.2	.2	221	5.6	.3	123	6.0	.3	119	4.5	.3
Invest time and money in the control of feral animals (eg wild dogs, cats, pigs, deer)	471	4.7	.2	221	4.2	.3	126	5.5	.4	118	4.7	.3
Undertake activities to improve recreation in your native forest with family and friends	452	3.1	.2	210	3.1	.3	121	3.3	.5	115	3.1	.3
Undertake activities to enhance the cultural, spiritual and/or aesthetic qualities of the forest	447	3.1	.2	205	3.4	.4	120	2.9	.4	117	3.0	.3

Attitudes towards private native forest

Landholders were asked a series of questions identifying their overall attitudes towards different aspects of managing and valuing their native forest, ranging from views about its values for environmental outcomes to views about the challenges of managing their forest areas. Figure 19 summarises findings for all Northern NSW landholders, as well as showing the proportion of native forest management by the landholders who agreed with each statement. For example, the 77% of landholders who agreed that their native forest provides corridors for wildlife movement managed 75% of the total forest area.

Overall, a majority of landholders agreed that their native forest provides a wildlife corridor (77.3%), adds value to their property (55.3%), is important for conservation of flora and fauna (75%) and is important for the protection of soil and water (71.5%). A majority disagreed that their native forest harbours undesirable native animals (61%), is costly to maintain (66.1%), is a fire hazard (52.9%), time consuming to manage (65.0%) or should be used to maximise income (56.8%).

Views were more mixed about timber production and whether forest should be 'left to grow as nature intended'. Very similar proportions of native forest landowners agreed (45.0%) and disagreed (40.6%) that their native forest should be managed to produce timber products, although the 45.0% who agreed managed 55% of the total forest estate. When asked if their forest should be left to grow as nature intended, similar proportions agreed (45.5%) and disagreed (43.4%), and the 45% who agreed managed 33% of the total forest estate (Figure 19, Appendix B Tables B4.1 to B4.16).

Landowners managing larger areas of native forest were more likely than those who managed smaller areas to agree that 'My native forest should be used to maximise income to my enterprise/household'. Those managing larger areas were also more likely than others to disagree that their native forest should be left to grow as nature intended. See Appendix B Table B4.1 to Table B4.16 for detailed data by landholder group and forest area.

When the views of different groups of landholders were compared, PNF PVP holders were significantly more likely than non-PNF PVP holders to agree that their forest should be (i) used to maximise income and (ii) managed to produce timber products, and significantly more likely to disagree that their native forest 'should be left to grow as nature intended'. There were few differences by region, with Northern Tablelands landowners more likely than those in other regions to agree that 'My native forest harbours undesirable native animals' and those in the Hunter to disagree that 'My native forest increases the productive capacity of my property'.

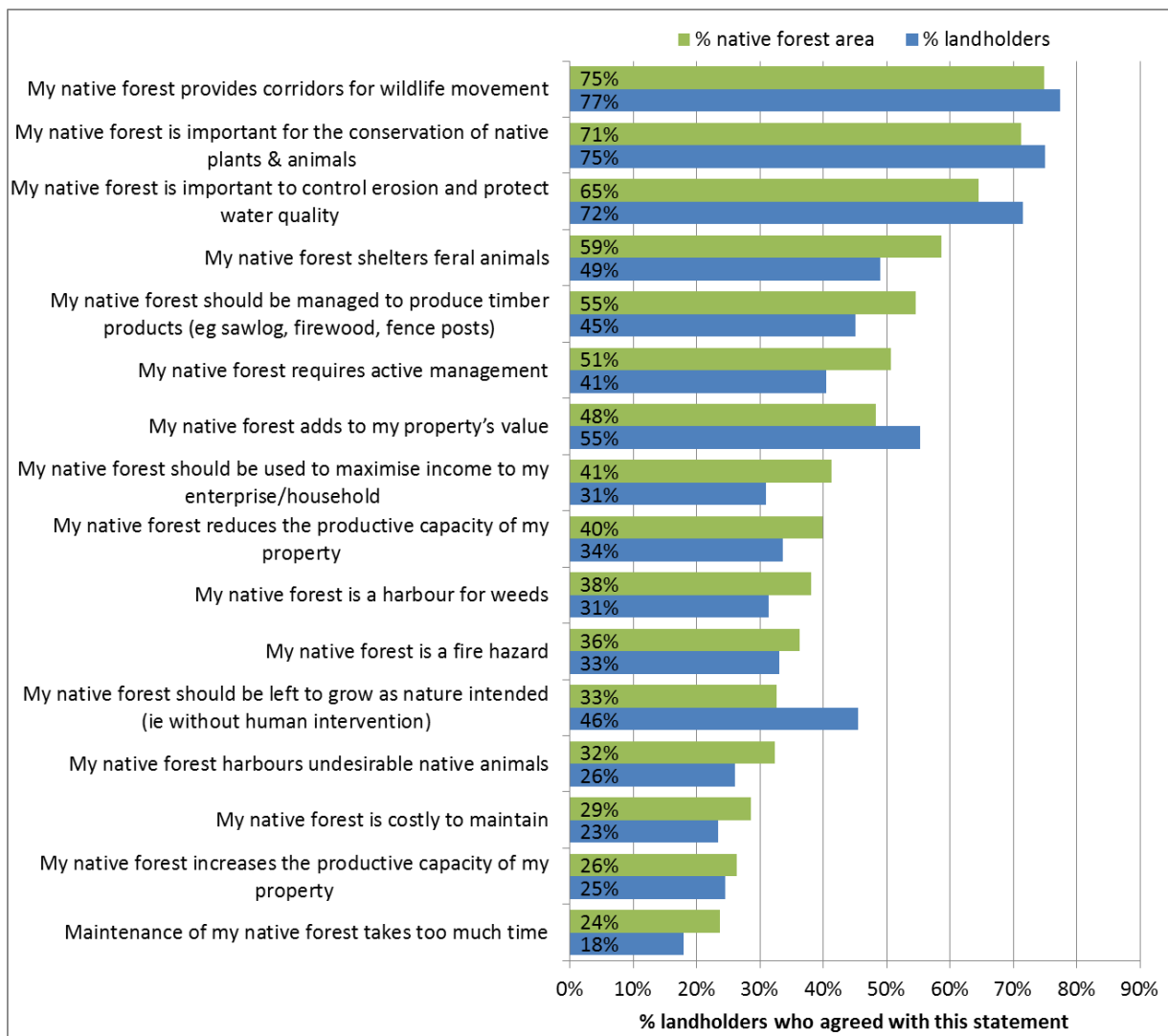


Figure 19 Attitudes towards native forest management – Northern NSW

Seeking advice about private native forest management

Landholders can seek information about managing their native forests from a range of sources, including friends, family and a number of service providers. Landholders were asked who they currently sought advice from about managing their native forest. The most common response – from 41% of landholders, managing 39% of the total private native forest area – was that they sought advice from no-one. Of those who did seek advice (Figure 20):

- 19% of landholders, managing 26% of the area of private native forest, sought advice from Local Land Services, indicating that those managing larger areas of forest are more likely to seek advice from Local Land Services
- 21% of landholders, managing 20% of forest area, sought advice from family and friends
- 19% of landholders, managing 16% of forest area, sought advice from neighbours
- 15% of landholders, managing 16% of forest area, sought advice from Landcare
- 9% of landholders, managing 14% of forest area, sought advice from private environmental or forestry consultants

- 6% of landholders, managing 10% of forest area, sought advice from the Office of Environment and Heritage.

This indicates that landholders who manage larger areas of native forest are more likely than those managing smaller areas to seek advice from NSW government agencies and from consultants.

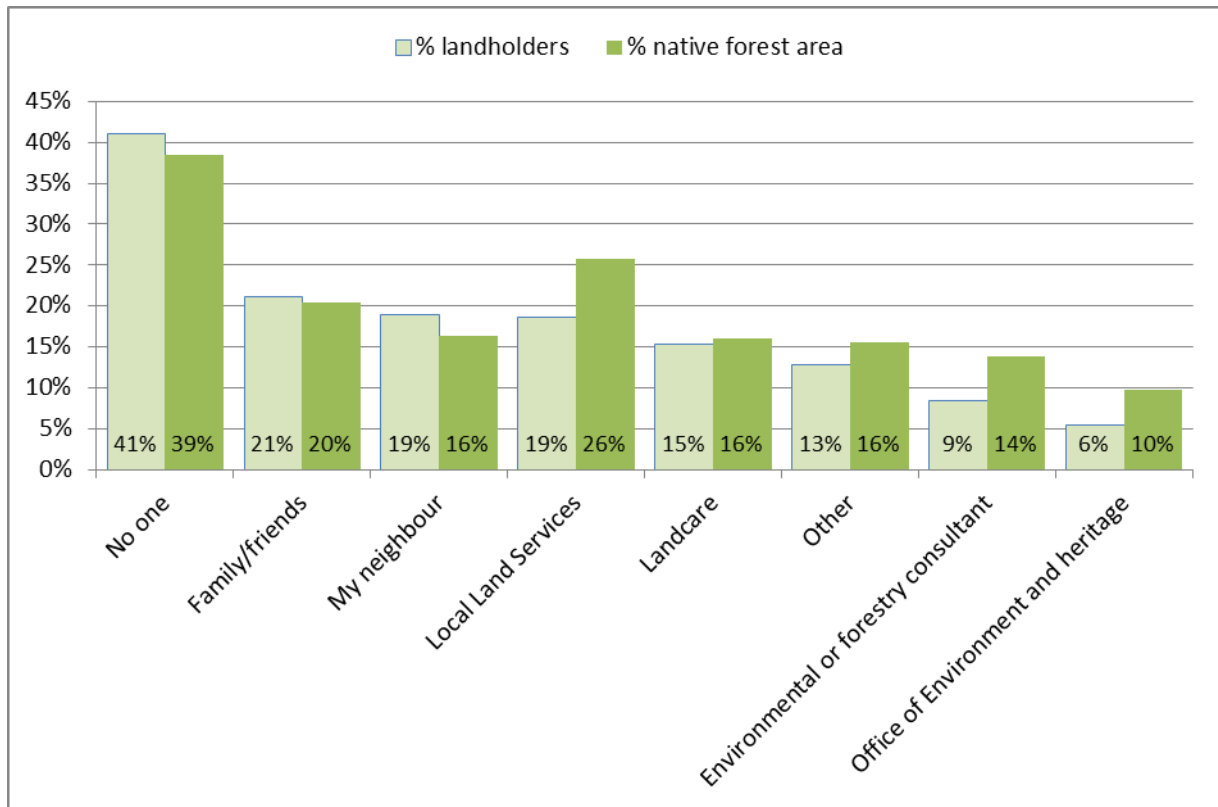


Figure 20 'Who do you currently seek advice from about managing your native forest?' – northern NSW

Landholders with a PNF PVP were more likely than those without a PNF PVP to seek advice from any source (Table 16), but were in particular much more likely to seek advice from consultants or 'other sources', and less likely to seek advice from neighbours or Landcare. Those managing larger areas of native forest were more likely to seek advice from Local Land Services and private consultants than those with smaller areas (Table 16). Those living in the Northern Tablelands were more likely to seek advice from Local Land Services than those in the other two regions, and those living in the North Coast used advice from family and friends more commonly than those in other regions.

Table 16 Current sources of advice about managing native forest, by PNF PVP status, forest size, and region

	Who do you currently seek advice from about managing your native forest?	No one	Family /friends	My neighbour	Local Land Services	Land-care	Other	Environmental or forestry consultant	Office of Environment and heritage
PNF PVP	Landholders with PVP	34.3%	25.2%	14.2%	21.5%	9.5%	20.3%	24.8%	9.3%
	Net native forest area with PVP	26.1%	25.6%	12.8%	25.7%	6.7%	24.9%	25.4%	9.6%
No PNF PVP	Landholders without PVP	41.9%	20.6%	19.6%	18.3%	16.0%	11.9%	6.3%	5.0%
	Net native forest area without PVP	41.8%	19.1%	17.1%	25.9%	18.6%	13.2%	10.8%	9.8%
Forest size	25-49ha	45.0%	24.0%	21.5%	7.2%	12.6%	9.5%	3.4%	0.7%
	50-99ha	34.6%	22.3%	20.9%	25.1%	20.0%	14.6%	11.4%	7.6%
	100-249ha	41.9%	12.1%	12.4%	32.2%	15.0%	17.5%	11.0%	10.1%
	250-499ha	41.9%	21.3%	15.5%	26.9%	15.5%	14.8%	18.0%	14.3%
	500 or more ha	34.8%	23.1%	9.6%	31.3%	11.3%	14.6%	23.6%	11.8%
Region	North Coast - landholders	40.5%	33.6%	17.4%	14.2%	14.7%	13.1%	11.0%	4.0%
	North Coast - net native forest area	37.3%	29.8%	17.2%	17.3%	14.0%	18.4%	16.8%	7.3%
	Northern Tablelands - landholders	33.6%	27.2%	17.4%	26.8%	30.9%	19.5%	7.1%	4.6%
	Northern Tablelands - net native forest area	37.3%	19.7%	17.2%	33.3%	24.6%	17.6%	11.3%	7.6%
	Hunter - landholders	44.9%	8.2%	21.4%	18.3%	9.4%	10.2%	6.3%	7.1%
	Hunter - net native forest area	41.4%	13.2%	14.3%	25.9%	11.0%	11.9%	12.7%	14.2%

4.4. Managing private native forest for commercial harvesting

Previous sections provided an overview of native forest uses and views. This section examines barriers to undertaking commercial timber harvesting and where forest owners go to get information regarding commercial forestry activities, critical to achieving the objective of understanding factors influencing intent to use native forest for timber production. The next section then examines barriers to entering stewardship agreements.

Barriers to selling timber from private native forest

Landholders were asked to what extent a number of factors would be barriers if they were to consider selling timber from their native forest (or had acted as barrier if they had already sold timber). As shown in Figure 21, of the top seven barriers, six related to challenges of meeting regulatory requirements and/or interacting with local or state government:

- 57% of landholders felt it would be too hard to interact with local council if planning permission were required
- 56% were reluctant to enter into bindings agreements with government; this item was included in the survey more to examine barrier to conservation agreements, and was not expected to be considered a barrier to harvesting timber. The high proportion of landholders suggests that things such as a PNF PVP may be viewed as binding agreements
- 46% of landholders were reluctant to deal with the EPA or with 'the government'
- 50% were concerned about not knowing what their legal obligations were or failing to comply with them
- 44% found required paperwork a barrier.

Of the top seven most common barriers, the only barrier that did not relate to government and regulatory requirements was 'concern about environmental impacts', reported by 55% of landholders. This 55% of landholders managed 46% of the private native forest area, indicating those managing larger areas of forest were less likely to view this as a barrier.

Most other issues were considered a barrier by around one-third of landholders, including lack of knowledge about various topics, finding it difficult to obtain advice and information, concern about visual impacts, and concern about financial impacts. Very few (17% of landholders, managing 13% of native forest area) reported that concern about what their neighbours might think acted as a barrier to harvesting timber.

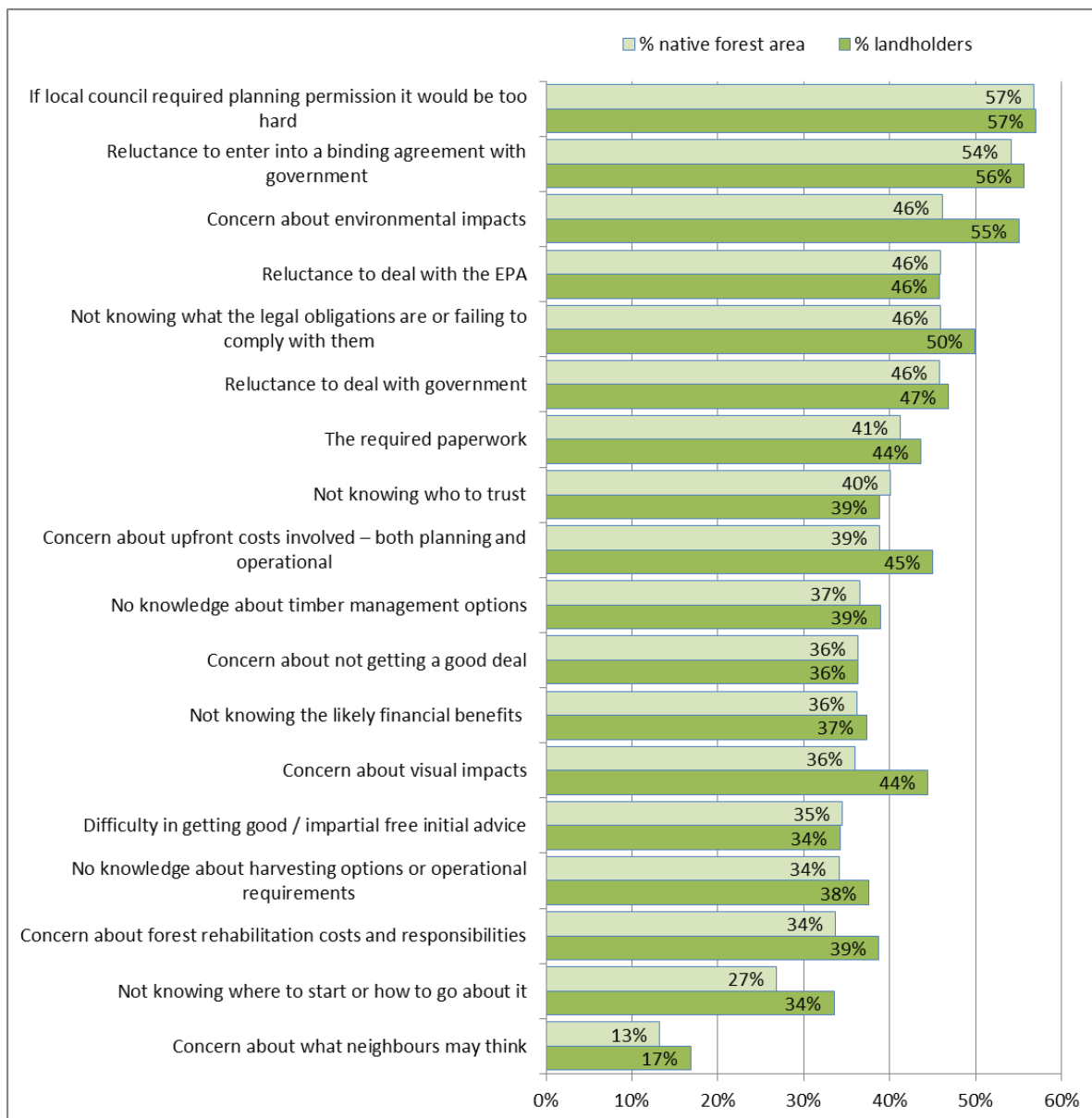


Figure 21 Barriers to selling timber from native forest

Landholders with a PNF PVP were less likely than non-PNF PVP holders to report that each of the issues asked about was a barrier to selling timber from their native forest. There were two exceptions: PNF PVP holders were slightly more likely than non-PNF PVP holders to report that not knowing who to trust was a barrier, and reported a similar level of concern about being able to achieve a good deal in commercial timber transactions (Table 17).

Table 17 Barriers to selling timber from native forest - by PNF PVP status

If you were to consider selling timber from your native forest, or have done this already – to what extent would the following act as a BARRIER to doing this?	Northern NSW		PVP		No PVP	
	% land-holders	% native forest area	% land-holders with PVP	% native forest area with PVP	% land-holders without PVP	% native forest area without PVP
If local council required planning permission it would be too hard	57.0%	56.8%	49.9%	49.0%	57.9%	58.8%
Reluctance to enter into a binding agreement with government	55.6%	54.1%	45.3%	53.3%	57.0%	54.3%
Concern about environmental impacts	55.1%	46.1%	35.4%	29.8%	57.8%	50.4%
Not knowing what the legal obligations are or failing to comply with them	49.9%	45.9%	37.1%	31.6%	51.7%	49.7%
Reluctance to deal with government	46.8%	45.8%	37.2%	35.2%	48.1%	48.7%
Reluctance to deal with the EPA	45.8%	45.9%	31.0%	39.5%	47.8%	47.6%
Concern about upfront costs involved – both planning and operational	45.0%	38.8%	26.2%	16.8%	47.6%	44.8%
Concern about visual impacts	44.4%	36.0%	28.4%	21.3%	46.6%	39.9%
The required paperwork	43.6%	41.2%	30.1%	32.7%	45.5%	43.5%
Concern about forest rehabilitation costs and responsibilities	38.9%	36.5%	23.4%	14.9%	41.0%	42.3%
No knowledge about timber management options	38.8%	40.1%	42.2%	33.3%	38.3%	41.9%
Not knowing who to trust	38.7%	33.7%	25.6%	18.0%	40.5%	38.0%
No knowledge about harvesting options or operational requirements	37.6%	34.1%	24.8%	14.4%	39.3%	39.3%
Not knowing the likely financial benefits	37.3%	36.2%	29.3%	17.8%	38.3%	41.1%
Concern about not getting a good deal	36.3%	36.3%	37.4%	31.2%	36.1%	37.6%
Difficulty in getting good / impartial free initial advice	34.2%	34.5%	30.4%	20.0%	34.8%	38.5%
Not knowing where to start or how to go about it	33.5%	26.8%	14.9%	10.2%	36.0%	31.4%
Concern about what neighbours may think	16.8%	13.2%	9.2%	4.8%	17.8%	15.4%

Consistent with the greater likelihood of managing their forest for timber production, landowners located in the North Coast generally reported fewer barriers to commercial timber production than those in other regions: for example, they were more confident they knew where to start, could undertake the paperwork and had knowledge about timber management and harvest options. Those in the Hunter region reported more barriers, again consistent with their lower likelihood of managing their forest for timber production. Hunter-based landowners were more likely to see almost all factors as barriers, particularly ‘not knowing where to start’, the need to get local permits, entering a binding agreement with the government, upfront planning, operational costs and forest rehabilitation costs, and lack of knowledge about the likely financial benefits, timber management and harvesting options (Table 18). See Appendix B, Table B5 for detailed data.

Table 18 Barriers to selling timber from native forest – by LLS region

If you were to consider selling timber from your native forest, or have done this already – to what extent would the following act as a BARRIER to doing this?	North Coast		Northern Tablelands		Hunter	
	% land-holders	% native forest area	% land-holders	% native forest area	% land-holders	% native forest area
If local council required planning permission it would be too hard	47.5%	48.3%	52.9%	56.9%	67.3%	64.4%
Reluctance to enter into a binding agreement with government	48.1%	51.7%	50.1%	59.5%	65.1%	51.8%
Concern about environmental impacts	53.7%	46.3%	48.8%	40.5%	60.2%	50.6%
Not knowing what the legal obligations are or failing to comply with them	48.6%	45.2%	38.1%	43.5%	57.0%	49.1%
Reluctance to deal with government	46.3%	47.8%	46.8%	51.4%	48.0%	39.6%
Reluctance to deal with the EPA	37.8%	34.0%	43.3%	57.4%	53.8%	45.1%
Concern about upfront costs involved – both planning and operational	30.3%	26.3%	42.6%	41.2%	58.5%	46.5%
Concern about visual impacts	45.6%	37.0%	39.4%	31.7%	46.5%	38.3%
The required paperwork	36.3%	33.4%	37.7%	43.6%	52.7%	45.2%
Concern about forest rehabilitation costs and responsibilities	26.3%	27.8%	33.9%	33.4%	50.8%	45.0%
No knowledge about timber management options	35.0%	37.1%	37.4%	42.1%	43.1%	40.3%
Not knowing who to trust	30.6%	28.4%	30.4%	28.7%	48.8%	41.8%
No knowledge about harvesting options or operational requirements	27.8%	27.4%	33.9%	32.4%	46.6%	39.3%
Not knowing the likely financial benefits	29.2%	29.8%	33.2%	37.7%	45.1%	38.5%
Concern about not getting a good deal	29.7%	32.8%	36.4%	35.8%	41.0%	37.7%
Difficulty in getting good / impartial free initial advice	31.2%	31.8%	27.9%	34.1%	39.6%	36.5%
Not knowing where to start or how to go about it	23.4%	17.8%	23.2%	27.6%	46.1%	33.6%
Concern about what neighbours may think	15.3%	14.5%	6.7%	4.4%	21.8%	19.4%

The average number of barriers reported by landholders was also compared for those who reported they were (i) unlikely and (ii) likely to harvest their forest in the next 10 years for commercial sale. A ‘barrier’ was defined as a landholder rating the issue as a score of five, six or seven on a scale from one (not a barrier) to seven (big barrier). On average, landholders who were unlikely to sell timber reported that seven different issues (an average of 7.1) were barriers to selling timber. Those who were likely to sell timber on average reported six (an average of 5.7) issues as being a barrier.

More important than the number of barriers they reported was the strength of the barrier. To better understand which barriers were most strongly associated of likelihood of a landholder harvesting their forest for commercial sale in the next 10 years, the average ‘barrier score’ was calculated and compared for landholders who were unlikely versus likely to sell timber from their forest in the next 10 years. As shown in Table 19, the average strength of the barrier was larger for those who were unlikely to sell in most cases, but there was some variation:

- Those who were likely and unlikely to sell timber were similar in their rating of the barriers of local council planning permission, reluctance to enter agreements with government, concern about not getting a good deal, and not knowing who to trust
- The biggest gaps between those who were unlikely and likely to sell timber – indicating they have a larger impact on the likelihood of a landholder considering sale were:
 - Concern about environmental impacts
 - Concern about visual impacts
 - Lacking knowledge about timber management options
 - Lacking knowledge about harvesting options and operational requirements
 - Concern about forest rehabilitation costs and responsibilities
 - Concern about upfront planning and operational costs.
 - Not knowing where to start or how to go about it.

This suggests that while all landholders report concern about government regulatory and planning requirements as barriers (irrespective of their intentions to harvest and sell timber in the next 10 years), those who do intend to sell timber are much less likely than those who do not intend to sell to hold concerns about environmental and visual impacts, to feel they lack knowledge about how to manage the forest and the harvest process, or to be concerned about the costs of the harvest and post-harvest management. To further explore this, a simple statistical correlation was performed, identifying the extent to which rating each issue as a barrier predicted the amount of variation in future intentions of the landholders to sell timber from their forest. This is shown in Table 19, and confirms that the barriers that predict the greatest amount of variation (i.e. if the barrier is present to a greater degree, there is a lower likelihood the landholder is intending to sell timber) are those listed in the dot points above.

Table 19 Average extent of barrier reported to selling timber, compared for landholders who were likely and unlikely to sell timber from their forest in the next 10 years

	Average 'barrier score' (rated from 1 = not a barrier to 7 = very large barrier)		Spearman's rho correlation test – correlation between rating of barrier for each item and landholder's likelihood of selling timber from their forest in the next 10 years*		
	Unlikely to sell timber in the next 10 years	Likely to sell timber in the next 10 years	r_s	p	n
If local council required planning permission it would be too hard	4.6	4.6	-.016	.737	430
Reluctance to enter into a binding agreement with government	4.4	4.3	-.054	.259	433
Concern about environmental impacts	4.6	3.1	-.370	.000	434
Not knowing what the legal obligations are or failing to comply with them	4.3	3.9	-.136 ^{**}	.005	431
Reluctance to deal with government	4.2	3.9	-.088	.069	433
Reluctance to deal with the EPA	3.9	3.6	-.108	.025	434

Concern about upfront costs involved – both planning and operational	4.1	3.1	-.215**	.000	434
Concern about visual impacts	4.2	2.8	-.331**	.000	432
The required paperwork	3.9	3.5	-.121	.011	433
No knowledge about timber management options	3.8	2.7	-.248**	.000	433
Not knowing who to trust	4.1	3.8	-.046	.339	431
Concern about forest rehabilitation costs and responsibilities	3.9	2.8	-.259**	.000	434
No knowledge about harvesting options or operational requirements	3.8	2.7	-.229**	.000	432
Not knowing the likely financial benefits	3.8	3.0	-.162**	.001	435
Concern about not getting a good deal	3.7	3.6	-.030	.526	436
Difficulty in getting good / impartial free initial advice	3.7	3.1	-.140**	.004	433
Not knowing where to start or how to go about it	3.2	2.3	-.226**	.000	435
Concern about what neighbours may think	2.5	1.9	-.178**	.000	432
<p>*The statistical test used was the Spearman's rho two-tailed bivariate correlation. The Spearman's test was used as the data were non-normally distributed and had ordinal 7-point scales rather than a truly continuous scale. The r_s column provides the effect size (larger effect sizes are more meaningful), and * indicates significance at the 0.05 level and ** indicates significance at the 0.01 level. The 'p' column then provides the probability value to further specify level of statistical significance of the correlation. The n column shows how many people answered both items. This analysis was performed on unweighted data and as such is based on proportion of landholders in the sample. Note that while many associations are significant, this does not mean each barrier independently predicts a specific proportion of variance in the likelihood of selling timber: many of the barriers asked about are inter-related and so co-occur with each other, thus jointly predicting variance in timber sale likelihood.</p>					

Working with agencies to commercially manage private native forest

Landholders were asked which of a number of government agencies and non-government organisations/entities they would prefer to deal with if they were planning timber harvest from their native forest, including the Department of Industry – Lands³, Local Land Services, EPA, consultants, Landcare and the Office of Environment and Heritage. The most common response amongst landholders was 'none of these' (31.6% of landowners, Figure 22), followed by Local Land Services (25.9%). Less than 26% of landowners had a preference for any given organisation. When examined by area of forest managed, there was little difference: landholders managing larger areas of forest were somewhat more likely to prefer advice from Local Land Services, consultants, and the Department of Industry– Lands, and slightly less likely to prefer advice from Landcare. However, these differences were small, as can be seen in Figure 22 by comparing proportion of landholders versus the proportion of native forest area managed by these landholders.

³ Note: Since undertaking this survey the forestry functions undertaken by the NSW Department of Industry- Lands have been transferred to NSW Department of Primary Industries (DPI)

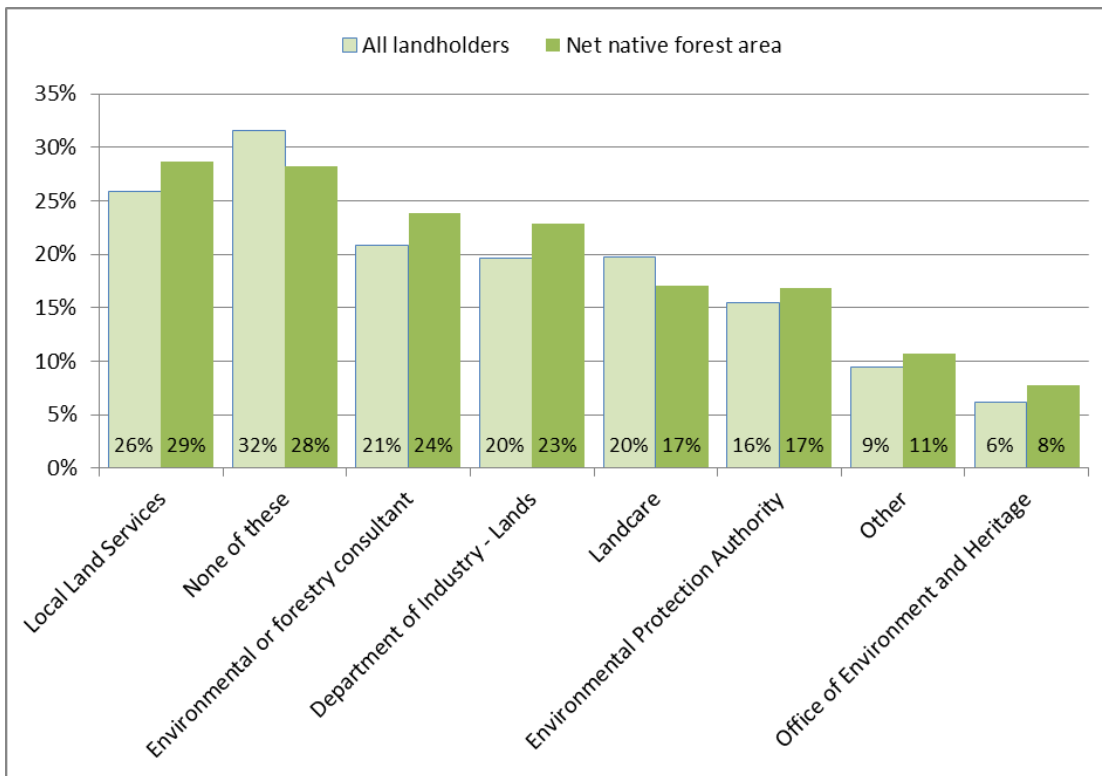


Figure 22 Organisations landowners would prefer to deal with when managing forest for commercial timber production - Northern NSW (n=455)

Landholders with a PNF PVP were significantly more likely to indicate interest in working with the Department of Industry– Lands, EPA and consultants, and less likely to indicate interest in working with Local Land Services or Landcare (Table 20). However, even where there was increased interest, typically 30% or slightly fewer of those with a PNF PVP indicated a preference to work with any of the organisations asked about. There was little difference between landholders in different regions, although those on the North Coast were significantly less likely to indicate a preference to work with Local Land Services (see also Appendix B Table B8.2).

Table 20 Organisations landowners would prefer to deal with when managing forest for commercial timber production – by PNF PVP status, forest area managed, and region

If you were to consider or are already managing your native forest for timber harvest, who would you prefer to deal with regarding managing your native forest for timber harvest?		Local Land Services	None of these	Private consultant	Dept Industry - Lands	Land-care	EPA	Other	OEH
PNF PVP	Landholders with PVP	20%	20%	30%	31%	9%	30%	10%	6%
	Net native forest area with PVP	26%	23%	28%	28%	5%	28%	9%	6%
No PNF PVP	Landholders without PVP	27%	33%	20%	18%	21%	13%	9%	6%
	Net native forest area without PVP	30%	30%	23%	22%	21%	14%	11%	8%
Area of native forest	25-49ha	20%	35%	15%	15%	22%	14%	9%	3%
	50-99ha	33%	29%	24%	24%	21%	18%	9%	9%
	100-249ha	30%	33%	25%	20%	14%	15%	8%	8%
	250-499ha	22%	25%	27%	25%	17%	16%	16%	11%
	500 or more ha	36%	18%	32%	31%	11%	20%	12%	7%
Region	North Coast - landholders	14%	34%	19%	21%	16%	13%	10%	4%
	North Coast - net native forest area	18%	27%	24%	25%	13%	23%	12%	7%
	Northern Tablelands - landholders	22%	38%	16%	15%	30%	7%	10%	3%
	Northern Tablelands - net native forest area	29%	34%	21%	20%	24%	8%	10%	3%
	Hunter - landholders	38%	27%	24%	21%	19%	22%	9%	9%
	Hunter - net native forest area	37%	23%	26%	24%	14%	20%	10%	13%

4.5. Entering conservation/stewardship agreements over native forest

In this section the views of landholders about entering into conservation/stewardship agreements for part or all of their native forest are examined, focussing on the perceived barriers to entering into a conservation agreement, and the amounts of money landholders would seek if they were to enter an agreement.

Barriers to entering conservation agreements

When asked about barriers to entering into a conservation agreement that covered part or all of their native forest, more than 50% of landholders (managing more than 50% of the forest estate in all but one case) identified that each issue was a barrier, with the exception of 'concern about what neighbours may think', which was a barrier for only 19% of landholders (who managed only 14% of the total forest area) (Figure 23). The issues reported as barriers by the highest proportion of landholders were concern that the conditions of agreements might be changed without permission (71% of landholders, managing 72% of forest area), that funding for conservation payments might not be available in the future (63% of landholders managing 67% of forest area), concern about costs of ongoing maintenance and responsibilities (68% of landholders managing 65% of forest area), and concern about additional actions that might happen in the future (65% of landholders managing 63% of forest area). The high proportion of landholders identifying each issue as a barrier suggests that entering into stewardship agreement is viewed as highly challenging by many landholders for a wide range of reasons, including the potential restrictions placed on use, lack of knowledge, and lack of confidence in being able to get good advice and trust the organisations providing it.

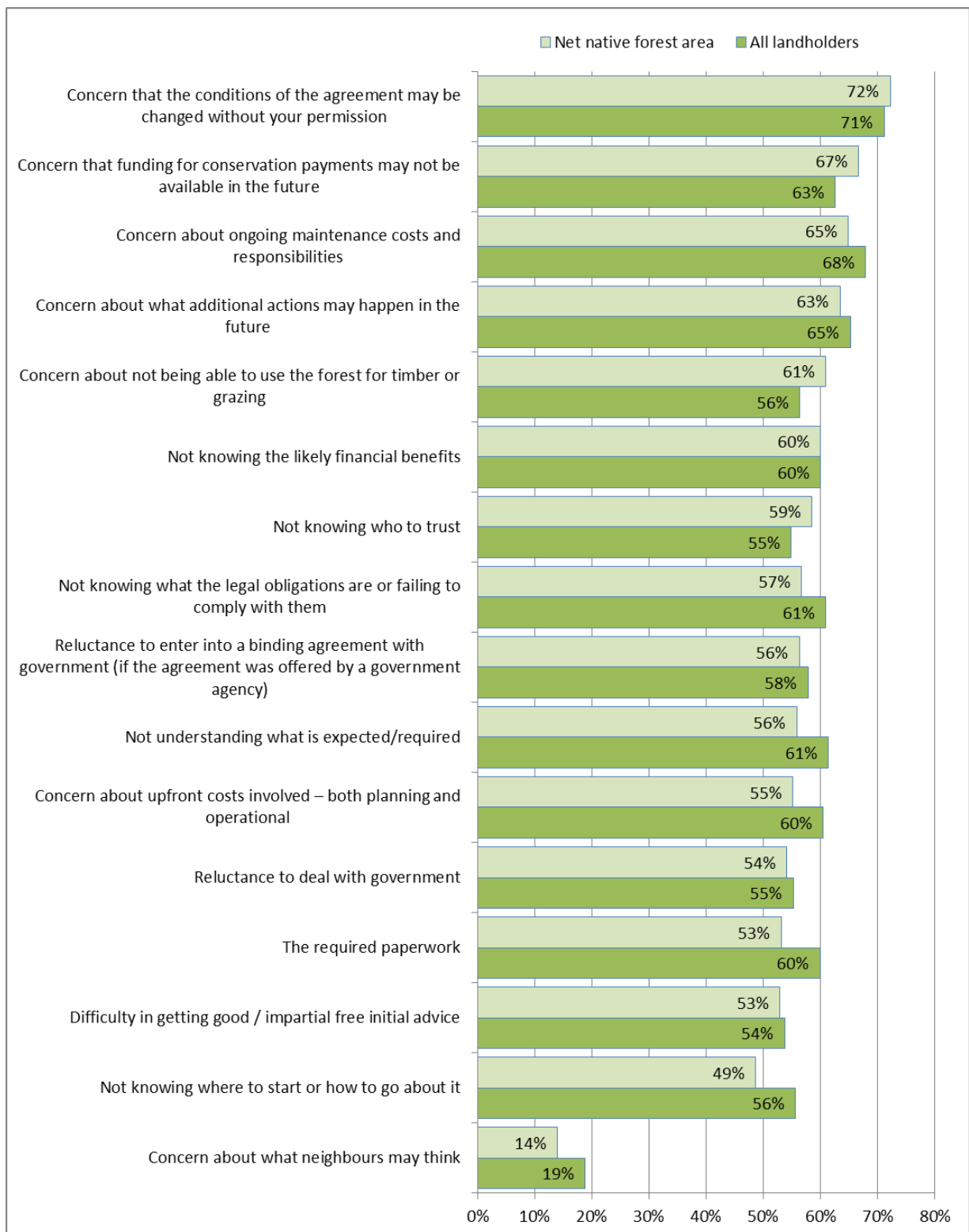


Figure 23 Barriers to entering into a conservation agreement – Northern NSW

Landholders with and without a PNF PVP and living in different LLS regions did not report significantly different barriers. As shown in Figure 24 (which compares landholders with and without a PNF PVP, and does not show results by forest area as they were almost identical to the results displayed), landholders with a PNF PVP were more likely than those without a PNF PVP to report concern about not being able to use the forest for timber or grazing.

There were few differences between landholders who managed differing areas of native forest (Table 21), although those managing a forest area of 50-99 hectares were significantly more likely to report concerns that funding for conservation payments may not be available in the future. Younger respondents (under 50 years) were significantly more concerned about potential loss of grazing access than other age cohorts, as were those whose highest educational attainment was high school, and those who used their property for forestry purposes. Those with a university degree or used their property for non-commercial/residential purposes were significantly less likely to perceive this as a barrier to entering into a conservation agreement (see Appendix B Table B6).

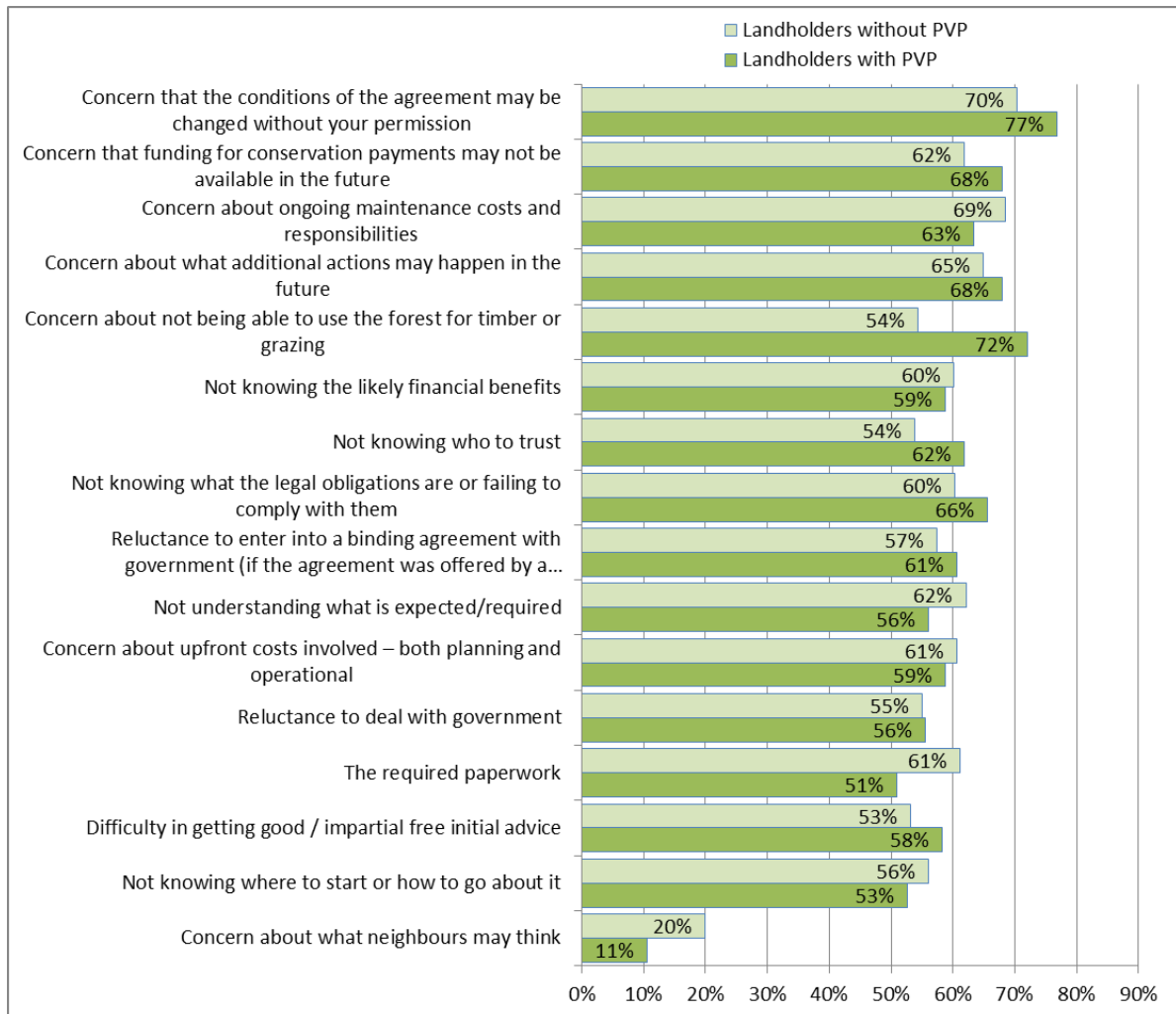


Figure 24 Barriers to entering into a conservation agreement – by PNF PVP status

Table 21 Barriers to entering into a conservation agreement – by area of forest managed and region

	Forest area					Region					
	25-49ha	50-99ha	100-249ha	250-499ha	500 or more ha	North Coast - landholders	North Coast - native forest area	Northern Tablelands - landholders	Northern Tablelands - native forest area	Hunter – land-holders	Hunter - native forest area
Concern that the conditions of the agreement may be changed without your permission	62%	83%	74%	79%	60%	74%	77%	68%	76%	71%	66%
Concern about ongoing maintenance costs and responsibilities	64%	79%	65%	64%	56%	64%	62%	73%	73%	69%	60%
Concern about what additional actions may happen in the future	63%	71%	64%	69%	48%	66%	68%	72%	72%	63%	52%
Concern that funding for conservation payments may not be available in the future	49%	81%	67%	75%	62%	61%	67%	68%	72%	62%	62%
Not understanding what is expected/required	62%	70%	50%	61%	46%	66%	59%	62%	61%	59%	49%
Not knowing what the legal obligations are or failing to comply with them	56%	77%	51%	62%	45%	67%	62%	62%	62%	57%	48%
Concern about upfront costs involved – both planning and operational	56%	74%	52%	60%	45%	57%	56%	62%	58%	62%	52%
Not knowing the likely financial benefits	55%	69%	61%	60%	56%	62%	63%	70%	68%	56%	51%
The required paperwork	62%	63%	55%	55%	46%	64%	55%	60%	58%	58%	48%
Reluctance to enter into a binding agreement with government	54%	65%	57%	57%	54%	62%	62%	62%	62%	55%	47%
Concern about not being able to use the forest for timber or grazing	49%	64%	61%	64%	64%	66%	70%	69%	70%	46%	47%
Not knowing where to start or how to go about it	59%	59%	45%	54%	41%	60%	54%	48%	49%	56%	45%
Reluctance to deal with government	51%	67%	50%	54%	52%	52%	54%	59%	61%	57%	49%
Not knowing who to trust	45%	69%	55%	68%	49%	58%	63%	61%	69%	51%	47%
Difficulty in getting good / impartial free initial advice	51%	59%	51%	59%	48%	60%	57%	47%	56%	53%	47%
Concern about what neighbours may think	21%	16%	23%	13%	1%	18%	10%	21%	18%	19%	13%

Payment for entering conservation agreements

Landowners were given a range of payment options per hectare, and asked which was the lowest they would consider to enter into three types of conservation agreement: an agreement in perpetuity, for 25 years, and for 10 years (Table 22). The most common response was 'I wouldn't do it', followed by 'Don't know', with more than half of landowners giving these responses (and very similar results irrespective of whether data were analysed based on the proportion of landholders or proportion of native forest involved). This indicates a substantial proportion of landholders, managing more than 65% of private native forest, would not consider entering a stewardship agreement of any length of time. Of those who would consider it, almost all selected the highest dollar value provided in the question (more than \$200 per hectare per year): at this level of payment, 15.4% of landholders (managing 17.5% of native forest area) would consider entering an agreement in perpetuity, 16.8% (managing 17.8% of forest area) an agreement for 25 years, and 21.2% (managing 24.3% of forest area) an agreement for up to 10 years (see also Appendix B Table B7).

Table 22 Level of monetary compensation per hectare per year required for forest owners to consider entering into a conservation agreement – Northern NSW

What would be the LOWEST amount of money you would need to be paid annually (\$ per hectare per year) to consider entering into a conservation agreement to manage all/part of your native forest area for the conservation of plants and animals?		Don't know	I wouldn't do it	\$1 to \$25 per ha	\$26 to \$50 per ha	\$51 to \$100 per ha	\$101 to \$150 per ha	\$150 to \$200 per ha	More than \$200
Agreement held in perpetuity	% landholders	25.9%	48.2%	1.4%	3.6%	1.7%	2.0%	1.9%	15.4%
	% native forest area	22.2%	44.6%	1.6%	3.0%	4.1%	3.4%	3.6%	17.5%
Agreement for up to 25 years	% landholders	27.4%	41.7%	1.1%	2.7%	5.5%	1.9%	2.9%	16.8%
	% native forest area	23.0%	37.1%	1.3%	4.0%	7.4%	2.8%	6.6%	17.8%
Agreement for up to 10 years	% landholders	27.1%	34.3%	2.5%	3.2%	5.3%	4.4%	1.9%	21.2%
	% native forest area	22.3%	28.9%	3.7%	3.8%	7.6%	5.8%	3.5%	24.3%

Answers to this question did not vary significantly for landowners with and without a PNF PVP (see Appendix B Table B7). Property owners managing an area of native forest greater than 500 hectares were significantly more interested in entering an agreement: 53.1% indicated they would consider entering an agreement at one of the prices listed, compared to only 25.9% of all landholders. Older people were significantly less likely to enter into any conservation agreement, regardless of duration (see Appendix B Table B7).

Working with agencies to manage private native forest for biodiversity conservation

When asked which organisations they preferred to work with to manage their forest for biodiversity conservation, only 27.7% of landholders indicated they wouldn't work with any of the organisations listed (Figure 25); those they most preferred to work with were Local Land Services (31.4%) and Landcare (25.6%). When examined by area of forest managed, there was some difference (Table 23): landholders managing larger areas of forest were somewhat more likely to prefer advice from Landcare than those with smaller forest holdings. However, these differences were typically small, as can be seen in Figure 25 by comparing proportion of landholders versus the proportion of native forest area managed by these landholders. Notably, landholders representing a higher proportion of private native forest area preferred to use Local Land Services, private consultants and DPI Lands (Figure 25, Table 23).

PNF PVP holders were significantly more likely than non-PNF PVP holders to prefer to work with the Department of Industry – Lands⁴ (21.4% compared to 9.8%) and the NSW EPA (29.5% compared to 13.9%) (Table 23). Landowners in the North Coast region were, similar to the previous section on timber production, significantly less likely to prefer working with their LLS than those in the other two regions (20.4% compared to 40.0% in the Hunter). Those who managed larger areas of native forest were more likely to prefer working with DPI- Lands (24.8% of those managing 500 hectares or more, compared to 11.2% of all respondents). Appendix B Table B8.3 provides detailed data.

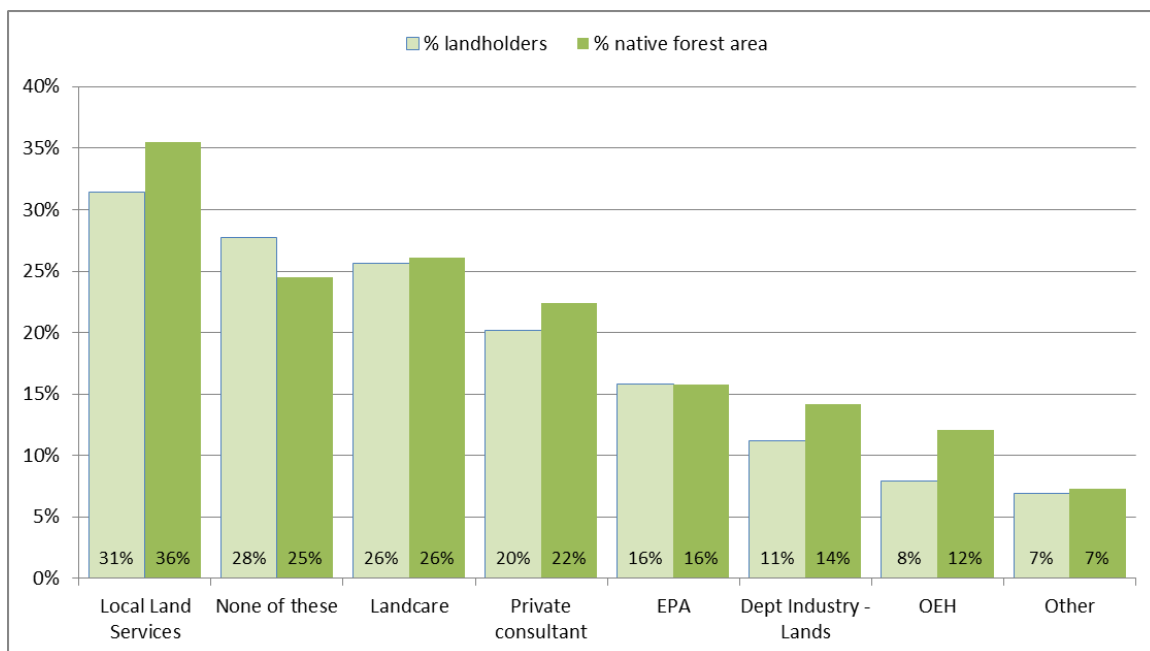


Figure 25 Organisations landowners would prefer to deal with when managing forest for biodiversity conservation – Northern NSW

⁴ Note: Since undertaking this survey the forestry functions undertaken by the NSW Department of Industry- Lands have been transferred to NSW Department of Primary Industries (DPI)

Table 23 Organisations landowners would prefer to deal with when managing forest for biodiversity conservation – by PNF PVP status, forest area managed, and region

If you were to consider or are already managing your native forest for biodiversity conservation, who would you prefer to deal with regarding managing your native forest for conservation?		% Dept. of Ind - Lands	% LLS	% EPA	% Env/ Forestry consultant	% Land-care	% OEH	% Other	% None of these
Northern NSW	All landholders	11.2%	31.4%	15.8%	20.2%	25.6%	7.9%	6.9%	27.7%
	Net native forest area	14.2%	35.5%	15.8%	22.4%	26.1%	12.1%	7.3%	24.5%
PVP	Landholders with PVP	21.4%	21.5%	29.5%	28.8%	20.9%	14.0%	5.3%	26.2%
	Net native forest area with PVP	23.4%	26.1%	23.5%	25.9%	13.5%	12.5%	12.3%	21.6%
No PVP	Landholders without PVP	9.8%	32.8%	13.9%	19.0%	26.3%	7.0%	7.1%	27.9%
	Net native forest area without PVP	11.7%	38.1%	13.8%	21.4%	29.5%	12.0%	5.9%	25.3%
Size of PNF	25-49ha	10.6%	22.1%	13.4%	19.9%	20.7%	1.5%	8.4%	27.7%
	50-99ha	13.8%	41.2%	22.8%	17.8%	33.8%	14.6%	5.6%	28.7%
	100-249ha	4.5%	36.9%	10.5%	20.5%	24.5%	9.8%	6.8%	29.9%
	250-499ha	17.3%	36.6%	16.7%	27.6%	31.7%	15.4%	1.9%	19.5%
	500 or more ha	24.8%	39.0%	17.5%	30.0%	18.8%	16.1%	6.7%	19.6%
LLS Regions	North Coast - landholders	10.4%	20.4%	18.6%	21.2%	25.1%	10.3%	4.4%	32.2%
	North Coast - net native forest area	16.4%	25.7%	23.6%	26.7%	27.2%	15.6%	4.3%	27.9%
	Northern Tablelands - landholders	9.3%	30.6%	7.3%	11.2%	36.1%	4.0%	13.3%	30.8%
	Northern Tablelands - net native forest area	12.8%	36.9%	8.5%	17.5%	32.2%	7.0%	12.7%	25.8%
	Hunter - landholders	12.9%	40.0%	17.5%	23.5%	22.4%	7.7%	6.4%	22.3%
	Hunter - net native forest area	13.7%	42.2%	16.0%	23.4%	20.6%	13.1%	5.2%	20.3%

5. Private Native Forest Property Vegetation Plans

Landowners who had PNF PVPs were asked whether they had undertaken any timber harvesting and, if they had, were asked to detail their experience of timber harvest. This provides further information that can assist in understanding when and why landholders decide to harvest timber for commercial sale. This section analyses only PNF PVP holders.

5.1. Timber harvest activity, timing and approval requirements

We estimate that approximately 63% of PNF PVP holders have harvested timber for sale at some point, as have a small number of those who did not report having a PNF PVP. There is some uncertainty around this figure: while 82.3% of 173 PNF PVP holders who answered this question (managing 90.3% of the total native forest area managed by those who answered this question) reported that they had harvested native forest timber for sale; a total of 225 landholders who had a PNF PVP took part in the survey. Only 77% of PVP holders answered the question about whether they had harvested timber. Inspection of responses earlier in the survey asking about timber harvest showed that almost all of the PVP holders who did not respond to this question had earlier indicated not having engaged in timber harvest. This means the actual proportion of PVP holders who have harvested is likely to be approximately 63%.

Those landholders who indicated having harvested their native forest in the past were asked a series of questions about the harvest. First, they were asked in which years they had harvested timber for sale. As is common in surveys that asked participants to recall past events, responses were skewed to recent years (**Error! Reference source not found.**, see also Appendix D2 and D3), with over half of those who answered having harvested since 2015 (note that landowners could report harvesting in more than one year if they had harvested multiple times). This is likely to reflect some landholders only entering their most recent year of harvest (rather than all), and others having poor recall of past years in which harvest occurred. It is also likely to suggest that there was some bias in responses towards those who had harvested in more recent years, who may have been more willing to answer questions about this harvest as they could easily recall details about it.

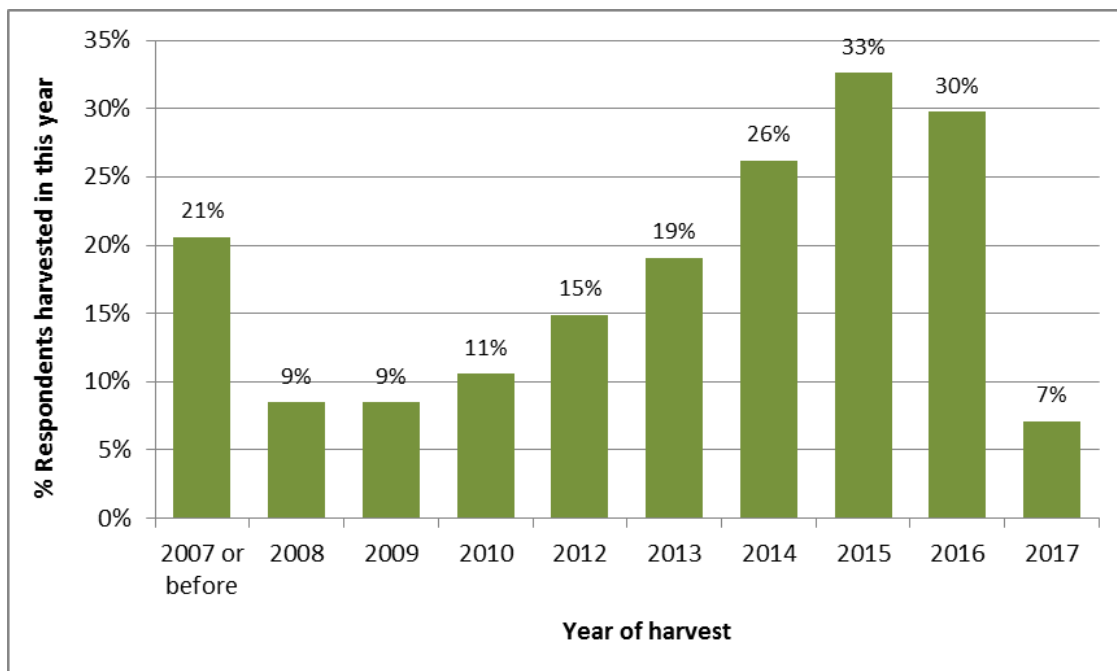


Figure 26 Year native forest harvesting occurred (n=141)

The tables below includes an analysis of all respondents who indicated they have harvested in any of the years from 2007-2017. The questions were asked by year of harvest, however there were not enough respondents in each year to be able to analyse the results by year, therefore responses were analysed as a whole. Not everyone who indicated they had harvested between 2007 and 2017 answered these question. Note respondents could indicate more than one harvesting method or product, therefore the total % exceeds 100%.

Overall, 67% of landholder who harvested their forest between 2007 and 2017 (who managed 58% of the total forest area) reported that they undertook selective harvesting for high value trees only, 38% (managing 46% of the total forest area) reported that they undertook selective harvesting for both high and low value trees, and 12% (managing 16% of the total forest area) that they undertook a thinning operation intended to assist growth of remaining trees to reach larger sawlog status (acknowledging that multiple types of harvesting can occur across the forest area at any given time) (see Table 24).

Sawlog production was the most common product harvested in timber harvest operations, with 65% of landholders (managing 83% of the total forest area) reporting sawlogs were produced in their harvest (Table 25). Poles and girders were also very common products, with more than half of landowners reporting these were part of the harvest each year. Fencing products were produced by 39% of the landholders reported producing, with 11%, reporting that they produced commercial firewood from timber harvesting (Table 25).

Table 24 Harvesting regimes undertaken on PNF from 2007 to March 2017

How were trees harvested on your property?		n	% Selective harvesting of native forest for the high commercial value trees only	CI	% Selective harvesting of native forest, taking both the high commercial value trees	CI	% Thinning native forest	CI	% Don't know	CI
Northern NSW	All landholders	122	67%	8%	38%	9%	12%	6%	3%	4%
	Net native forest area	122	58%	9%	46%	9%	16%	7%	3%	4%
Size of PNF	25-49ha	23	83%	16%	17%	16%	4%	12%	5%	13%
	50-99ha	31	67%	16%	40%	17%	21%	14%	3%	9%
	100-249ha	23	62%	19%	47%	19%	13%	15%	0%	10%
	250-499ha	25	50%	19%	56%	19%	5%	12%	4%	12%
	500 or more ha	20	44%	20%	57%	20%	28%	19%	6%	14%

Table 25 Forest products harvested from PNF from 2007 to March 2017

What products were made from the logs harvested on your property?		n	% Commercial fire-wood	CI	% Fencing products	CI	% Saw-logs	CI	% Poles/girders	CI	% Other	CI	% Don't know	CI
Northern NSW	All landholders	127	11%	6%	39%	9%	65%	8%	60%	9%	29%	8%	17%	7%
	Net native forest area	127	12%	6%	40%	9%	83%	7%	61%	9%	42%	9%	17%	7%
Size of PNF	25-49ha	23	11%	14%	9%	14%	44%	19%	76%	17%	24%	17%	13%	15%
	50-99ha	32	0%	8%	60%	16%	58%	17%	37%	16%	24%	15%	16%	13%
	100-249ha	24	20%	16%	44%	19%	79%	17%	80%	16%	32%	18%	21%	16%
	250-499ha	26	16%	15%	37%	18%	93%	12%	59%	18%	46%	18%	12%	14%
	500 or more ha	22	15%	16%	47%	20%	86%	16%	36%	19%	40%	19%	27%	18%

Motivations for selling timber from private native forest

Landholders were asked to describe their motivations for selling timber from their forest. Responses to this question have been analysed by landholder only, not by native forest area managed, as the question asked for descriptive text responses. When asked about their motivations for harvesting timber from their forest for commercial sale, the most common motivations reported by the 139 landowners who responded were:

- Financial return (n=80)
- Forest and property management purposes (eg. silvicultural management, road improvements, use of section of productive land) (n=73)
- Availability of a harvest contractor or a need to fill a timber order (n=18), and
- Being approached by a harvest contractor (n=6).

When discussing financial return related motivation, many landholders simply indicated that the need for money or income motivated them to harvest at a given time. Others described more detailed financial motivations including a need to reduce debt, to increase income during a period of drought, or to earn income to help cope with low cattle prices:

“I wanted to reduce debt”

“Financial [need] due to severe drought”

“Cattle prices and returns low, need [to harvest] for cash flow injections”

Others had a longer-term plan for commercial forest management as an integral part of their property management and business strategy. For these landholders, commercial timber harvest provided supplementary income to support other parts of the business enterprise such as the purchase of new properties, and overall costs of property management, or their longer term retirement plans:

“We selectively log our forest all year round as an additional income to beef farming on other properties.”

“Timber due for harvest in this area of the property. [Area is] now replanted & regrowing for the next cycle. Income useful to assist purchase of additional forest properties.”

“[Harvesting is] always a part of our overall property income scheme. I put a lot of time and money into controlling weeds and fire hazards and need to get some income to pay for these management processes. Also a part of our superannuation plan.”

Others focused on silvicultural and ecological motives for harvesting. In particular, the motivation for some forest owners to harvest was to enable them to undertake silvicultural treatments to encourage growth of remaining trees:

“The forest needs thinning out because it is overgrown and choking itself, and tree growth has slowed”

“The land not been harvested of a long long time. It need some clearing to allow young trees to grow and provide wood products for the community and also to having a small income.”

“It has been long-standing family policy to harvest about every 10 years, removing selected mature trees to allow younger trees the space to mature”

“We do not harvest; we selectively log. The growth of timber said it was time. Now we have more coming on as they have room.”

Several landholders identified that the benefits of harvesting for their overall property management needs motivated timber harvesting:

“Reduction of weeds and bushfire risks”

“[Harvesting is] a way of getting roads/tracks improved and drained”

Other landholders were concerned about the potential for government to change the rules and restrict harvesting in the future, and this motivated them to harvest:

“We'd had a PNF PVP for some time and were concerned that maybe regulations would change before we could do a harvest”

“Needed the money & worried about not being able to log in the future”

An invitation from a harvest contractor, or the availability of a contractor within the local surrounds, was also an important motivator for some, while others have integrated businesses (ie. forest properties, harvesting capacity, sawmills) and needed the logs to fill contractual obligations:

“Approached by harvesters who were operating in the area”

“Contract available to perform selective harvesting of both high and low grade trees at a desirable time frame”

“The need for logs to keep our little family mill operating”

“1 tree here 1 tree there sawn at the stump for orders”

For some, trusting the contractor was integral in the decision to harvest:

“A local lumberjack contacted me and explained the opportunity, benefits of tree thinning and how he would look after the activities. He was trustworthy and sincere.”

“Find the contractor who will do the harvest in a manner in accordance with my plans for the future”

The decision to harvest is driven by multiple motivations. While earning income is a key part of this, and may drive a decision to harvest during a time of financial stress, for most landowners financial return was one of multiple considerations which also included views about forest health, tree growth, and the availability and attitude of forest contractors.

Arranging private native forest harvesting

Landholders who had undertaken commercial timber harvest in the last 10 years were asked how they arranged and managed their most recent harvest. While the large majority of landowners relied heavily on harvest contractors to arrange and undertake harvest activities, only 50% of landholders who had harvested (managing 40% of the total forest area⁵) had entered into a written timber sale agreement or harvesting contract for the harvest operation (Figure 27, Appendix D Table D11).

Landowners reported that harvest contractors were the main organisers of not only operational tasks such as development of the harvest operational plan and associated tree and boundary marking, but also financial and administrative tasks such as preparation of a written contract, collection and distribution of payments and the marketing of wood products. In around 6-10% of cases forest consultants were involved in the planning and management of harvest; sawmills were reported as being involved in collection/distribution of payment, marketing of products and preparation of timber sale agreement in 12-16% of cases, and were rarely involved in other aspects of harvest (see Error! Reference source not found.).

Landowners who managed smaller areas of forest (25-99 hectares) were significantly more likely than those with larger areas of forest to use a harvest contractor to arrange many aspects of harvest, including preparing plans, selecting contractors, preparing timber sales agreements and harvest contractors, marketing products, supervising the operation, and collecting and distributing payment (Appendix D Table D12).

There were few differences in how landowners organised and managed harvest operations in different regions (Appendix D Table D12). Northern Tablelands landowners were more likely than those in other regions to report they had prepared the forest plan of management themselves (83%, managing 91% of the total forest area, compared with 47% all landholders managing 66% of the total forest area), and significantly less likely to use a harvest contractor to undertake this role than other landholders (13%, managing only 2% of the total forest area, compared with 42% all landholders managing 21% of the total forest area). They were also more likely to actively monitor and supervise the harvest themselves (87%, managing 95% of the total forest area, compared with 47% of all landholders managing 57% of the total forest area). Landholders in the Hunter were significantly less likely to use harvest contractors to prepare a timber sale agreement or harvest contract (21%, managing 13% of the total forest area, compared with 54% of all landholders managing 36% of the total forest area), or to supervise/administer activities (20%, managing 16% of the total forest area, compared with 48% all landholders managing 28% of the total forest area). Landholders in the Hunter were more likely to undertake their own post-harvest assessments (71%, managing 71% of the total forest area, compared with 42% of all landholders managing 59% of the total forest area), and least likely to use harvest contractors for this role (16%, managing 20% of the total forest area), compared with 43% of all landholders managing 24% of the total forest area). See Appendix D Table D12 for further detail.

⁵ In this section, 'total forest area' refers to the total area of native forest managed by those landholders who had undertaken some timber harvesting. Note that the harvest would usually have been of part, not all, of the native forest they managed.

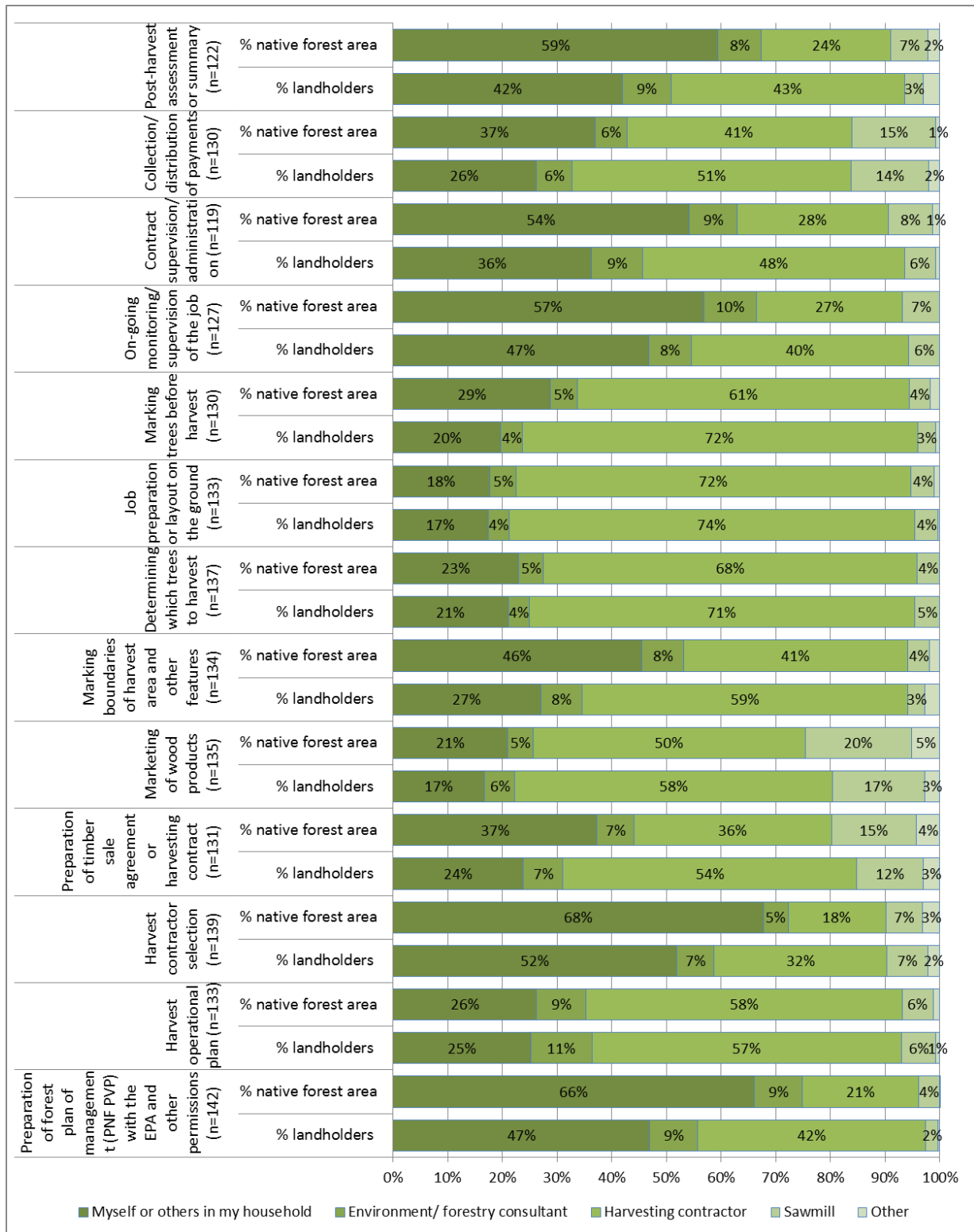


Figure 27 Who mainly arranged the following for your most recent native forest harvesting operation?

5.2. Experience of forest harvest operations

The majority of landholders (also managing the majority of the total forest area) reported that their most recent native forest harvest was a positive experience overall (Figure 28 and Appendix D Table D6): three quarters or more were satisfied with the way the harvest was planned prior to the operation, condition of remaining trees in the forest, trees selected for harvest and the payment process.. Between 70% and 75% (managing between 78% and 83% of the total forest area) were satisfied with the way the harvest contractor interacted with neighbours and others, the financial outcome, condition of harvest/skid trails and log dumps/landings, the way their forest contractor looked after the harvest, and overall condition of the forest after harvest. Fewer – 55% of landholders, managing 70% of the total forest area - with 33.1% of landholders dissatisfied.

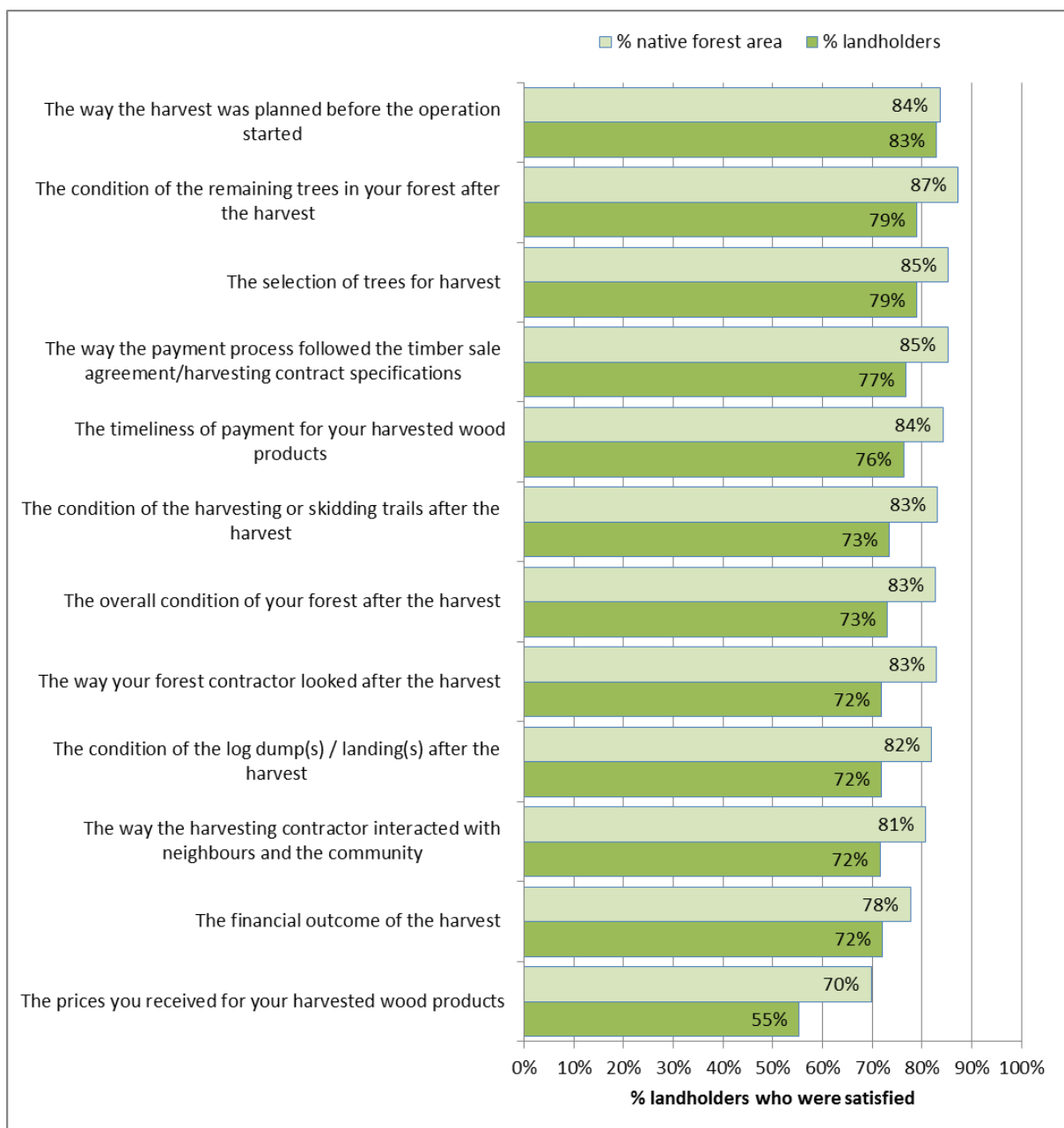


Figure 28 Satisfaction with most recent native forest harvest operation

When asked to write comments about their harvest experience, while some landholders were satisfied with the financial outcome, others were concerned about the returns given the investment in value-adding the forest

“Very beneficial to my budget”

“Very hard to know the outcome as I invested so much in value adding and paying for logging/It took years to be sold ... But overall I think it was profitable”

Landowner’s knowledge about forestry operations and the variation in prices offered by contractors contributed to concerns about financial returns:

“Price offered by contractors can vary greatly.”

“Didn't discover at commencement that some sawmills were offering different (higher) prices on some species. More market research should have been done”

“A challenging process. Unless you are on the spot and harvest regularly, how do you ascertain a fair price?”

“I have no idea what my timber is worth so I am totally at the mercy of the timber harvesters”

Some landholders reported problems with delays in payment: some were not paid at all or paid for only some of the timber harvested from their property:

“Not paid”

“I was not paid for all loads taken off my property”

“The harvest was staggered over a couple years. Unfortunately the first contractor disappeared and we didn't get paid. The following contractor was OK, and we did eventually get paid.”

“[The] logging company was extremely difficult to deal with. Logging started in Sept 2015 and now in March 2017 we still have not received final payment. We had to visit the logging company many many times before any payment was made.

These difficulties in understanding the value of timber, and experiences of poor treatment of landowners by forest contractors, prompted one landholder to call for more regulation and support for private native forest owners. Other landholders had positive experiences with their forest contractors and/or forestry consultants, including their ability to effectively interpret government rules:

“Logging companies need to be regulated. There should be an independent valuation of the timber so people do not get ripped off. We would never have any more timber harvested from our property as the experience has been very stressful.”

“[You need to] know how to find a good logger who will neither rip you off or his workmen stealing logs (cut into fence posts) from you, plus other items from property.”

“The contractor we choose was very good and treated the forest very well and paid top price.”

“Timber management/ harvesting is a complex exercise and many rules and codes are bent for mostly good reasons. This leaves us with liabilities that restrict other processes. If government hasn't been as much problem as expected it is because the [government representative] on the ground was "reasonable".”

Despite their overall positive rating when asked to rate satisfaction, when writing comments several landholders had mixed views about how the property was left following harvest operations:

“Happy with the roadworks completed but unsatisfied with the mess left by the operator and the aesthetics of the native forest afterward.”

“Left a lot of rubbish and logs on the ground. I worry about fire risk. I would not be keen to log again unless I financially need to.”

“Could not be happier with the way the forest, tracks and grazing paddocks were looked after.”

“... We have tracks down most spurs and ridges for mustering and management. Contractors tend to rehabilitate these tracks, leaving tree heads, which we have to clear to use the tracks again.”

Landowners were asked whether the overall reaction to their most recent native forest harvest operation from neighbours or community members was negative, positive, mixed or if they were unsure. While 43% of landholders (managing 47% of the total forest area) reported there was a positive response and only 7.5% of landholders (managing 5% of the total forest area) a negative response, 38% of landholders were unsure of their neighbour's reaction (see Appendix D Table D7). Female landholders were significantly more likely to report they were not sure how neighbours/community members felt about their harvesting activities (66% of female landholders compared to 38% of all landholders), and were significantly less likely to report positive reactions (12% of female landholders compared to 43% of all landholders who had harvested) (Appendix D Table D7).

Given the significance of harvest contractors in ensuring a harvest operation that is satisfactory, it is important to understand how landowners select their harvest contractors. Figure 29 shows that a large proportion of landholders used recommendations from friends, neighbours or relatives to select a harvest contractor (45% of landholders, managing 34% of the total forest area), identified a harvest contractor working locally (37% of landholders, managing 24% of the total forest area) or were approached by the harvest contractor directly (30% of landholders, managing 21% of the total forest area). Very few landholders used consultants (10%, managing 12% of the total forest area) or advertising (5%, managing only 3% of the total forest area) to select their harvest contractors. While only 13% of landholders indicated using the same harvesting contractor they used before, these landholders manage a large proportion (32%) of the total forest area.

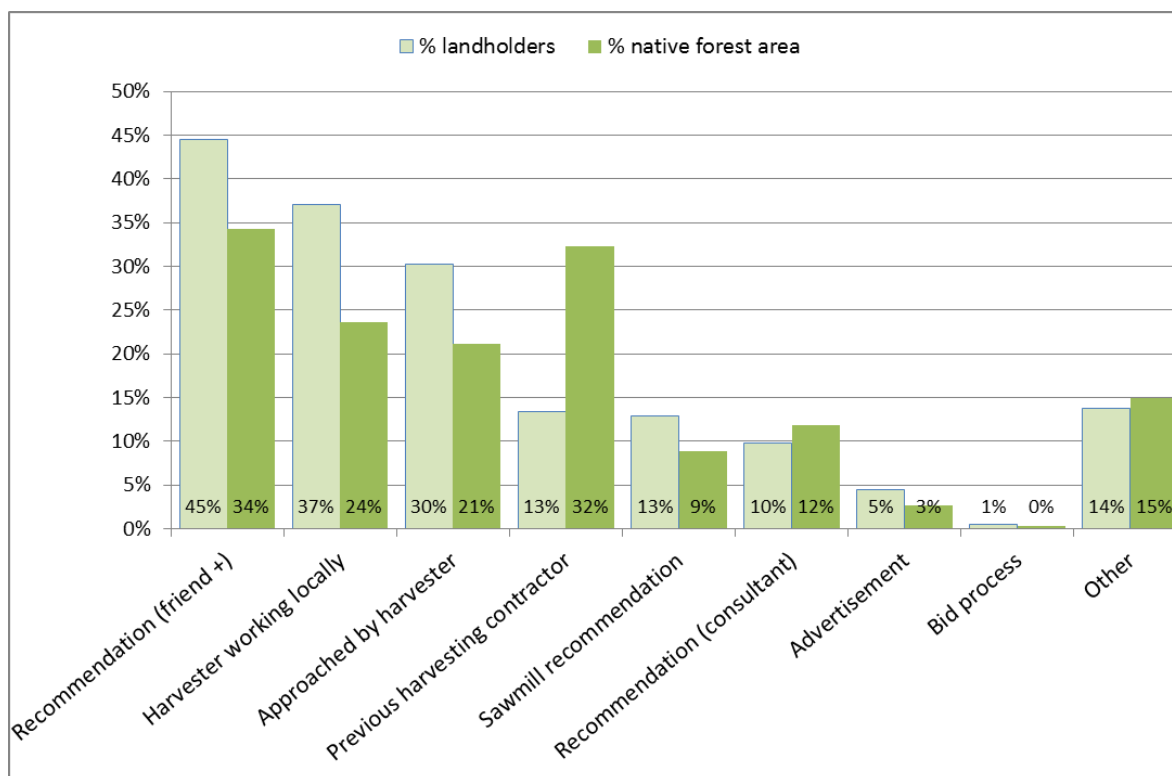


Figure 29 How did you choose your harvesting contractor for your most recent native forest harvest operation?

There was some variation in how different categories of PNF owners selected their harvest contractors (Appendix D Table D8). Landowners managing a forest area of 25-49 hectares (67.7%) were significantly more likely to select a harvest contractor based on the fact they worked locally (compared to 37.1% of all landholders). Landholders with commercial farming experience were significantly less likely to use contractor already working in the area (15.8%). Those with 50-99 hectares (32.3%) or have commercial farming experience (40.1%) were significantly more likely to be guided by sawmill recommendations (compared to 12.9% all NSW landholders). Landholders with 250 hectares or greater were significantly more likely to select harvest contractors based on previous experience, using the same harvesting contractor they had worked with before (Appendix D Table D8). Landowners who used their native forest for both commercial and non-commercial purposes were significantly more likely to use recommendations from a friend, neighbour or relative (81.9%) or a sawmill (49.1%) than other landholders (44.5% and 12.9% of all landholders respectively) (Appendix D Table D8).

Overall 71% of landholders (managing 85% of the total forest area) indicated they would be willing to work with their most recent harvest contractor again, with 17.0% not willing and 11.8% unsure (Appendix D Table D9). Similarly 70% of landholders (managing 83% of the total forest area) would recommend their most recent harvest contractor to other native forest owners, while 17.9% would not be willing to recommend them and 12.2% were unsure (Appendix D Table D10). Landowners in the Hunter region were significantly more likely to indicate that they would not use the harvest contractor again (46%, compared to 17.0% across all landholders), however these landholders manage only 15% of the total forest area. Landowners with commercial farming experience (43%) were also more likely to indicate that they would not use the harvest contractor again (Appendix D Table D10). Those owners that

use their private native forest for forest harvesting purposes were significantly more likely to use their harvest contractor again (89%), whereas only 38% of native forest owners who primarily use their forest for conservation/environment purposes, and 36% who use the PNF for other purposes, but had undertaken harvesting activities, indicated they would use the harvest contractor again (71% of all landholders managing 85% of the total forest area) (Appendix D Table D9). Similarly those forest owners who use their forest primarily for timber harvesting were significantly more likely than other forest owners to recommend their harvest contractor to other native forest owners (see Appendix D Table D11).

Reasons provided for not wanting to use a harvest contractor again or recommend them to another landowner included issues of dishonesty, difficulties with contractor management, poor payments and the poor state of the forest following the harvest activity:

“He ripped me off, lied and stole items of property”

“Because I found out he removed timber from my property for his own personal gain (it was not paid for)”

“Very untrustworthy and difficult to deal with”

“Poor communication, failed to follow instructions”

“They said the timber was worth a certain amount and we got less than a third of his estimate”

“Due to mess left and request to wait for payments.”

When landholders who had previously undertaken harvesting activities were asked whether they would change how they undertook a future harvest activity three core themes emerged: i) many (44.7% of 76 landholders who answered the question) would make no changes, ii) several would change the management of the harvest process and iii) some would change the harvest contractor.

Many landholders indicated that they would like to have more control over the harvest operation, to ensure a better quality outcome, and to save money:

“I will make sure that I manage the operation, have a clearer assessment of which trees to cut or not to cut, select and manage the buyer of the timber, marking boundaries, oversees the falling of trees to collection of payments and finally have a post-harvest assessment/summary of the works taken and evaluate its value and compare to conservation expectations or standards. Minimum third party supervision is necessary as it will cost more than the money one can get out of the harvesting of the logs.”

“I'd do it myself to cut out the middle man.”

“I would want more knowledge and take more control over what was taken and what was left”

“Possibly mark overall area from which trees may be harvested on a map as well as describe in writing. Mark particular trees I want left as well as the boundary area trees. Obtain written information on roadworks to be carried out for logging trucks and

improvements to existing roads. Seek greater clarification of attitude of sawmill representatives to so called 'useless' trees so that their philosophy and mine more closely align."

Others would undertake more research prior to harvesting and change the process to enable a better alignment with personal values and financial outcomes:

"Partial payments to be made at various agreed stages of the operation, instead of the one total payment made a number of months after the completion of the operation."

"Research export markets more thoroughly"

"I would want more knowledge and take more control over what was taken and what was left. Ideally I would like to manager the forest to the benefit of the environment, nature and animals."

Some landowners had more than one property and were asked whether they would have answered the survey questions differently for their other property/properties. Responses highlighted the importance of different environmental and social characteristics of properties, with some more or less suited to forest operations:

"Two very different forests and properties. One grazing with young regrowth not yet commercial (the one the survey is completed for). Another property with forestry with FSC"

"Forests are like the soils they grow on, very complex, diverse and [so] present very different values both environmentally and financially"

The location of properties is also important, with landholders indicating that the local government area influences forest harvesting potential:

"In my other areas of ownership local town planners know very little about timber"

Landowners also like to use different properties for different purposes, economic, social or environmental:

"Different properties have different management considerations, some are integrated with cattle &/or timber plantation operations, some are not."

"On this property, the steep terrain makes it difficult to make a viable proposition out of forestry. On another property, it was viable (and extensively logged prior to purchase). Overall, I'm happy to leave this property as conservation and family enjoyment. I do NOT want to tie it up in red tape or strip-mine it for profit."

"If we find a simple and secure long-term (25 year) option for biodiversity income we would access it as an asset to improve the property value. But it is very important to us to "hand-on" the land to the next generation of private landholders (not big companies or government) so they can continue to grow culturally and spiritually. We have already sold our main forestry property (approx. 330Ha) to a young rural family who are continuing to manage it for similar values."

Landowners who had PNF PVPs were asked whether they had undertaken any timber harvesting and, if they had, were asked to detail their experience of timber harvest. This provides further information that can assist in understanding when and why landholders decide to harvest timber for commercial sale. This section analyses only PNF PVP holders.

6. Views about forest certification

Forest certification is a global forest governance approach developed to improve the sustainability of commercial forest management practices. Although well adopted by large scale forest management organisations, including government, forest certification programs are rarely adopted by private forest owners. Given the vast tracts of forest under the management of private forest owners across both Australia and the world, this represents a significant challenge and opportunity for forest certification programs. In this study we aimed to develop an understanding of NSW private forest owner's knowledge of forest certification, barriers to becoming certified and intent to certify.

As found in other studies (eg. Dare and Eversole 2012), NSW PNF owners had very low recognition and understanding of forest certification, either the Forest Stewardship Council (FSC) or Australian Forestry Standard (AFS) (Figure 30). Those with professional forestry experience were significantly more likely to have heard of forest certification programs, although such experience did not always expose respondents to forest certification with only 51.1% of respondents with professional forestry experience having heard of FSC certification (Appendix E Table E1), and only 48% had heard of AFS certification (Appendix E Table E2). Respondents with a university degree were significantly more likely to have heard of FSC certification, with 51.7% having not ever heard of it compared with 67.2% of all NSW respondents (Appendix E Table E1), although this was not observed for AFS certification.

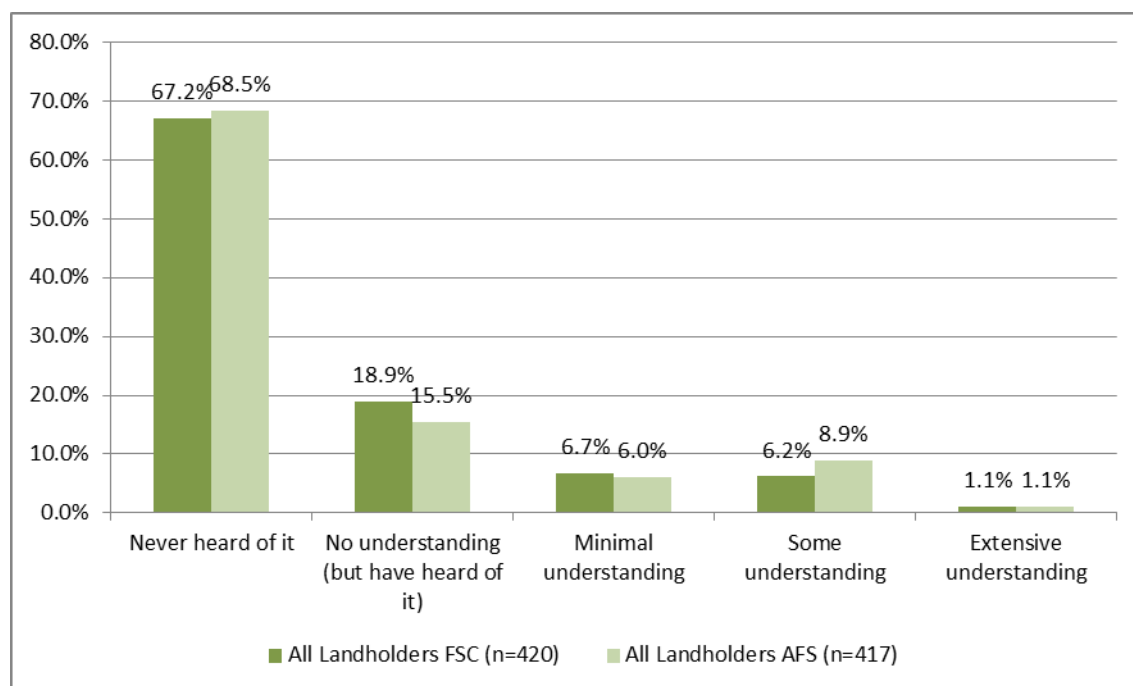


Figure 30 Knowledge of forest certification

Owners of properties used for forestry purposes were significantly more likely to have heard of both FSC and AFS certification than all NSW landholders, non-commercial/residential and agriculture properties (Appendix E Table E1 and E2). For AFS certification, those with a PVP were significantly more likely to have heard of AFS certification, with only 52.9% having not heard of it compared with 68.5% of all NSW landholders and 70.5% of non-PVP holders.

Understanding what inhibits private forest owners from certifying their forest helps to better design certification programs and incentives. Figure 31 (see also Appendix E Table 3) details what influenced survey respondents decision to certify or not certify, recognising that many respondents had not heard of forest certification before undertaking the survey and hence there was a high number of forest owners responding ‘don’t know’.

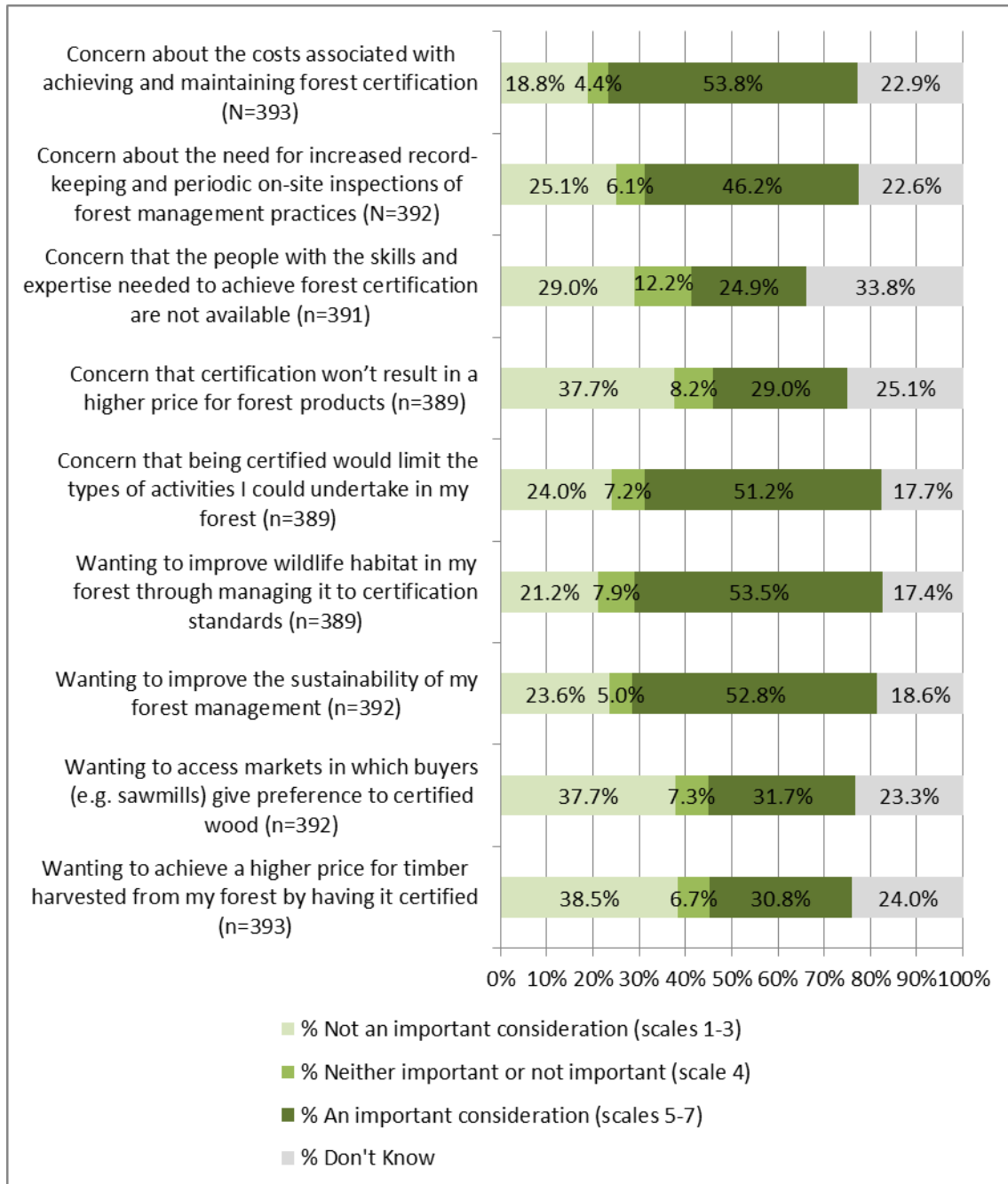


Figure 31 Influences to adopting forest certification (all respondents)

A majority of landholders indicated that the potential costs of certification influenced their decision to certify or not to certify (53.8%), as well as concerns that certification would limit the activities they could undertake in their private native forest (51.2%). Others identified the potential benefits of certification as being important considerations, including wanting to

improve wildlife habitat in their native forest (53.5%) and the sustainability of their forest management (52.8%).

When explored by PVP status (Appendix E Table 3), significant differences can be observed with PVP holders seeing ‘wanting to achieve a higher price for timber harvested from my forest by having it certified’, ‘wanting to access markets in which buyers (e.g. sawmills) give preference to certified wood’ and ‘concern that certification won’t result in a higher price for forest products’ as a significantly more important consideration than NSW landholders.

Further breakdowns on differences across various categories of respondents can be found in (Appendix E Table 3).

Private native forest landholder are highly unlikely to seek forest certification in either FSC or AFS programs (Figure 32), with approximately 7% of respondents likely to seek certification in either scheme and only 1.7% already certified to the FSC standard and 1.4% certified to the AFS standard.

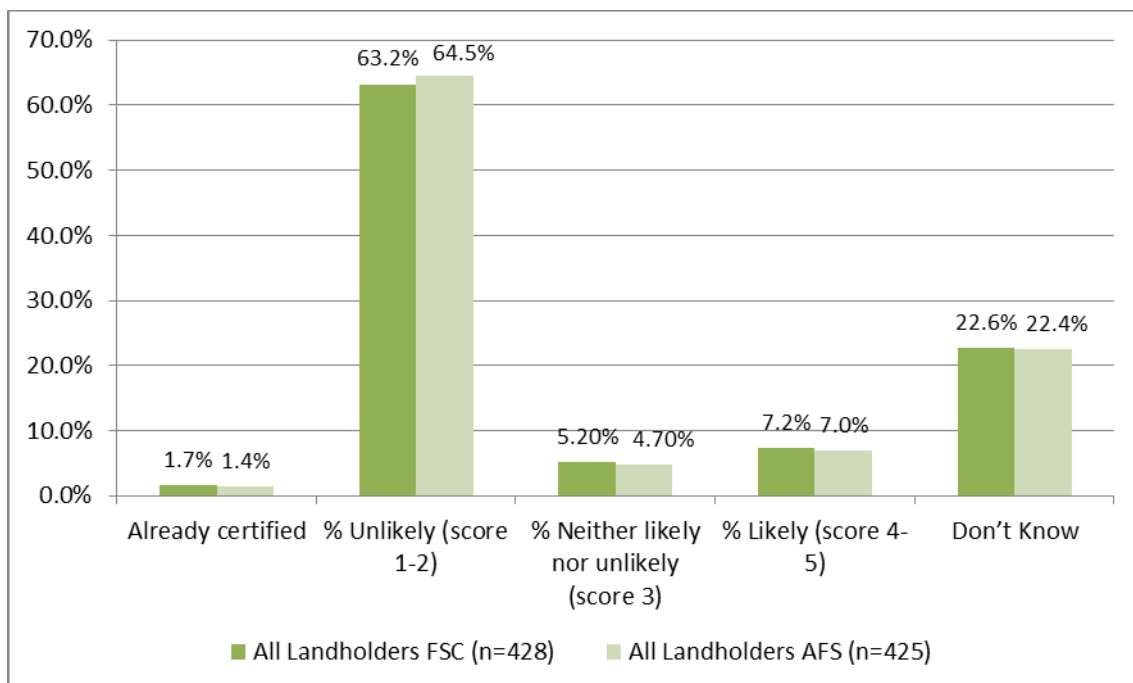


Figure 32 Likelihood to seek forest certification (all respondents)

Further highlighting the challenges of increasing the area of certified private native forests, the majority of private forest owners do not know what they would be willing to pay for forest certification (52.7% - noting that most respondents had not heard of certification prior to completing the survey), with a further 35.8% not willing to pay anything for forest certification (Figure 33).

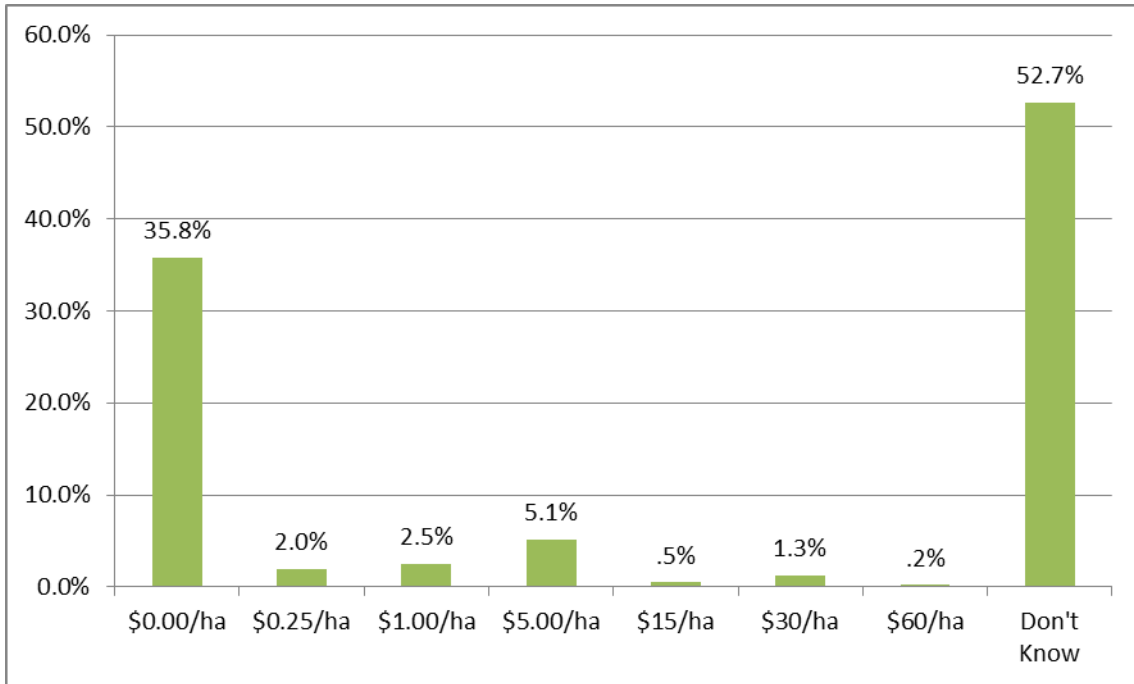


Figure 33 Highest amount willing pay per hectare per year for forest certification (all respondents)

7. Health and wellbeing

A person's health and wellbeing is both an important factor influencing how they manage their land, and something that is influenced by what happens on the land. However, a person's health and wellbeing is influenced by many factors, ranging from the quality of their relationships with close family and friends, to their standard of living, feeling of safety where they live, and confidence in the security of the future. This means that in many cases, even though health and wellbeing may influence how a person manages their land, it may be difficult to observe this relationship due to the many other factors affecting wellbeing.

Appendix C provides details of the health and wellbeing of the NSW landholders surveyed. Overall, their health and wellbeing was very similar to that identified in comparable surveys.

When asked about their satisfaction with their life as a whole, a common measure of subjective wellbeing, the mean score was 8.1 out of a possible range of 0 to 10. This is higher than the rural Australian average of 7.1 (Schirmer et al. 2016), but is relatively typical of older farmers, who were shown by Schirmer et al. (2015) to typically report wellbeing scores that are 0.5 to 1 point higher than other rural Australians. There were no significant differences between those with and without PVPs or in different regions. As is typical of the Australian population, older people and women reported higher satisfaction with their life as a whole. Those reporting lower income also reported higher satisfaction, likely reflecting that these are typically those who are older.

When examining native forest uses, there was one significant difference: those who managed their native forest for non-commercial uses only (e.g. residential, recreation or conservation with no commercial uses also implemented) reported significantly lower life satisfaction (a mean of 7.7 with a confidence interval of ± 0.4) compared to those who used their property for mixed non-forestry uses that included both commercial (usually agriculture) and non-commercial (recreation, residential) activities (mean of 8.5 ± 0.2). Those who managed their native forest for current or future timber harvest had life satisfaction very similar to the average (mean of 8.1 ± 0.4).

When asked about their satisfaction with their standard of living, there were almost no significant differences across different groups of landholders: satisfaction was generally high with a mean score of 8.2 out of a possible range of 0 to 10, and was similar for those who managed their private native forest for non-commercial uses only (7.9 ± 0.4), for current/future timber harvest (8.2 ± 0.5), and those who had mixed commercial and non-commercial use that did not include timber harvest (8.4 ± 0.3).

When asked about their satisfaction with 'what you are currently achieving in life', a measure that is typically a useful predictor of overall positive psychological outlook, there was a similar pattern: most landholders were satisfied (mean of 7.7 ± 0.2), those using their private native forest for non-commercial uses reported slightly lower scores but the difference was not significant (7.3 ± 0.4), those with current/future timber harvest activities were similar to the average (7.7 ± 0.5), and those with mixed non-timber commercial and non-commercial activities had slightly but not significantly higher scores (8.1 ± 0.3).

There were fewer significant differences between different groups of respondents when they were asked their level of satisfaction with their personal relationships, how safe they felt, their future security, and feeling part of their community. This suggests that those who manage their private native forest for different purposes are not significantly more or less likely to feel part of their community or have confidence in their future.

When asked about their level of satisfaction with their health, overall satisfaction was slightly lower, with an average score of 7.5 ± 0.2 out of a possible range of 0 to 10. Women were significantly more satisfied (mean of 8.2 ± 0.3) than men (7.2 ± 0.3). When examining native forest uses, those who managed their native forest for non-commercial uses only reported significantly lower satisfaction with health (a mean of 6.7 ± 0.4) compared to those who used their property for mixed non-forestry uses (mean of 8.1 ± 0.3). Those who managed their native forest for current or future timber harvest had life satisfaction very similar to the average (mean of 7.8 ± 0.5). This suggests that health may have an influence on how landholders choose to manage their property, with commercial use less likely amongst landholders with poor health.

Survey participants were also asked 'how would you rate your general health' and could rate their general health as excellent, very good, good, fair or poor. This 'general health' measure is widely used in multiple studies as has been validated as a good indicator of health status in studies that have compared answers to objective measures of a person's health (De Salvo et al. 2006). The sample of landholders showed expected patterns of different in general health. Overall, 53.4% reported having very good or excellent health, 34.8% good health and 11.8% poor or fair health. Women reported significantly better health than men, and those aged 70 and over reported poorer overall health than those in younger age groups, as did those with lower levels of educational attainment (see Appendix C for detailed data). While the mean scores were very similar for those who used their property and native forest for different purposes, there were differences in the proportion reported different health:

- Those managing their property for forestry use more often reported very good and excellent health (60.7%) compared to those using their property for non-commercial uses only (45.5%) or for agriculture or other non-forestry commercial purposes (54.9%)
- Those managing their native forest for non-commercial use only were less likely to report having very good/excellent health (49.6%) and more likely to report fair/poor health (17.6%) while those managing their native forest for current/future timber harvest were less likely to report having fair/poor health (9.0%), and those managing forest for mixed uses were both more likely to report very good/excellent health (61.2%) and less likely to report poor/fair health (7.5%)

This again suggests that an important factor that influences how land is managed is a landholder's health: those with poorer health are less likely to manage their private native forest for commercial uses of any type, including timber harvest. This is not a function of property size: people with poor health were not more likely to manage smaller properties, with no significant differences in the general health status of those managing different sized properties.

8. Discussion

This study explored how private native forest owners valued and used their forest, both now and into the future. Recognising the multiple demands on private native forests for the provision of biodiversity conservation, timber production, recreation and amenity benefits, the study identified private native forest owners intent to manage and use their forest for both timber harvesting and biodiversity conservation outcomes. Three key findings were found from this study, each of which is further described below:

- 1) Participation and interest in PNF is strong, particularly amongst larger landholders and in the North Coast LLS region.
- 2) Northern NSW private native forest is used for a diversity of purposes and outcomes
- 3) There are considerable barriers inhibiting Northern NSW private native forest owners entering into conservation agreements

8.1. Interest in PNF

The 'Northern NSW Private native forest owner attitudinal survey' found that 20% of private forest owners intended to 'gain money from selling timber' within the next ten years. These landholders manage close to one third (31%) of the region's private native forests. Of those likely to harvest their PNF in the next 10 years 15% (managing 21% of the total forest area) do not have a current PNF PVP, highlighting that landholder interest in PNF extends beyond those landholders with an existing PNF PVP.

In contrast to previous studies, this survey found only three factors that significantly influenced harvest intent: having a PNF PVP, professional forestry experience and locality. The area of private native forest, age, education, and duration of forest ownership/management, often found to be influencing factors, were not found to be a significant influence on harvest intent for Northern NSW private forest owners. While Northern NSW forest owners with larger private native forest areas were substantially more inclined to be interested in harvesting timber for sale, the difference across the private native forest area groupings was not statistically significant. Similarly, the study found that the higher the forest owner's income the less likelihood of undertaking commercial timber harvesting, but again the difference was not statistically significant for Northern NSW private native forest owners.

The location of the native forest was found to be an influencing factor, with private native forest owners in the North Coast LLS region significantly more likely to harvest their PNF within the next 10 years than forest owners in other regions. While nearly 36% of North Coast LLA landholders indicated they were interested in selling timber, they represent over 51% of the North Coast PNF area. Alternatively in both the Northern Tablelands and Hunter LLS

regions the majority of landholders (and with them the majority of PNF area) are not likely to sell timber in the next 10 years. The reasons for this are not determined in this study.

The presence of a PNF PVP, which supports and enables harvesting activity, also influenced the intent to harvest. This is not unexpected given that a PNF PVP is required in order to harvest native forest. Over 60% of PNF PVP holders (managing over 73% of PNF with a PVP) indicated they were likely to gain money from selling timber in the next 10 years. Also expected is the influence of professional forestry experience on harvest intent, with 55.1% of those landholders with forestry experience likely to sell timber from their PNF in the next 10 years, compared with only 20.5% of landholders with no prior forestry experience.

While individually few significant barriers to harvesting were identified, apart from difficulties with local government approval and unwillingness to enter into an agreement with government (eg. PNF PVP); when considered in-combination these barriers potentially become significant.. Governments seeking to reduce the barriers to timber harvesting could consider various communication, engagement and extension options that inform landholders about PNF harvesting, particular those not familiar with PNF or the timber industry (e.g. smaller landholders).

8.2. Private native forest is used for a diversity of purposes

As detailed in section 4.2, Northern NSW private native forest owners use their forest for a range of purposes. Native forest is often just another land use within a larger property entity. Its utility to the forest owner varies based on the owner's values and attitudes towards native forest management, and the benefits the forest can provide to the individual, their family and the farm enterprise or other business unit.

Given this multiple-use approach, private forests are often being co-managed for environmental and socio-economic outcomes. For example 50% of properties with a conservation agreement in place are simultaneously being managed for commercial timber harvesting. Similarly many properties managed for commercial timber production are also being managed for environmental outcomes, including improved water quality, soil conservation and hunting for pest control. This highlights that Northern NSW private native forest owners are comfortable with the notion of using their forested area for multiple purposes – that conservation and timber production can occur side by side providing environmental, social and economic benefits simultaneously.

Similarly, Northern NSW private native forest landholders harvest their native forest for a number of reasons, for financial gain to support the individual and/or the farm enterprise, to source on-farm timber (e.g. posts) and in many instances to improve the health of the forest and promote long term sustainable forest harvesting opportunities. Through timber harvesting operations landholders have been able to reduce debt, provide funds for broader property management activities including fencing and weed management. Harvesting has also enabled landholders' access into the forested area to simultaneously undertake stewardship activities including weed reduction and reducing bushfire risk through a reduction in fuel loads and improved road and track access. Many Northern NSW forest landholders expressed

the importance of timber harvesting in improving forest health, removing some trees to enable others to grow and provide an ongoing source of timber over generations. This integrated approach highlights that private forest management is complex and often opportunistic, with multiple values and objectives in play at any given time.

Recognising this complexity, Northern NSW private forest owners are quick to determine the trade-offs when considering the opportunities offered by timber harvesting or conservation agreements. As identified by Pannell et al. (2006), if the benefits (income, farm inputs) of engaging in these alternative management actions outweigh the costs (reduced grazing area, rehabilitation costs, aesthetics) and provide a relevant outcome for the landholder (eg. income, forest health, water quality), then they are more likely to undertake the activity. In light of this some forest owners are ready to explore the potential contribution of conservation agreements within their broader property management strategy:

"Please also note I would be willing to explore further opportunities to enter into conservation covenants over parts of other properties at varying rates, where I can mount a sound business case. E.g. I may be able to acquire properties in future that have a mix of values, and enter into conservation agreements over those parts of each property with high conservation values and low agricultural values (as well as possibly the establishment of wildlife corridors across the higher value agricultural land)."

This approach to forest, or indeed property, management is potentially beneficial for increasing the intent of private native forest owners to undertake timber harvesting activities and/or enter into conservation agreements. Raising the awareness of such forest management alternatives through the provision of credible and transparent information that outlines the potential benefits and costs may encourage forest owners to undertake timber harvesting or enter into a conservation agreement (see Pannell et al. 2006). Such information needs to be salient for private forest owners, and considerate of the many values and attitudes towards forest management that exists across the community.

8.3. There are considerable barriers inhibiting PNF owners entering into conservation agreements

Environmental stewardship on freehold property is important in the effective conservation of biodiversity. In NSW, the Biodiversity Conservation Trust has been established to support conservation on private land using three voluntary private land conservation agreements; biodiversity stewardship agreements (BSAs) that provide permanent protection and allow for the creation of biodiversity credits, conservation agreements (CAs) which are permanent or time-bound agreements and may provide stewardship payments, and wildlife refuge agreements (WRAs) which do not require a permanent agreement. This study found that a large proportion of Northern NSW private forest owners are not interested in engaging in these agreements, particularly long term agreements with nearly 50% of landholders expressing they would not enter into a conservation agreement that was in perpetuity. Payments of over \$200 per hectare per year were required to incentivise participation in such agreements, with lessor payments not attracting much interest from landholders. Even at \$200

per hectare per year a maximum of just over 21% of Northern NSW landholders (managing 24.3% of PNF) were interested in entering into a 10 year agreement.

It is important to recognise that a considerable number of Northern NSW private native forest landholders were uncertain about their intent to enter into a conservation agreement. Despite landholders identifying that they manage their forests for a diversity of outcomes, the notion of entering into an 'in perpetuity' agreement solely for environmental protection is seen as unduly constraining, with concerns about limitations on future land-use activities prominent. Other barriers to entering in a conservation agreement included issues of governance and a mistrust of the government to effectively manage the agreements over the long term, and a lack of available information about i) the agreements and the impacts and benefits of such agreements for their property, ii) likely costs associated with obtaining and maintaining the agreement, and iii) where further credible and impartial information can be sourced.

These barriers are important factors in influencing the adoption of conservation practices as identified by Pannell and colleagues (2006). Northern NSW private native forest landholders have expressed strong positive values towards the environmental services offered by their forest estates, including wildlife habitat, and the protection of water quality and control of soil erosion. These values indicate that conservation agreements are likely to be congruent with many private native forest landowners' values and beliefs, including those who also manage their property for timber harvesting. As identified previously, areas of private native forest are often managed as part of a larger property plan, entering into such agreements increases the complexity of the management and will have important trade-offs depending on the conditions of the agreement (eg. reduce grazing, reduced access to firewood and on-property timber). Given that landholders manage their forest for a diverse range of purposes, often simultaneously, the Biodiversity Trust needs to adopt a flexible and accommodating approach that recognises and accommodates landholder preferences, including the ability for multiple use options.

The Biodiversity Conservation Trust is a new program; as such private native forest landholders do not have sufficient awareness of the associated agreements and potential outcomes for their forest and property management. Given there is very little information currently available, there is a high level of uncertainty about the agreements and their relevance to property management objectives, and distrust of government and the formal conservation agreements that they are offering. Further information would help to overcome issues of distrust resulting from uncertainty and enable PNF landholders to make well-considered decisions about the suitability of conservation agreements for their circumstances.

9. Conclusion

Private native forests make up a large proportion of the NSW native forest estate, with nearly 50% of native forest in Northern NSW privately owned. Private forests are managed for a variety of objectives and contribute significant social, economic and environmental outcomes that benefit the forest owners and the broader society. As such there is a need to better understand private forest owner's forest management objectives. Using a quantitative survey, this study explored how private forest managers currently use and value their forest, the interest of private forest owners in harvesting timber from their forest, and the interest of private forest owners in entering into conservation stewardship programs.

The study found that 20% of landholders, managing 31% of the PNF estate were likely to harvest their forest in the coming 10 year period, with those landholders with larger areas of forest, a PVP or located in the North Coast LLS more likely to harvest their forest than others. Similarly a low proportion of landholders were interested in entering into a conservation agreement, with only 21.2% (managing 24.3% of forest area) of landholders interested in entering into a conservation agreement for up to 10 years at over \$200 per hectare per year payment.

The opportunity for a financial return was only one of multiple considerations when deciding to harvest. Landholders use their forests for multiple purposes, often providing environmental, social and economic benefits simultaneously. Forest owners are willing to explore various forest management arrangements within broader property management strategies. However, currently the limited availability of credible and transparent information that outlines the potential benefits and costs of available alternatives inhibits their capacity to make informed decisions, placing undue emphasis on the perceived risks of alternative forest management opportunities.

Further research is needed to develop a rich understanding of landholder concerns and needs, including their distrust of government agencies, and interaction with harvesting contractors. Such information would help to improve industry and government awareness of barriers to uptake of forest harvesting and/or conservation agreements, informing improved communications and engagement between landholders, government, industry and other stakeholders.

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