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Opportunities for Natural Capital Financing in Forestry

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Launceston Centre

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Opportunities for Natural Capital Financing in Forestry

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by

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1. Executive summary

This report assesses opportunities for natural capital financing as a source of funding for managing non-timber natural capital and the goods and services that flow (as ecosystem services) from forests to the economy and society. It is principally applicable to the Australian forest sector and uses the Tasmanian forest industry as a case study. We define 'natural capital finance' as the sub-set of sustainable finance that is directed specifically towards conservation, enhancement or maintenance of natural capital.

Forest operational decisions can have significant impacts—either positive or negative—on matters such as greenhouse gas emissions/carbon sequestration, nutrient cycling, water quality, air quality, and biodiversity, as well as timber production. Yet at present, only some forestry natural capital stocks and flows – principally standing timber and harvested wood products – are measured and explicitly valued by forest managers and investors.

This report describes the options for natural capital to influence balance sheets, cash flows or risk management through different financial mechanisms: equity, bonds, loans, public sector finance, philanthropy, environmental markets and insurance.

The identified opportunities do not all apply to the same types of forest or forest owner. The largest-scale opportunities relate to the growth in responsible investment demand for new privately-owned sustainable forestry assets, which could be combined with a sustainability-linked loan scheme; and the potential to issue a green bond for improved natural capital management of publicly-owned native forests. However, interventions aimed at small-scale private native forest owners could also have a large cumulative impact, due to the size of this sector in Tasmania. Typically, such interventions would require some degree of government or philanthropic support, possibly combined with new revenue streams from environmental markets. Examples that could be explored include working forest conservation covenants; developing an Australian Forest Resilience Bond; increased public funding for forest natural capital management; collaborative funding approaches to achieve landscape-level outcomes; blended finance; and new environmental markets.

Although each opportunity tends to have its own specific barriers, there are a number of generic actions that the forest industry can take to translate opportunities into reality. These include:

- Identify the natural capital benefits provided by forest estates.
- Implement natural capital accounting and/or risk assessment, where appropriate.
- Engage with researchers and government-provided tools and data.
- Communicate natural capital benefits to stakeholders.
- Understand current and future financial opportunities.
- Identify new investible projects, activities and assets with the potential to improve natural capital benefits.
- Develop an impact theory.
- Map to sustainable development goals.
- Engage with policy makers and regulators.
- Consider natural capital risk.

Governments can play an important role in coordinating action at the landscape level. Suggested actions include:

- Understand landscape scale responses to natural capital risk, such as bushfire management.
- Implement landscape scale natural capital accounting.
- Consider scale and connectivity benefits.
- Consider innovative ways of meeting scaling requirements, for example a cross-sectoral or even multi-sectoral approach.



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Acronyms

AASB	Australian Accounting Standards Board
ACCU	Australian Carbon Credit Unit
ANZ	Australia and New Zealand Banking Group
AUASB	Auditing and Assurance Standards Board
CDSB	Climate Disclosure Standards Board
CEFC	Clean Energy Finance Corporation
CSF	Climate Solutions Fund
CSR	Corporate Social Responsibility
ERF	Emissions Reduction Fund
ESG	Environmental, Social and Governance
FSB	Financial Stability Board
FSC	Forest Stewardship Council
FRB	Forest Resilience Bond
GDP	Gross Domestic Product
GIIN	Global Impact Investing Network
GRI	Global Reporting Initiative
IIRC	International Integrated Reporting Council
ISO	International Organization for Standardization
MIS	Managed Investment Schemes
NAB	National Australia Bank
NGO	Non-Governmental Organisation
NSW	New South Wales
PEFC	Programme for the Endorsement of Forest Certification
PES	Payments for Ecosystem Services
PRI	Principles for Responsible Investment
SASB	Sustainability Accounting Standards Board
SDG	Sustainable Development Goal
SEEA	UN System of Environmental Economic Accounting
TCFD	Task Force on Climate-related Financial Disclosures
TIMO	Timber Investment Management Organisation
TNFD	Task Force on Nature-related Financial Disclosures
UNEP FI	United Nations Environment Programme Finance Initiative
WFCE	Working Forest Conservation Easements

2. Introduction

Globally, environmental degradation is widespread, on the rise, and occurring across a broad range of landscapes (ELD Initiative 2015). Human activity has already pushed the planet beyond four of its nine safety boundaries as defined by Steffen et al. (2015), and megatrends including population growth and climate change (EY 2017) mean that pressures on natural resources are likely to increase into the future. Current levels of biodiversity loss and ecosystem damage have been estimated to cost 3% of global Gross Domestic Product (GDP), second only to violence and armed conflict growth, and this could rise to 18% by 2050 without considerable change in sustainability practices (Business and Sustainable Development Commission 2017).

In 2015, governments committed to two major initiatives to address these global sustainability challenges. The first was the Paris Agreement on climate change, which set out a global action plan to limit global warming by 2100 to well below 2°C, and to pursue best efforts to limit the increase to 1.5°C, calling for all countries to shift towards low carbon economies (United Nations 2015a). The second was the 2030 Agenda for Sustainable Development (United Nations 2015b), through which all United Nations (UN) member states agreed to achieve 17 Sustainable Development Goals (SDGs) by 2030, across a range of areas including sustainable use and conservation of ecosystems, climate action, poverty alleviation, improving health and education, and reducing inequality.¹

Achieving these goals will be expensive. Estimates of the total investment required to meet the SDGs are highly variable, but most agree that it will be in the order of trillions of dollars per year (United Nations 2013a). A combination of public, private, domestic and international sources of finance need to be mobilised to achieve these investments, recognising that each source of finance has different characteristics (United Nations 2013b). The term 'financing for sustainable development' refers to all of these flows of finance towards sustainable development objectives, whereas 'sustainable finance' generally refers to private sector flows, albeit often supported by public interventions or blended with sources of public finance. We define 'natural capital finance' as the sub-set of sustainable finance that is directed specifically towards conservation, enhancement or maintenance of natural capital – the stocks of natural assets (resources and ecosystems) that provide benefits to the economy and society.

Sustainable finance refers to “any form of financial service integrating environmental, social and governance criteria into the business or investment decisions for the lasting benefit of clients and society at large”.²

We define 'natural capital finance' as the sub-set of sustainable finance that is directed specifically towards conservation, enhancement, or maintenance of natural capital.

Increasingly, private enterprise around the globe is engaging in this challenge from two perspectives: to reduce risk associated with future policy directions and also to ensure that

¹ <https://sustainabledevelopment.un.org/> (Accessed 12 December 2019)

² <https://www.sustainablefinance.ch/> (Accessed 12 December 2019)

their business models are well equipped to capture the opportunities associated with achievement of the SDGs. Policy drivers include both government policy-making (at all levels, from international agreements such as those on climate change and biodiversity, down to local government planning and regulation) and voluntary self-regulation, as well as many hybrids between the two. Increasingly, taking climate change and other environmental risks into account is simply becoming a mainstream expectation for doing business. For example, legal opinions published by the Centre for Policy Development in 2016 and 2019 (Hutley and Hartford Davis 2019) stated that because climate-related risks are foreseeable for Australian businesses, company directors could now be found liable for breaching their duty of care and diligence if they fail to take action to address these risks. The Reserve Bank of Australia, the Australian Securities and Investment Commission and the Australian Prudential Regulation Authority have all issued statements and guidance over the past three years that indicate that there is now a general expectation from regulators that companies will take account of climate and sustainability risks and disclose relevant information to their shareholders and other stakeholders.³ Likewise, the Australian Accounting Standards Board (AASB) and the Auditing and Assurance Standards Board (AUASB) have jointly issued guidance (AASB and AUASB 2018) advising companies to investigate and disclose climate and other emerging risks in their financial statements. The recommendations of the Financial Stability Board (FSB) Task Force on Climate-related Financial Disclosures (TCFD) (2017), have been highly influential, supported by the Network for Greening the Financial System, representing 36 central banks and supervisors, and signatories to the Principles for Responsible Investment (PRI), representing US\$83 trillion of assets under management.⁴ There have been growing calls for an equivalent Task Force on Nature-related Financial Disclosure (TNFD) to be set up to provide authoritative international guidance on natural capital risks (Cooper and Trémolet 2019).

In terms of opportunities, the Business and Sustainable Development Commission (Business and Sustainable Development Commission 2017) has identified more than 60 market hotspots across four themes: agriculture and food, cities, energy and materials, and health and wellbeing. Just 15 of the 60 hotspots identified accounted for approximately 50% of market opportunities. Within the agriculture and food services sector, forest ecosystem services were ranked as the second highest opportunity, behind reducing food waste in the value chain. For example, if a carbon price of US\$50/tonne by 2030 is assumed, it is anticipated that major new opportunities would open in sustainable forest services such as climate change mitigation, protection of watershed services and biodiversity conservation, provided the mechanisms to fund them are developed. These types of calculations are probably underestimates as they do not reflect the cost of externalities, particularly the natural capital (the renewable and non-renewable natural resources such as soil, water, land, biodiversity) that forest and other primary enterprises rely on to produce goods and services (Truecost 2013).

Momentum has been growing in sustainable finance in response to these expectations, with overall market growth of 34% observed between 2016 and 2018 (Global Sustainable Investment Alliance 2019). The rise of new market instruments such as sustainability loans and bonds, and the growing integration of environmental, social and governance (ESG) and SDG reporting into investment processes as well as government decision making, suggests that opportunities will continue to grow, provided investor expectations around sustainability outcomes can be met (Business and Sustainable Development Commission 2017).

³ <https://www.rba.gov.au/publications/fsr/2019/oct/box-c-financial-stability-risks-from-climate-change.html> (Accessed 28 November 2019).

⁴ <https://www.unpri.org/news-and-press/tcfd-%20based-reporting-to-become-mandatory-for-pri-signatories-in-2020/4116.article> (Accessed 28 November 2019).

The forest industry plays a vital, front line role in the stewardship of natural capital and the goods and services that flow (as ecosystem services) to the economy and society. Operational decisions can have significant impacts – either positive or negative – on matters such as greenhouse gas emissions/carbon sequestration, nutrient cycling, water quality, air quality and biodiversity, as well as timber production. Yet at present, only some forestry natural capital stocks and flows – principally standing timber and harvested wood products – are measured and explicitly valued by forest managers and investors. For example, Australia’s national balance sheet includes approximately A\$10.2 billion in plantation assets and A\$1.8 billion in native forest assets (Montreal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013, Australian Bureau of Agricultural and Resource Economics and Sciences 2018). However, this significantly undervalues Australian forestry because it is limited to the available ‘standing timber’ market value, and ignores the value of the non-timber ecosystem services of forests, such as carbon sequestration, maintaining biodiversity, salinity mitigation, water regulation, soil retention, air quality, and recreation (Binner et al. 2017, Binner et al. 2018).

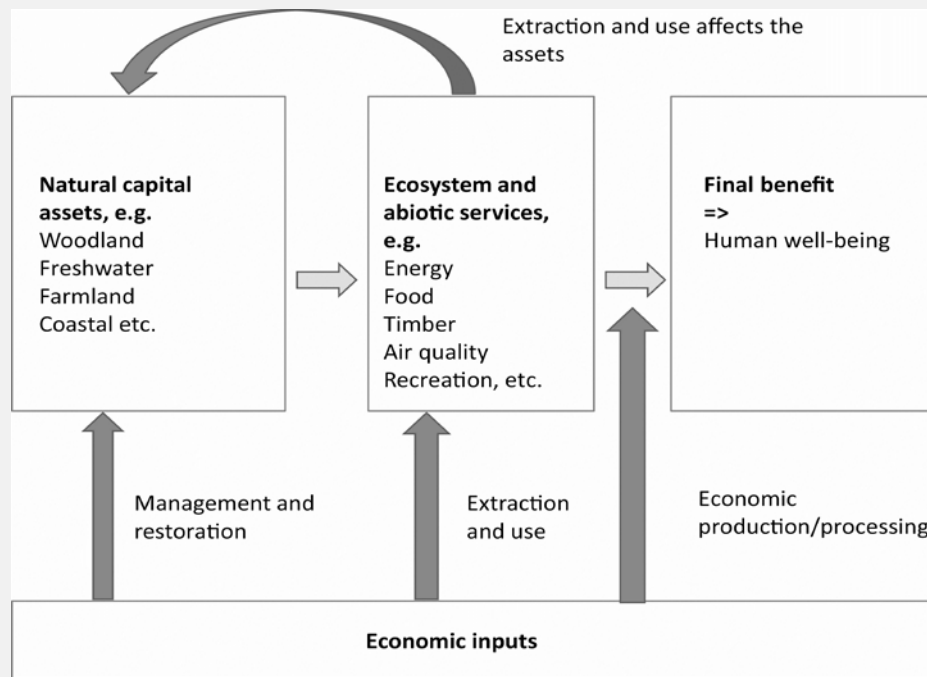
At the same time, countries such as Australia have regulatory expectations for sustainable forest management that are integrated into various policies, codes of practice and regional forest agreements and many commercial growers have third party certification that demonstrates they meet national and international sustainability standards in their management. From an investor perspective, this is attractive as it provides assurances around best practice management and potentially lowers associated financial risk. Yet it also means that, because Australian forestry is starting from a relatively high sustainability base, it requires innovative thinking about the additional sustainability activities and projects it can offer that will be attractive to the natural capital finance sector.

This report assesses the opportunities for natural capital financing as a source of funding for managing non-timber ecosystem goods and services deriving from production forests. For a range of financial instruments, it provides a description of the scope of the opportunity, the current investment trajectory, the sorts of activities/projects that are likely to be ‘in scope’, and requirements for demonstrating sustainability outcomes. Barriers to access are also discussed. The report intends to provide the background for a cross-sectoral workshop with the objective to encourage the development of new, innovative tools or instruments (or innovative ways of applying existing tools and instruments) to finance the sustainable management of non-timber ecosystem goods and services for the Australian forest sector, using the Tasmanian forest industry as a case study.

Natural Capital Definitions

The term natural capital refers to the stocks of assets provided by nature. These assets, for example, clean air, water, land, soil, and all living things, provide a range of services, often called ecosystem services, which deliver wellbeing to humans. The links between natural capital, ecosystem services and well-being are presented in Figure 1, with the associated economic interventions also highlighted.

Figure 1: Natural capital assets, ecosystem services and benefits



Source: (Bright et al. 2019)

Why is natural capital relevant to business?

All businesses impact on or depend on natural capital to some extent. Impacts are outputs from production processes, while dependencies are inputs to production processes (Natural Capital Coalition 2016). Significant negative impacts degrade or destroy valuable natural capital, beyond its sustainable replacement rate; while significant dependencies are usually those where the resource depended upon is non-renewable, used beyond its replacement rate, or threatened by other factors. Significant impacts and dependencies can manifest in various risks at a business level, for example, as increased operational costs, lower yields or productivity, poorer quality of products, an increase in regulatory requirements, or reputational damage. Thinking in terms of natural capital helps promote a more balanced view of the inter-relationships between business, society and the environment. Taking a natural capital approach can assist businesses to make better decisions by identifying risks and opportunities more effectively. Businesses can then develop strategies to protect and enhance the natural capital and ecosystem services that are important to them.

How do businesses manage natural capital?

Two complementary but distinct approaches have emerged in recent years. Both are based on the premise that measurement is the first step towards management. The first is natural capital accounting, which is generally backward-looking and concerned with measurement and valuation; the second is natural capital risk assessment, which is forward-looking and concerned with risk evaluation (Ascui and Cojoianu 2019). The current state of methods used under each approach is summarised below.

Natural capital accounting

There is widespread recognition from both government and businesses that natural capital needs to be measured and managed in order to maintain and enhance the values received from it into the future. Recently the term 'natural capital accounting' has found widespread use, both in government and business. Natural capital accounting, whether at the national or corporate scale, is about identifying changes in natural capital (stock of natural assets) and changes in the flow of ecosystem services and goods that these natural assets supply, and then

measuring the benefits or costs of those changes. For government, natural capital accounting represents an extension to the System of National Accounts, the UN standard system of macroeconomic statistics. For business, natural capital accounting or ‘corporate natural capital accounting’ is an extension of financial accounts, attempting to bring the structure and rigour to natural capital that is already applied to financial capital. Work is currently being undertaken at the national scale in the UN System of Environmental Economic Accounting (SEEA) and there are those that think such work will provide a structure or useful guidance for similar standards at the corporate scale (Obst et al. 2013, Obst et al. 2016). In April 2018, Australian Government and all states and territory governments agreed on a National Strategy to implement SEEA (Commonwealth of Australia 2018). The International Organization for Standardization (ISO) has recently released standards providing guidance for organisations on natural capital accounting (ISO 2019a) and monetary valuation of environmental impacts, releases and use of natural resources (ISO 2019b).

Corporate natural capital accounting attempts to meet the increasing requirement to bring the measurement of environmental assets and risks into mainstream corporate financial management. Unlike traditional accounting frameworks—which are well established and mostly mandatory—corporate natural capital accounting is a voluntary and flexible process. Currently, it is fair to say that corporate natural capital accounting is in a stage of experimentation and there are no global standards, although a variety of methods and frameworks are emerging in different areas. For example, those related to sustainability reporting include the work of the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB) and the International Integrated Reporting Council (IIRC); those related to climate disclosure include the Carbon Disclosure Project, the Climate Disclosure Standards Board (CDSB) and the FSB Task Force on Climate-Related Financial Disclosures; and those specifically working on corporate natural capital accounting frameworks such as the UK’s Nature Capital Committee, Office for National Statistics and Defra (Eftec et al. 2015).

Natural capital risk assessment

Approaches are likewise emerging for natural capital risk assessment. The business-led Natural Capital Coalition has produced a generic framework, the Natural Capital Protocol (Natural Capital Coalition 2016) to guide businesses undertaking assessments of their natural capital impacts and dependencies. A Forest Products Sector Guide (Natural Capital Coalition 2018b) has also been developed. These guides are flexible and non-prescriptive, in contrast with forest product certification schemes such as the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC). However, the objectives of both approaches overlap, and there is considerable potential for the measurement procedures and data required by certification to feed into relevant parts of a natural capital assessment.

The Natural Capital Protocol and Forest Sector Guide are aimed at individual businesses conducting internal assessments to inform their own decision-making. A similar guide for financial sector businesses has also been produced (Natural Capital Coalition 2018a). However, the financial sector’s direct exposure to natural capital is limited; its most significant exposure is secondary, via the companies that it invests in, lends to or insures. This implies a need for a different level of natural capital risk assessment, to inform financial sector decision-making. A variety of tools and guides have recently been developed to support this, including a guide to rapid assessment of natural capital dependency risks at portfolio level (Natural Capital Finance Alliance and PricewaterhouseCoopers 2018), supported by an

online tool, ENCORE⁵; and a transaction-level guide to undertaking natural capital credit risk assessment in agricultural lending (Ascui and Cojoianu 2019).

Sectors such as agriculture and forestry are characterised by a high degree of diversity across sub-sectors and geographies, which can result in significant differences in materiality of natural capital risks. This means that while generic approaches may serve to guide assessments, they often need to be tailored to more specific conditions at sub-sector/regional level. Developing a framework for natural capital risk assessment in Australian forestry will be the subject of a subsequent report by the authors.

⁵ <https://encore.naturalcapital.finance/> (Accessed 3 June 2019).

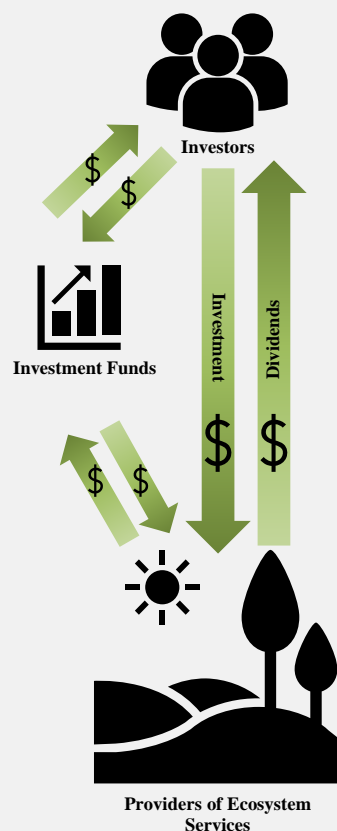
3. Financing Natural Capital

There are essentially three main ways in which natural capital can become more relevant to the financing of any business: through adding recognised value to the balance sheet; improving cash flows (for example by increasing revenue, reducing costs, or favourable tax treatment); or improving risk management, which has the potential to lower the cost of capital and thereby improve returns. These are not mutually exclusive: for example, a predictable new funding stream could simultaneously improve a company's cash flow, add to its valuation by an amount corresponding to the present value of future cash flows, and improve its credit rating, thus lowering its cost of capital.

Broadly speaking, natural capital accounting approaches are an attempt to measure the value of natural capital stocks (which could become balance sheet assets) or ecosystem services flows (which could become new revenues), while natural capital risk assessment approaches attempt to identify, evaluate and help manage risk.

However, any such accounting or risk assessment approaches will ultimately only translate into financial flows when economic actors begin to transact on the basis of these approaches, either voluntarily or if required by government regulation. In this section, we discuss the options for natural capital to influence balance sheets, cash flows or risk management through different financial mechanisms: equity, bonds, loans, public sector finance, philanthropy, environmental markets and insurance. In each case, we consider the key features of a natural capital approach, and the implications in terms of monitoring requirements.

3.1 Equity



Equity investment refers to the buying of shares in a company, either through a stock market ('listed equity') or privately ('private equity').

Investors can buy shares in companies directly or through investment funds. Investors only recover their money when they sell their shares to other investors, or when the assets of the firm are liquidated. Returns are generated through the increase in value of the company shares (capital gain) and/or the distribution of company profits as dividends. From the company's perspective, equity investment only produces new inflows of finance when new shares are sold to investors, for example at first listing on a stock market (Initial Public Offering) and subsequent share issuances.

Options for natural capital financing

- **Responsible investment** is the strategy and practice of incorporating ESG factors into investment decision-making and ownership. There are a variety of sub-types of responsible investment, including **ethical investment** (avoiding companies that are associated with activities considered unethical by the investor); **socially responsible investment** (screening potential investments according to social and/or environmental criteria); and **impact investment** (which seeks to promote specific social or environmental objectives in addition to achieving financial returns). Globally, assets worth over US\$30 trillion were managed under some form of responsible investment strategy in 2018 (Global Sustainable Investment Alliance 2019).
- **Sustainable forestry investment** is a sector-specific 'niche' within responsible investment. 93 out of 1,400 signatories to the PRI reported holding forestry investments in 2018 (Principles for Responsible Investment 2019).

Key features

- **Expectations of returns are higher for equity than debt.** Equity investment is high risk as the market value of a company can rise and fall and shareholders only have the right to residual profits once all of the company's other obligations have been met. Investors therefore require higher returns to compensate for that higher risk.
- **Nevertheless, some investors may accept below market-rate returns.** Although a market-rate return on investment is the standard expectation, some impact investors are willing to accept below market (concessionary) returns in exchange for positive social or environmental outcomes. The scale

of such investment is limited in comparison with investments that can offer commercial returns.

- **Need for consistent, comparable financial and ESG information.** Investors and regulators expect companies to provide decision-useful information in accordance with accepted accounting standards. Increasingly, this is also expected to include material ESG information.
- **Most institutional investment in forests is channelled through a Timber Investment Management Organisation (TIMO)** which acquires forest assets on behalf of the investors and then subsequently manages them, in return for a fee (typically 0.85%-1% of the value of the assets under management, plus a further 1% for property management, which may be outsourced or provided directly by the TIMO).⁶

Monitoring requirements

- **A vast range of voluntary frameworks for ESG investment appraisal exist.** Sustainable investment comes with the commitment to measure and report on social and environmental performance, however, currently this varies according to the type of investment, its objectives and the capacity for measurement. ESG impacts or benefits from the investment are often difficult to quantify. However, extensive guidance is available from organisations such as PRI and the World Bank/International Finance Corporation, which launched a set of voluntary principles for impact investing in 2019 (International Finance Corporation 2019). The Global Impact Investing Network (GIIN) has also produced a system for monitoring and measuring impact—IRIS/IRIS+ metrics⁷ (Global Impact Investing Network 2018). Organisations such as the GRI, SASB, CDSB and the IIRC have all issued standards and guidance for measurement, reporting and disclosure of ESG information.⁸
- **FSC or PEFC certification is usually a key requirement for sustainable forestry investments,** although it is noted that this does not always fully address all ESG issues (Principles for Responsible Investment 2019). The PRI has developed a due diligence questionnaire specifically for investors to appraise how well a potential forest manager/TIMO manages ESG issues.⁹

Examples:

Managed Investment Schemes (MIS)

Managed Investment Schemes (MIS) were introduced in the *Managed Investments Act 1998* to encourage investment into forestry and agri-business. A retail investment structure, characterised by lots of small investments from individuals, was created that allowed investor deductions in personal income tax

⁶ <https://forisk.com/blog/2011/06/20/how-do-timberland-investment-managers-timos-make-money/> and <http://lymetimber.com/wp/wp-content/uploads/2017/09/2017-05-05-Hourdequin-RISI-London-Talk-with-charts.pdf> (Accessed 3 December 2019).

⁷ <https://iris.thegiin.org/about/> (Accessed 12 December 2019)

⁸ <https://www.globalreporting.org/>, <https://www.sasb.org/>, <https://www.cdsb.net/>, <https://integratedreporting.org/> (Accessed 3 December 2019).

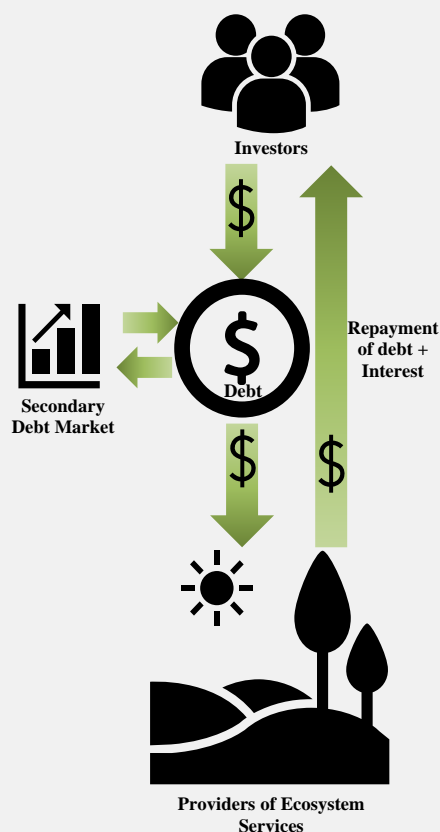
⁹ <https://www.unpri.org/forestry/responsible-investment-ddq-for-forestry-investors/4248.article> (Accessed 4 December 2019).

for the cost of the investment. The MIS industry expanded rapidly, establishing almost 1 million hectares of timber plantation in Australia between 1998 and 2008. After the global financial crisis of 2008-2009, the combined effect of volatile share prices, a reduction in demand, and an inability to extend or roll over debt led to a raft of bankruptcies (New Forests 2015). From 2009 to 2015, nearly all of the MIS forestry assets were sold to institutional investors, with most MIS investors losing much of their investment. This demonstrates the high risk to investors from this type of investment.

New Forests – sustainable forestry investment

New Forests have so far invested in three Australia and New Zealand Forest Funds, totalling over A\$2 billion in assets. Those funds have invested in a portfolio of native and plantation timberland properties and forestry-related investments in Australia and New Zealand. Most of the timberland is FSC or PEFC certified and is monitored through the company's Sustainable Landscape investment performance framework (New Forests 2019). According to the Responsible Investment Benchmark Report 2017 (Responsible Investment Association Australasia 2017), New Forests' sustainable forestry funds constitute more than 10% of the Australian market for sustainably themed investment.

3.2 Bonds



Bonds are essentially loan contracts between an investor and an issuer (usually a company or government), specifying the issuer's obligation to repay the bond principal at a certain date (maturity), plus an additional fixed or variable amount of interest (the coupon).

Bonds are issued by large, well-established companies or governments when they want to borrow more money than a bank is willing to lend. Since bonds are payable to the holder of the bond they can easily be transferred, giving rise to an active secondary market in traded bonds.

Options for natural capital financing

- **Green bonds** are generally identical in structure and pricing to traditional bonds, with the difference being that the capital raised is promised to be directed towards financing environmental activities or projects. **Climate bonds** are a sub-set of

green bonds aimed specifically at raising capital for climate change mitigation and adaptation projects. The total green bond issuance from 2007-2018 was US\$521 billion, with US\$167 billion issued in 2018 and a further US\$250 billion forecast for 2019 (Climate Bonds Initiative 2019b). Although growing, this still accounts for only a small percentage of the overall US\$104 trillion bond market. The Green Bond Principles include “environmentally sustainable forestry, including afforestation or reforestation, and preservation or restoration of natural landscapes” (ICMA 2018a p.4) as an eligible project category, and the land use sector has seen cumulative green bond issuance (to 2018) of US\$4.3 billion (Climate Bonds Initiative 2018a), with the majority of this going to forestry.

- **Sustainability and SDG bonds** are similar to green bonds, with proceeds being allocated to a mix of social and green projects. US\$21 billion of sustainability bonds were issued in 2018 (Climate Bonds Initiative 2019b).
- **Social or environmental impact bonds** are not strictly bonds at all, but similar contractual arrangements to raise money from philanthropic and impact investors for investment in social or environmental activities or projects, where the return to investors depends upon the extent to which the social or environmental objectives are met (McKinsey & Company 2012, Nicola 2013). Social and environmental impact bonds are currently at an early stage of development.

Key features

- **Large sums of money.** Bonds (including green bonds) are intended to mobilise large sums of money. For example, the average green bond issued in 2018 was US\$107 million (Climate Bonds Initiative 2019b). As such they

are less suited to early stage investments, and better suited for raising additional capital (refinancing).

- **Credit ratings.** A key determinant of the coupon rate that a bond issuer must offer in order for the bond to be taken up by investors is their credit rating. Credit ratings for governments, companies and their bonds are generated by agencies such as Moody's, Standard & Poor's and Fitch Ratings; these ratings help investors judge the risk of the bonds and the chances of default. Credit ratings depend on the borrower's credit history, its ability to raise revenue and any security specific to the bond.
- **Collateral and cash flow requirements.** A bond can be backed (secured) by the issuer (for example, relying on a government's power to tax its citizens, or the revenue and assets of a company), or by revenue from specific projects (such as railways, toll roads or airports) to which they are committed. In some cases, purchasers may be willing to buy bonds which are completely unsecured, known as debenture bonds. At the other end of the spectrum, a 'covered' bond provides additional security in the form of a pool of specified assets that bondholders have access to in the event of a default by the bond issuer.
- **Expectation of market returns.** Commonly, for green and other 'labelled' bonds the risk and pricing is the same as an ordinary or 'vanilla' bond from the same issuer.¹⁰ Theoretically, investors may be willing to trade-off higher environmental or social returns for increased risk or lower yields but the real market evidence suggests this is not currently the case (Larcker and Watts 2019). The only significant exception to this is social or environmental impact bonds, which are generally higher risk, yet which may attract finance from impact investors willing to accept a below-market rate of financial return.

Monitoring requirements

- **Voluntary standards exist, and continue to be developed.** Recent years have seen the development of voluntary standards for labelled bonds, including the Green Bond Principles (ICMA 2018a), the Sustainability Bond Guidelines (ICMA 2018b) and the Climate Bonds Standard (Climate Bonds Initiative 2019c). As the names suggest, these vary from broad guidelines to a more rigorous standard which enables climate bonds to be certified as such by an approved third-party verifier. Of the US\$167 billion in green bonds issued in 2018, 14% (US\$23 billion) were certified climate bonds while the rest met the core requirements of the Green Bond Principles (Climate Bonds Initiative 2019b).¹¹ In Europe, there are proposals currently under consideration for a classification system or taxonomy of climate change and sustainability related activities, which could in future be linked to a voluntary EU-wide Green Bond Standard.¹² The international standards body, ISO, is also developing a standard for assurance of green bonds (ISO 14030).¹³

¹⁰ <https://www.climatebonds.net/market/explaining-green-bonds> (Accessed 10 December 2019).

¹¹ These core requirements are to: 1) report the use of proceeds, 2) report the evaluation and selection process used, 3) track the use and management of proceeds from the green bonds separately, and 4) report any qualitative and quantitative information on the performance of the green projects.

¹² https://ec.europa.eu/info/business-economy-euro/banking-and-finance/green-finance_en#implementing (Accessed 10 December 2019).

¹³ <https://www.iso.org/standard/43254.html> (Accessed 10 December 2019).

- **A variety of external reviewers of labelled bonds are available.** These include consultants, Non-Governmental Organisations (NGOs) and auditors providing external reviews and assurance; accredited climate bond certifiers; and ratings agencies such as Moody's and Standard & Poor's who provide green bond ratings (Climate Bonds Initiative 2019b).
- **Impact bonds require more specific metrics of social or environmental performance to be measured.** Examples for forestry might include successfully restored land area, increased volumes of fresh water supply, or avoided greenhouse gas emissions from reduced fire risk (Blue Forest Conservation 2017).

Examples:

Forest Bonds

Forest bonds were proposed by Chapple et al. (2007) as a way to increase financing for sustainable forest management, with an emphasis on tropical forests. The first major forest bond was issued by the International Finance Corporation in 2016, raising US\$152 million to help combat deforestation across 200,000ha in Kenya.¹⁴ Investors in the 5-year bond were given the option of receiving their coupon either in the form of carbon credits or cash, with the cash option being backed by BHP Billiton up to US\$12 million in exchange for rights to the associated carbon credits. The bond was bought by a variety of global institutional investors, including CalSTRS, Treehouse Investments LLC, TIAA-CREF and QBE.¹⁵

The first issuer to allocate part of a green bond's proceeds to sustainable forestry was Svenska Cellulosa Aktiebolaget in 2014. The Brazilian paper company Klabin issued a US\$500 million green bond in 2017, and a further US\$500 million bond in 2019, to finance establishment of new FSC-certified plantations, native forest restoration and biodiversity conservation, along with biomass renewable energy, energy efficiency, waste and water management, climate change adaptation, and other projects.¹⁶ The Finnish pulp and paper company Stora Enso issued a similar SEK 6 billion (US\$604 million) green bond in February 2019. In 2018, Sweden's Landshypotek Bank issued the first green covered bond (SEK 5.2 billion/US\$605 million) secured on a pool of 320,000 ha of FSC and/or PEFC certified forest assets.¹⁷ Smaller green bond issuances have also been used to raise capital for forest preservation, for example by Martha's Vineyard Land Bank in 2014 and 2017 (US\$35 and 20 million respectively).¹⁸ The largest issuer of forestry related green bonds is the Agricultural Development Bank of China, accounting for a third of this category of issuance to date (Climate Bonds Initiative 2018a).

¹⁴ <https://www.reuters.com/article/bhp-environment-forest-bond-idUSL8NID86VG> (Accessed 9 October 2019).

¹⁵ https://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/first-forests-bond-on-the-lse (Accessed 9 October 2019).

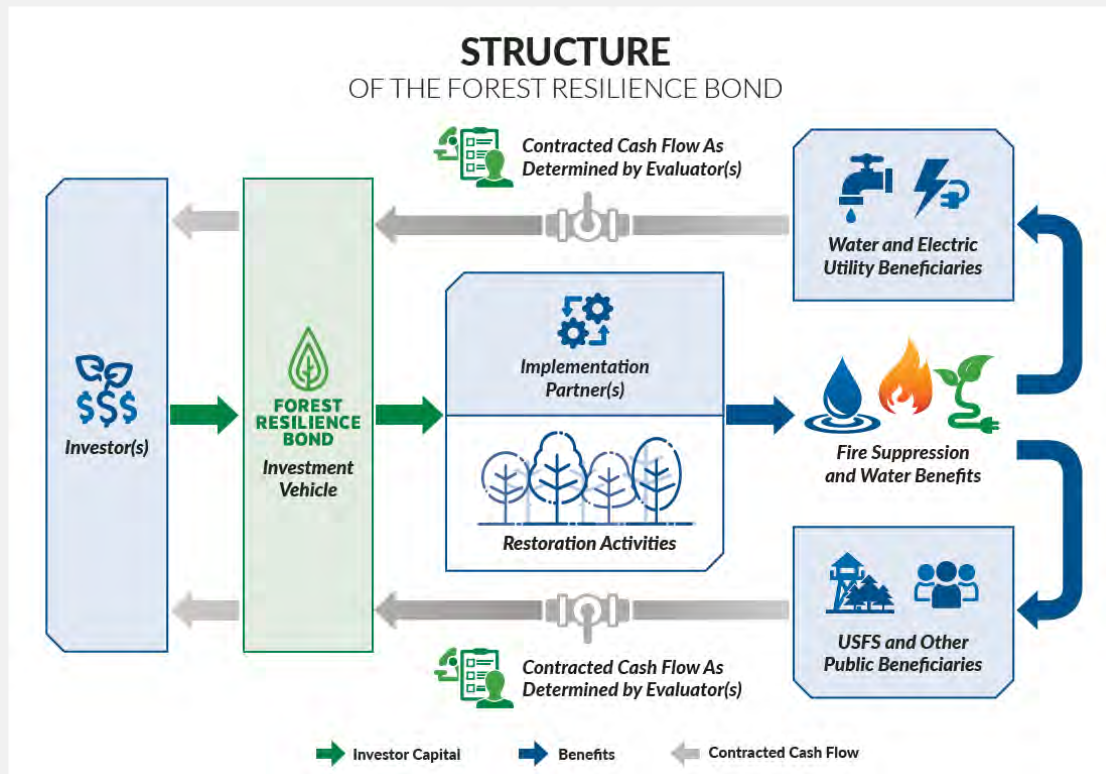
¹⁶ https://www.sustainalytics.com/wp-content/uploads/2017/09/Klabin-Green-Bond-Framework-and-Opinion-08302017_FINAL.pdf and <http://ir.klabin.com.br/financial-information/klabin-bonds> (Accessed 11 December 2019).

¹⁷ <https://www.landshypotek.se/en/about-landshypotek/press-releases/press-releases/landshypotek-bank-issues-the-first-ever-green-covered-bond-to-finance-sustainable-forestry/> (Accessed 11 December 2019).

¹⁸ <https://www.climatebonds.net/files/files/Climate%20Bonds%20Forestry.pdf> and <https://www.climatebonds.net/2014/11/martha%E2%80%99s-vineyard-land-bank-issues-green-muni-bond-35m-5-20-years-aa-rated-%E2%80%93-it%E2%80%99s-green-not> (Accessed 11 December 2019).

Forest Impact Bond – Forest Resilience Bond

Blue Forest Conservation, a US public benefit company, has developed the concept of a ‘Forest Resilience Bond’ (FRB) in partnership with the World Resources Institute. The FRB is more accurately described as a performance-based contract, rather than a formal bond. The structure of the FRB is summarised in the figure below. Essentially, capital for forest restoration on public lands is raised from private investors, who are repaid by beneficiaries such as water or electricity utilities benefiting from watershed management, or state governments benefiting from fire management. These services are provided by an implementation partner.



Source: <https://www.blueforestconservation.com/#frb> (Accessed 11 December 2019).

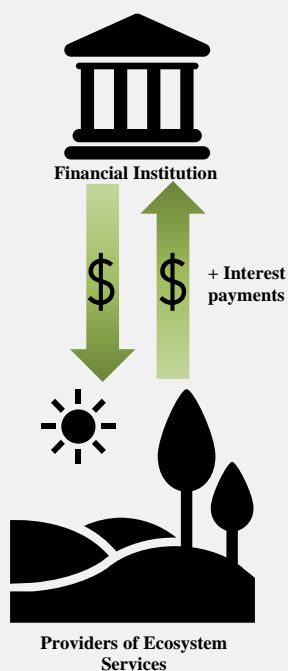
A pilot FRB project was launched in November 2018, raising US\$4.6 million from philanthropic and impact investors to fund forest restoration across 15,000 acres of the Yuba watershed in Tahoe National Forest, with repayments from the Yuba Water Authority and State of California as beneficiaries.¹⁹

Massachusetts Green Bonds

Bonds issued by local governments, states or territories are commonly known as municipal bonds and are used to finance capital projects, including public transportation systems, energy systems, water treatment facilities, hospitals, and schools. The Commonwealth of Massachusetts issued the first green municipal bond in 2013 with the first issuance for US\$100 million and a subsequent issuance of US\$350 million in 2014. The money was assigned to green projects that support various water, energy efficiency in buildings, offshore wind, land rehabilitation and habitat restoration and preservation projects.

¹⁹ <https://www.blueforestconservation.com/bfcthoughts/2018/11/1/announcing-frb-yuba-pilot-project> (Accessed 11 December 2019).

3.3 Loans



Loans are a form of debt finance. A loan is an amount of money ('principal') provided by a third party to a project, person or organisation that must be repaid during or at the end of an agreed term, plus interest if applicable.

The majority of loans are provided by banks. A loan involves a contractual agreement between the lender (or 'creditor') and the borrower, which can include various conditions or covenants. Loans can be 'secured' against assets ('collateral') by providing the lender with a contractual right to recover monies owed through taking possession of the collateral. Since this gives the lender added certainty of recovering monies owed, secured loans are typically offered at a lower interest rate than unsecured loans. A loan contract also specifies what priority the lender has over other creditors or equity owners: higher priority ('senior') debt attracts a lower interest rate than lower priority ('junior' or 'subordinate') debt, due to being lower risk. Commercial bank debt is typically the lowest cost source of finance for small, medium and even some larger entities who lack the scale required to access the bond market.

Options for natural capital financing

- **Green loans** have been defined as “any type of loan instrument made available exclusively to finance or re-finance, in whole or in part, new and/or existing eligible Green Projects” (Loan Market Association 2018) In other words, it is a label for loans made to borrowers with an asset base that qualifies as 'green'. The Green Loan Principles include “environmentally-sustainable forestry, including afforestation and reforestation, and preservation or restoration of natural landscapes” (ibid. p.4) in their list of potentially eligible types of 'green' project.
- **Sustainability linked loans** have been defined as “any types of loan instruments and/or contingent facilities... which incentivise the borrower's achievement of ambitious, predetermined sustainability performance objectives” (Loan Market Association 2019). The difference to green loans is that the monies borrowed need not be put towards specific 'green' projects, but rather can be used for any purposes, as long as the sustainability performance of the borrower improves over time, as measured using specific indicators.
- **Natural capital credit risk assessment** is an approach being advocated by some lenders (Ascui and Cojoianu 2019), which involves evaluating the risks that natural capital impacts and dependencies pose for conventional loans. This could enhance (or restrict) the ability of more (or less) sustainably managed companies to borrow in future.

Key features

- **Very new frameworks.** Although lenders have labelled certain loans as ‘green’ for some time, a widely endorsed framework (the Green Loan Principles and Sustainability Linked Loan Principles) only emerged in 2018, and a similarly endorsed framework for natural capital credit risk assessment first appeared in 2019.
- **Collateral and cash flow requirements.** Lenders will expect assets to be pledged as collateral (exceeding the value of the loan) and evidence that the loan can be repaid either from expected returns from specific projects or business cash flow.
- **Possible discounted interest rates.** The Green and Sustainability Linked Loan Principles do not require lenders to offer discounted interest rates. However, some institutions may offer lower interest rates for loans to more sustainable or lower-risk assets, or for improved performance over time.

Monitoring requirements

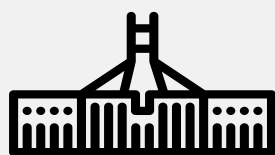
- **Relatively light-touch but dependent on individual borrower-lender agreements.** The Green and Sustainability Loan Principles provide only broad guidance on monitoring and reporting. For example, for green loans, borrowers should be able to provide a list of green projects to which funds have been allocated, describing the project, amounts allocated and expected impact. Use of performance indicators or measures, as well as third-party review (e.g. rating, verification or certification) is recommended but not required. Sustainability linked loans require the lender to establish sustainability performance indicators and request borrowers to make such information available to lenders at least on an annual basis; lenders are likewise encouraged, but not required, to seek external review and public disclosure.
- **Little consensus on indicators and metrics.** There is considerable debate about the indicators or metrics that should be used to measure ‘green’-ness or sustainability performance. In addition, banks may be reluctant to offer discounted loans until there is solid evidence linking specific measures to improved financial performance or resilience.

Examples:

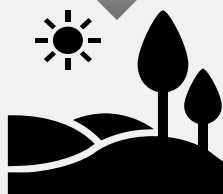
The Clean Energy Finance Corporation (CEFC)

The green loan market in Australia has been aided by the creation of the Clean Energy Finance Corporation (CEFC), a green bank investing in renewable energy, energy efficiency and low emissions technologies on behalf of the Australian Government. Although the CEFC is focused on energy, there is some relevance for forestry: for example, in November 2015 the CEFC provided A\$100 million towards the Australian Bioenergy Fund (ABF). The ABF invests in a range of technologies including biomass-to-energy projects (for example, using plantation timber residues and sawmill waste) and wood pelletisation and targets equity investments in projects from A\$2 million. The CEFC’s aim is not just to invest funds but to leverage additional funds from the private sector. Part of that involves partnerships with traditional banks to target small scale investment through co-financed programs.

3.4 The public sector: ownership and subsidies



Government



Providers of Ecosystem Services

Public sector funding has traditionally been the main source of finance for sustainable land use and conservation, through direct ownership and management of land or through a variety of subsidies and grants.

Funding provided by government commonly does not require a financial return, but instead focuses on non-financial social or environmental returns, or wider economic benefits. However, some forms of public sector funding, for example provided to state-owned enterprises, may require financial returns.

Options for natural capital financing

- **Public ownership** includes conservation reserves, multiple-use public forests, and Crown land.

The management of these is funded from government spending.

- **Subsidies** are defined as benefits given by the public sector to help an industry, business or individual undertake activities that they would have otherwise found too costly. Subsidies can include grants, payments, and tax incentives.
- **Grants** are defined as non-repayable financial assistance and are usually assigned to be used for a specific project.
- **Tax incentives** (also tax subsidies or tax breaks) are another way for the government to incentivise certain activities by reducing the tax burden. This does not require up-front expenditure by government but does reduce future tax revenue.

Key features

- **Financial returns not necessarily required.** Governments, unlike most other funding providers, have the freedom to invest without the expectation of a commercial return and may therefore invest in the full spectrum of public goods.
- **The funding depends on the political and economic situation.** The nature of public sector funding depends on current public and political priorities and the current economic climate. For example, government spending for particular projects can change rapidly with changes of government.
- **Diverse aims and objectives.** Subsidies and grants are typically focused on specific projects and outcomes, whereas public ownership arrangements may have broad and long-term objectives.

Monitoring requirements

- **Government reporting standards for financial but not non-financial outcomes.** Government spending is tracked under a strict set of reporting standards, however, associated changes in natural capital and ecosystem

services benefits is often unmeasured and unreported. However, this may change in future, as Australian state and federal governments have recently agreed to collaborate on a national approach to environmental-economic accounting (Commonwealth of Australia 2018).

- **Monitoring and measurement may be required but vary with individual agreements.** Subsidies, and in particular grants, often require tracing the progress towards impact through prior assessment and ongoing monitoring or measurement at the project's conclusion. Public sector ownership arrangements can require monitoring and measurement of both financial and non-financial outcomes depending on the ownership and reporting agreements in place.

Examples:

The Tasmanian Forest Conservation Fund

The Tasmanian Forest Conservation Fund was developed in 2005 to protect old growth forests and other rare but unreserved forest communities on private land. The fund supported private landowners to manage and conserve forest on their land using voluntary conservation agreements. The program concluded in 2009 having secured contracts with 150 landowners and protecting approximately 28,000 hectares of forest. The program used a number of different market-based incentives including a competitive tender process where landowners could apply for funding to add a covenant to their forested land, direct payments, and a revolving fund, where properties of high conservation value were purchased and then a covenant was added before the property was resold. The revolving fund was extended with funds managed by the Tasmanian Land Conservancy.

New South Wales (NSW) Biodiversity Conservation Trust

The Biodiversity Conservation Trust was established in 2017 under the *Biodiversity Conservation Act 2016*. The NSW government has allocated A\$240 million over 5 years from 2018, and ongoing funding of A\$70 million/year thereafter, to supporting private land conservation, under the Biodiversity Conservation Investment Strategy 2018 (Office of Environment and Heritage 2018). Funding is delivered through a variety of mechanisms, such as tenders for landowners to enter into biodiversity stewardship agreements, conservation agreements or wildlife refuge agreements; grants; and a A\$15 million revolving fund. The Biodiversity Conservation Trust also acts as a facilitator and intermediary in the NSW Biodiversity Offsets Scheme (see section **Error! Reference source not found.** below).²⁰

The Climate Solutions Fund (CSF)/Emissions Reduction Fund (ERF)

The Australian Government invested \$2.55 billion in the Emissions Reduction Fund (ERF) in 2014, and in February 2019 provided an additional \$2 billion under the Climate Solutions Fund (CSF). These schemes have built on the Carbon Farming Initiative which was introduced in 2011 as a voluntary scheme that

²⁰ <https://www.bct.nsw.gov.au/> (Accessed 12 December 2019).

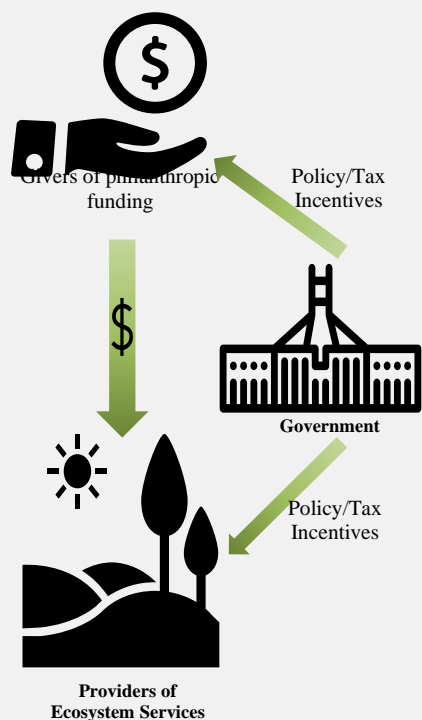
allowed eligible farmers and land managers to earn tradeable carbon credits (Australian Carbon Credit Units—ACCUs) by storing carbon or reducing greenhouse gas emissions on their land. The credits can be sold to Government through periodic auctions and through the secondary market to state and territory governments and businesses. The types of projects that can be undertaken and specific project activities are defined in the fund rules. Projects relating to the land sector include plantation forestry, increasing soil carbon, expanding opportunities for environmental and carbon sink plantings, reforestation and revegetation, and protecting native forest or vegetation that is at imminent risk of clearing.²¹

A Billion Trees for Jobs and Growth

To meet the future demand for Australia's wood the Australian Government has outlined aims for 400,000 hectares of additional plantations over the next decade, equivalent to 1 billion trees (Department of Agriculture and Water Resources 2018). A\$20 million in government funding will be provided between 2018-19 and 2021-22 to support the forest sector in meeting this target, but the vast bulk of the finance is assumed to come from other sources.

²¹ <https://www.environment.gov.au/climate-change/government/emissions-reduction-fund/methods> (Accessed 11 December 2019).

3.5 Philanthropy



Environmental philanthropy covers a wide variety of different private initiatives that provide for the public good. The finance is often provided without the requirement for any financial return.

Givers of philanthropic funding can be individuals, trusts and businesses. The funding can be used to pay ecosystem service providers for activities and projects and can be further incentivised through policy or tax incentives.

Options for natural capital financing

- **Individual donations** cover a variety of philanthropic giving methods where the donor provides funding for projects or organisations to fund environmental improvements. For example, high-net-worth individuals funding specific projects, regular donations or bequests to philanthropic organisations, or crowd-funding.

- **Voluntary surcharges** are small charges added to the final cost of goods and services. The money funds environmental projects or organisations.
- **Corporate social responsibility (CSR)** is defined as the voluntary effort by corporations to improve social and/or environmental impacts.

Key features

- **Funds targeted towards charitable organisations.** Philanthropic funds are generally only available for charitable organisations and it is unlikely that private companies would directly fund other for-profit private companies.
- **Generally project based.** The focus for environmental philanthropy is usually on the implementation of projects (specific activities that provide environmental outcomes). Successful projects generally demonstrate a collaborative approach with a clear path to impact. It can be difficult for long-term programs to obtain repeat philanthropic funding – generally, donors prefer to fund new projects rather than maintain existing activities.
- **Flexibility.** Environmental philanthropy can be applicable at a variety of scales, from very small-scale projects to joined up large-scale projects. Philanthropic funds also have potential to be blended with a variety of other financial instruments, offering opportunities for scaling-up projects.

Monitoring requirements

- **Requirement of path to impact prior to project funding.** Demonstration of how the funding will be utilised and how it will lead to environmental improvements is often required prior to funding.

- **Relatively light-touch monitoring, but dependent on individual agreements.** The monitoring and measurement of outcomes is typically subject to agreement between the philanthropic donors and service providers. Measurement of CSR outcomes is rarely a priority although there are growing calls for more focus on measuring and reporting outcomes.

Examples:

The Tasmanian Forest Conservation Fund

The Tasmanian Land Conservancy use a revolving fund method to purchase private land, add a conservation covenant and then sell on the land to conservation-minded buyers, in addition to owning and managing their own private reserves. In 2010, 28,000 ha of the ex-Gunn's native forest estate was put up for auction. The Tasmanian Land Conservancy acquired 27,390 ha with the assistance of a philanthropist who gifted land worth A\$4.7 million, a A\$14 million loan from the Elsie Cameron Foundation, and other philanthropic giving. The purchase was the biggest private conservation deal in Australia's history at the time, only surpassed in 2019 by a 33,000 ha purchase in the Murray Darling region by The Nature Conservancy. In order to repay the loans, properties have been covenanted and sold through the revolving fund mechanism (3,712 ha to date). Later, the BHP Billiton Foundation provided A\$13.4 million to establish a reserve endowment fund, and a 2014 partnership with Virgin Australia provides income through the sale of ACCUs bought by Virgin Australia customers to offset their flights.²²

Lyme Timber Company – Working Forest Conservation Easements

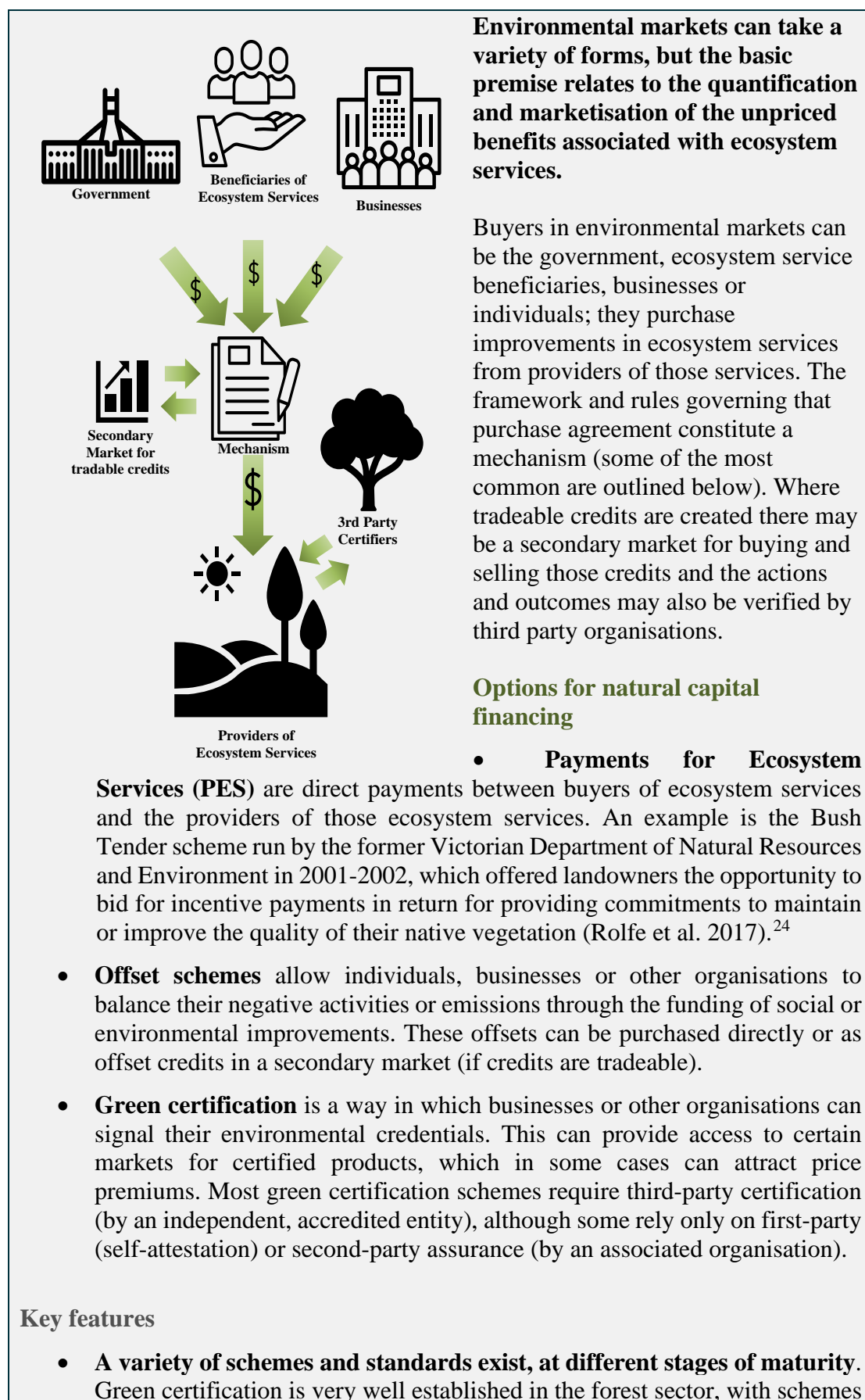
The Lyme Timber Company is a US TIMO that acquires and manages land with high conservation values. Their current portfolio includes 700,000 ha of forest land and rural real estate in the USA.²³ Lyme specialises in adding value to conventional timberland investments by incorporating income from activities such as recreational leasing and sale of carbon credits and conservation interests. 85% of their current portfolio consists of timberlands, with the remainder being more specialised investments in conservation areas supported by environmental markets for wetland, stream and biodiversity mitigation.

A key component of Lyme's strategy is the sale of working forest conservation easements (WFCEs) to provide timber investments with an early return on capital (Stein and Hiller 2018). WFCEs are essentially covenants that apply to ecosystem services other than timber production, such as recreational use rights or carbon sequestration rights. A common requirement of WFCEs is certification as a sustainable timber manager. WFCEs can be donated by the landowners (in the US, this provides the landowner with income tax and estate tax benefits) or sold, for example to environmental NGOs, land trusts, or government natural resource management agencies, using a combination of public and/or philanthropic funds. The US Forest Legacy Program (created in 1990) is an example of public funds used to buy WFCEs, while The Nature Conservancy is a major NGO purchaser of WFCEs using philanthropic funds. To date, Lyme has facilitated the conservation of 820,000 ha through the sale of WFCEs and other conservation instruments.

²² <https://tasland.org.au/2012/01/the-new-leaf-project/> (Accessed 11 December 2019).

²³ <https://www.lymetimber.com/> (Accessed 11 December 2019).

3.6 Environmental markets



Environmental markets can take a variety of forms, but the basic premise relates to the quantification and marketisation of the unpriced benefits associated with ecosystem services.

Buyers in environmental markets can be the government, ecosystem service beneficiaries, businesses or individuals; they purchase improvements in ecosystem services from providers of those services. The framework and rules governing that purchase agreement constitute a mechanism (some of the most common are outlined below). Where tradeable credits are created there may be a secondary market for buying and selling those credits and the actions and outcomes may also be verified by third party organisations.

Options for natural capital financing

- **Payments for Ecosystem**

Services (PES) are direct payments between buyers of ecosystem services and the providers of those ecosystem services. An example is the Bush Tender scheme run by the former Victorian Department of Natural Resources and Environment in 2001-2002, which offered landowners the opportunity to bid for incentive payments in return for providing commitments to maintain or improve the quality of their native vegetation (Rolfe et al. 2017).²⁴

- **Offset schemes** allow individuals, businesses or other organisations to balance their negative activities or emissions through the funding of social or environmental improvements. These offsets can be purchased directly or as offset credits in a secondary market (if credits are tradeable).
- **Green certification** is a way in which businesses or other organisations can signal their environmental credentials. This can provide access to certain markets for certified products, which in some cases can attract price premiums. Most green certification schemes require third-party certification (by an independent, accredited entity), although some rely only on first-party (self-attestation) or second-party assurance (by an associated organisation).

Key features

- **A variety of schemes and standards exist, at different stages of maturity.** Green certification is very well established in the forest sector, with schemes

²⁴ <https://www.environment.vic.gov.au/innovative-market-approaches/bushtender> (Accessed 11 December 2019).

such as FSC and PEFC covering 26.7 million ha of native forests and plantations in Australia.²⁵ Carbon offset markets are also well established, followed by biodiversity offsetting (in New South Wales only). Offset mechanisms for other types of ecosystem services, and PES schemes in general, are less well developed, even though there have been over a hundred trials of conservation tenders in Australia since the early 2000s (Rolfe et al. 2017).

- **Additionality is typically required under offset schemes.** Additionality (improvements above business-as-usual activities) is often a fundamental requirement of schemes that allow other organisations or individuals to continue with activities that have negative social or environmental impacts, in order to achieve at least zero net impact (if not net positive impact).
- **Flexible and wide ranging.** Environmental markets can be applicable at a variety of scales, from small scale (primarily suitable for direct payments) to large scale (tradeable credit schemes).

Monitoring requirements

- **Measurement and monitoring frameworks generally exist for tradeable credits, offset schemes and green certification,** with programs typically audited by third parties. However, monitoring of environmental outcomes is often modelled or conducted through remote sensing as the costs of individual level monitoring can be prohibitive.
- **Payment for Ecosystem Services monitoring is relatively light-touch but dependent on buyer-seller agreements.** For PES schemes the monitoring requirements are part of the negotiation or rules set by the buyers to verify both compliance and outputs. In some cases, payments to the providers are contingent on the environmental outputs provided; these are known as results-based payments for ecosystem service schemes.

Examples:

California's cap-and-trade program

California's emissions reduction program is a cap-and-trade system which sets a total annual limit on greenhouse gas emissions and allows emitters to purchase 'emission allowances' through auctions. In addition, emitters can purchase offset credits—a tradable credit that represents a greenhouse gas reduction or removal of one metric tonne of CO₂ equivalent (tCO₂e). These offset credits are created by activities and projects that reduce or absorb greenhouse gas emissions. California's offsets program allows timber companies and other private landowners to sell credits obtained from activities such as stopping harvesting operations, afforestation, or managing forest in ways that increases carbon storage (e.g. longer rotation lengths). By reducing the number of allowances auctioned over time and limiting offsetting, the state aims to reduce the greenhouse gas emissions associated with economic activity in California in an efficient and cost-effective way. However, there is controversy and debate around California's cap and trade program, in particular in terms of the additionality provided by the offset activities. At present the program allows some activities that can be classified as "business-as-

²⁵ <https://www.agriculture.gov.au/forestry/australias-forests/certification> (Accessed 11 December 2019).

usual land management” i.e. management that the landowners would have undertaken anyway. Ruseva et al. (2017) discuss the issues and show that stricter implementation of additionality standards may create barriers to participation in the program.

New South Wales Biodiversity Offsets Scheme

In NSW, a voluntary scheme known as the Biodiversity Offsets Scheme aims to address the loss of biodiversity due to habitat degradation from land clearing and development. It is legislated under the *Biodiversity Conservation Act 2016* and replaced the previous scheme ‘BioBanking’ (Biodiversity Banking and Offsets Scheme) which commenced in 2008. The BOS imposes an obligation on landowners who undertake development or land clearing to purchase and retire offset ‘biodiversity credits’ (either directly in the market, or via a Biodiversity Conservation Fund operated by the Biodiversity Conservation Trust) from other landowners who generate credits by entering into in-perpetuity agreements to manage their land for the protection and enhancement of biodiversity. The credits can also be sold to those voluntarily seeking to offset their operations or to those wanting to invest in conservation outcomes, for example, philanthropic organisations and governments.²⁶

Reef Credits

The Reef Credit Scheme is a voluntary market for water quality improvements in the Great Barrier Reef, designed by GreenCollar. The scheme is currently in the initial stages of implementation. It aims to enlist land managers to undertake projects that improve water quality through changes in land management to generate a tradeable unit of pollutant reduction or ‘Reef Credit’. A Reef Credit represents a quantifiable volume of nutrient, pesticide or sediment prevented from entering the Great Barrier Reef catchment. The credits are tradeable and thus the value of them will depend on the supply and demand. The credits are available to be purchased by any buyer who values water quality improvements in the Great Barrier Reef catchments. Currently this is targeted at the tourism, resource and transport industries.²⁷

Catchment-based water payments in the UK

Water companies in the UK have implemented various catchment-based schemes where landowners upstream of a water company’s water abstraction location have been paid to change their land-management activities so as to provide cleaner water downstream. The funding mechanism for such projects comes from the recognition that it is cheaper for farmers to provide clean water from their land rather than the water companies relying on expensive filtration equipment to treat polluted water. For example, South West Water as part of their ‘Upstream Thinking Initiative’ partnered with West Country Rivers Trust to pay for capital investments on farms that would lead to improved water quality (Bateman et al. 2019) and Anglian Water paid farmers to switch away from a particularly hard to treat pesticide, metaldehyde (Smith et al. 2017, Ibrahim et al. 2019, Smith et al. 2019).

²⁶ <https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/biodiversity-offsets-scheme> (Accessed 11 December 2019).

²⁷ <https://www.reefcredit.org/> (Accessed 11 December 2019).

3.7 Insurance

Insurance is a risk management tool. Insurance involves a contract between the insurer and the insured (or ‘policy holder’), under which the insurer undertakes to compensate the policy holder for specified covered losses, in return for payment of a fee known as the ‘premium’.

Having insurance can help an entity to obtain finance, because it transfers some of the entity’s financial risk to the insurer. Therefore, it is not uncommon for insurance to be a pre-condition of funding from risk-averse sources such as lenders, grant-giving bodies and philanthropic donors. Another way of putting this is that having insurance can reduce an entity’s cost of capital, either through enabling access to lower-cost sources of finance, or through reducing the risk premium.

Options for natural capital financing

- **Conventional forest insurance.** The main risks covered by forest insurance in Australia are losses caused by fire and hail, followed by storm damage and various other perils. As these risks can also have a significant impact on non-timber natural capital values, simply having conventional forest insurance also provides some support for the latter. It is estimated that around 60-70% of privately-owned plantation forests in Australia have insurance, but some large players choose to self-insure instead.²⁸ Forest insurance is provided by three insurers within Australia (Rural Affinity, Primacy, and Insurance Facilitators) and by some international insurers (e.g. Lloyds).
- **Insurance for specific stocks of natural capital.** At present, the only such product we are aware of is for carbon sequestered in recognised forestry carbon offset projects.²⁹ The product covers the value of carbon offsets which are lost as a result of specified events (fire, hail etc.). Different levels of cover can insure against carbon sequestered up until the point of loss, or including up to four years of carbon that would have been sequestered in future.

Key features

- **Niche market.** Conventional forest insurance is itself a small niche within global insurance markets and insuring non-timber natural capital value is therefore even more specialised. In addition, currently most forest insurance applies only to private plantation forests (UNEP FI Climate Change Working Group and UNEP FI Insurance Working Group 2008, Swiss Re Group 2015). This may limit the scope to make natural capital insurance cost-effective by achieving economies of scale.
- **Requires large pool of independent risks.** Insurance works by spreading risks over time and space, across a portfolio of insured assets. If risks are highly correlated, then the insurer may require re-insurance to cover the risk of large correlated losses; which in turn requires higher premiums. Some natural capital values may be affected by large-scale processes (such as climate change) which may result in correlated risks, particularly within specific geographical areas.

²⁸ Specialist insurance broker, pers. comm. (Accessed 21 October 2019).

²⁹ For example, <https://www.if.net.au/carbon-insurance> (Accessed 21 October 2019).

- **Requires good understanding of risks.** The business model of an insurance company depends on an accurate understanding of insured risks, so that payouts are on average across a portfolio of insurance policies, sufficiently covered by premiums plus returns on invested capital. This in turn implies that there must be a good understanding of risks, which is not necessarily the case for natural capital risks.
- **Requires agreed valuation of assets.** There needs to be an easily applied, mutually agreed method for valuing the underlying assets so that losses can easily be quantified after a loss event. Technology such as remote sensing has potential to lower the costs of valuation.
- **Short timescales.** Insurance contracts are typically renewed on an annual basis. This may not provide sufficient certainty to finance providers who may have to wait decades for a return on their investment.

Monitoring requirements

- **Apply only in the event of a claim.** If a claim is made, then evidence of losses, and possibly evidence of the causes of those losses and/or interventions made to prevent the losses, may have to be provided.

Examples:

Insurance Facilitators Forest Insurance

Insurance Facilitators claims to have been the first provider of insurance cover for forest carbon in Australia.³⁰ A carbon insurance policy covers the key risks facing Australia's plantation forests: primarily extreme weather events such as fire, lightning, hail and windstorms. Three levels of cover are offered, with the standard policy covering the grower for contracted sequestered carbon at their current contracted carbon price, and additional options covering carbon sequestered but not yet contracted, as well as up to four years' future carbon sequestration.



³⁰ <https://www.if.net.au/carbon-insurance> (Accessed 21 October 2019).

4. Opportunities, barriers and potential solutions for natural capital financing in Tasmanian forestry

No single option can provide the solution to increasing financial flows into non-timber natural capital, because of the very different characteristics of plantations versus native forests, as well as the different types of ownership and management of forests. Tasmania provides an illustrative case study because it includes a mix of plantations and native forests, conservation and productive forestry, public and private ownership, and different forms of financing associated with these.

Tasmania also has a strong regulatory framework that supports sustainable forest management practices—the Forest Practices Code. This, as well as the spectrum of forest ownership in the State, influences the financing opportunities available to the sector.

This section discusses those opportunities and the potential barriers and solutions through information gathered from the latest literature and interviews with forest managers, owners and financiers.

Overview of Tasmanian forestry

Almost half (49%) of Tasmania is forested (3,354,000 ha), with 53% of forests in formal or informal reserves (1,778,000 ha). Of the reserved forest, 70% (1,252,000 ha) is in formal reserves on public land, such as national parks; 24% (430,000 ha) is in informal reserves on public land, and 6% (96,000 ha) is in private reserves on privately owned land. Of the forests in informal reserves, 399,000 ha is classified under the *Forestry (Rebuilding the Forest Industry) Act 2014* as ‘future potential production forest land’ and protected from logging until April 2020, after which it may be reclassified, subject to parliamentary approval. Of the 1,577,000 ha in unreserved forest, 81% (1,275,000 ha) is native forest, while the remaining 19% (302,000 ha) is plantation, 75% of which is hard wood and 25% soft wood (Forest Practices Authority 2017).

In terms of ownership, 42% (531,000 ha) of unreserved native forest is publicly owned (509,000 ha by Sustainable Timber Tasmania, the remainder mainly by Hydro Tasmania and the Commonwealth), while the other 58% (744,000 ha) is privately owned. The largest individual private forest owner is the TIMO New Forests (through Forico and Timberlands Pacific) which owns around 80,000 ha of native forest and nearly 150,000 ha of plantation forest. New Forests together with Norske Skog (now 100% owned by Oceanwood Capital Management, an investment fund) and RMS (which is in the process of selling its Tasmanian assets) own virtually all of Tasmania’s private plantation estate. The situation is very different with respect to native forest, however, where up to 5,000 individual landowners (mainly farmers) own about 87% of the private estate.

Financing of the Tasmanian forestry sector is similarly mixed. Public funds support the management of state-owned native forest and plantations plus 95% of reserved forest, while the remaining 5% in private reserves has been established through a combination of government incentives and philanthropic investment. At least 13% of privately-owned native forests are in the hands of institutional private equity, while the remaining 87% is mainly small-scale (landowner) private equity, probably including a small proportion of bank debt, as this may have been used by

farmers to buy properties. Privately owned plantations are now almost entirely in the hands of large-scale private equity, but they were largely established with equity from small-scale investors, plus bank debt. Between 2000 and 2009, MIS plantation forestry across Australia attracted around A\$4 billion from retail investors, many of whom borrowed to fund their investment from the financing arms of MIS companies, or commercial banks. The combined loan books of Timbercorp, Great Southern and Gunns at their peaks reached around A\$1.4 billion.³¹ Other forms of finance are rare in the Tasmanian or Australian forestry industry: for example, forestry companies have never featured heavily in the Australian stock market. Kangaroo Island Plantation Timbers claims to be Australia's only listed timberland company, although at least one other ASX-listed company (Midway) also owns some Australian plantations.³²

Table 1: Tasmanian forest by reservation status, tenure and type

	Native forest (ha)	Plantation (ha)	Total (ha)
Formal reserves (public)	1,252,000	-	1,252,000
Informal reserves (public)	430,000	-	430,000
Private reserves	96,000	-	96,000
Total reserved land	1,778,000	-	1,778,000
Unreserved public land	531,000	111,000	642,000
Unreserved private land	744,000	189,000	933,000
Total unreserved land	1,275,000	302,000	1,577,000
Total forest land	3,052,000	302,000	3,354,000

Source: (Forest Practices Authority 2017)

Table 2: Tasmanian unreserved forest by ownership and financing

	Area (ha)	Financing
Native forest (public)	531,000	
- Sustainable Timber Tasmania	509,000 ^a	100% public
- Hydro Tasmania/ Commonwealth/ Other	22,000	100% public
Native forest (private)	744,000	
- New Forests (Forico)	79,722	100% equity
- RMS (PF Olsen)	8,647	100% equity
- Norske Skog	5,700	100% equity
- Other landowners	649,931	unknown
Plantation (public)	111,000	
- Sustainable Timber Tasmania	111,000	100% public

³¹ Timbercorp A\$500 million: Senate Economics References Committee (2016, p. 211); Great Southern A\$725 million: https://en.wikipedia.org/wiki/Great_Southern_Group#cite_note-20; Gunns A\$140 million: <https://www.afr.com/politics/investors-in-gunns-timber-schemes-caught-in-middle-20120926-j1oku> (Accessed 18 October 2019).

³² <https://kipt.com.au/> and <https://www.midwaylimited.com.au/wp-content/uploads/2019/10/Midway-Annual-Report-2019.pdf> (Accessed 23 October 2019).

Plantation (private)	189,000	
- New Forests (Forico)	92,620	100% equity
- New Forests (Timberlands Pacific)	54,145	100% equity
- Norske Skog	18,570	100% equity
- RMS Timberlands (PF Olsen)	21,600	100% equity
- Other landowners	2,065	unknown

^a 352,000 ha is production forest and 157,000 ha is non-production forest (Sustainable Timber Tasmania 2018).

Source: Sustainable Timbers Tasmania & Tasmanian Government: Department of State Growth, pers. comm. (Accessed 19 December 2019) and 2019 annual reports from each organisation.

4.1 Equity

Opportunity: Likely growth in responsible investment demand for sustainable forestry assets. The long-term decline in returns from fixed income investments (bonds) due to low interest rates in major economies is fuelling a shift of trillions of dollars into higher risk asset classes, including real assets such as forestry (New Forests 2017). In Australia, institutional investors such as pension funds already own about half of Australia’s two million hectares of commercial plantations, while timber and MIS companies own 9% and farmers and other landowners own 21% (Australian Bureau of Agricultural and Resource Economics and Sciences 2018). Global demand for forestry assets is expected to grow (Brand 2019) and in Australia, the Federal Government’s target of an additional 400,000 ha of plantations by 2030, if achieved, will create a pool of new assets that will likely be attractive to institutional investors. At the same time, responsible investment is becoming mainstream – in Australia and New Zealand, it now accounts for 63% of professionally managed assets (Global Sustainable Investment Alliance 2019), up from 51% in 2016. This means that increasingly, equity investors in forestry assets will expect them to be managed sustainably, and to be demonstrating this through certification. However, this is largely the case already – 90% of Australia’s large public and private native (timber harvesting) forests and plantations are already certified.³³ There may therefore be a market in future for further differentiation or a ‘certification-plus’ strategy for forestry assets that go beyond minimum certification requirements in actively managing for positive impacts on natural capital. Financiers, asset owners and forest growers interviewed considered the ecosystem services provided by forests to be fundamentally undervalued; if these services are better understood and monetised it is likely to create investment opportunities in sustainable forestry.

Opportunity: Potential for investment growth if additional financial returns are available through environmental markets, sale of conservation covenants or public or philanthropic incentives. ‘Timber-plus’ strategies, where commercial timber production is combined with other revenue streams based on monetising non-timber natural capital value, have been demonstrated to drive additional investment in forestry, in the US in particular. Public and philanthropic funds can leverage considerable private investment by providing incentives, for example to cover the risk of lower timber production due to managing for a broader range of natural capital outcomes.

Barrier: Lack of capacity, standards, methods and data for non-timber natural capital assessment. Forestry is a relatively small asset class for private investors, with the global pool of potentially available forests (100-200 million ha) thought to be worth approximately

³³ https://www.responsiblewood.org.au/wp-content/uploads/2017/11/Responsible_Wood_Overview.pdf (Accessed 18 December 2019)

US\$200-400 billion, of which around US\$100 billion is already owned by equity investors (Brand 2019). As institutional investors have shifted into real assets more generally, forestry has to compete for limited investment analyst attention with asset classes that are much larger, generally easier to value, and can provide private benefits such as energy and infrastructure (Bass et al. 2019). A common problem with sustainable landscape and land-use change investments is that the environmental or social returns are difficult to quantify, moreover, those social or environmental returns are commonly public benefits rather than private benefits. While standards for ESG investment appraisal exist at a high level, and sustainability certification is well established in the forestry sector, it is challenging to go beyond this. New revenue streams may enhance the financial attractiveness of an investment, but require additional risk assessment, which may be highly context-specific. Our interviews with asset managers and investors revealed that without reliable data and methods for quantification, they currently have difficulty including potential land-use, environmental or social benefits in their investment decisions. For some, monetary valuation of environmental benefits would be required, whereas for others, quantification in biophysical terms would be sufficient. These findings were echoed in a recent study by the Global Impact Investing Network (GIIN) on the potential for scaling forestry impact investment, which interviewed 24 asset owners, asset managers, and intermediaries, and assessed a database of 37 forestry funds and vehicles (Bass et al. 2019).

Barrier: Reputational damage from MIS and the global financial crisis. The reputational damage to forestry investment due to the collapse of multiple MIS companies following the global financial crisis was raised by multiple interviewees, with the loss of confidence and trust still likely to affect institutional investment today, and to temper the appetite for investment from small scale investors. The GIIN study likewise noted that many investors, particularly institutional investors, no longer have allocations to forestry due to low returns, or the perception of low returns, since the financial crisis. Although most asset owners felt that changing regulatory and consumer pressures would lift forest valuations in the next 5-10 years, others felt that the timing was less imminent (Bass et al. 2019).

Barrier: Limits to growth as existing TIMOs already own and manage a large proportion of Tasmanian plantations. Responsible investment is already well-established in the Tasmanian forest industry, although it is focused on large institutional investors through TIMOs. It is more challenging for smaller-scale forest owners to conduct the monitoring and reporting for sustainability certification, let alone going beyond this.

4.2 Bonds

Opportunity: Potential to issue a green bond for Australian forestry. A green bond for Australian forestry could be issued under the Green Bond Principles or the Climate Bonds Standard, which published and made its Forestry Criteria available for certification in November 2018. The scope of eligible activities under the Climate Bonds Forestry Criteria includes plantation forestry, sustainable forest management, production of non-timber forest products, forest conservation and restoration, and certain supply chain activities linked to the above (Climate Bonds Initiative 2018b). Currently, Australia has A\$15.6 billion of green and climate bonds outstanding, with A\$3.9 billion issued in the six months to 30 June 2019 (Climate Bonds Initiative 2019a). The majority of these green bonds are issued by state governments and large corporations and most are directed towards low-carbon buildings and renewable energy, with only 2% of issuance to date going to the land use sector (Climate Bonds Initiative 2019a). 83% of Australian green bonds are certified under the Climate Bonds Standard, demonstrating best practice. A green bond could be issued by the Tasmanian state

government, for example to co-invest in new plantations combined with biodiversity plantings on privately-owned land.

Barrier: Required scale of investment is large. Bonds are not currently used in Tasmanian forestry as the sums of money mobilised are considered to be too large. Despite the growth in green bonds and the potential for further expansion, the applicability to forestry, particularly Australian forestry, is still in question. From the interviews, both forest managers and forest investment managers stated that bonds were not currently used or being considered in the immediate future. There was a prevailing view that Tasmanian forestry projects may be too small to appeal to investors. However, the latest report on Australia's green finance market notes that although 75% of green bond issuance is over A\$500 million in size, smaller deals of up to A\$100 million are also popular (around 20% of deals by number), particularly when backed by pools of green assets and incorporated in larger transactions (Climate Bonds Initiative 2019a). This suggests that a covered bond, where investors have recourse to a pool of specified assets, perhaps including native forest with conservation covenant potential as well as native production forests and plantations, could be a way forward. Alternatively, a green bond could be issued to refinance loans made by local institutions to forest-friendly projects or activities carried out by individuals, communities or businesses. In this case, the cash flow required to pay back the bond would come from future repayment of these loans. Finally, if the issuer were a public-sector entity, a green bond could be structured on the basis of cash flows generated through policy-based mechanisms such as natural capital taxes, user fees or environmental liability legislation. A bond could also be developed that integrates several of these options (depending on who the issuer is). Potentially more success could come from combining projects or receiving backing and coordination from government (see as an example the Massachusetts green bond project - Commonwealth of Massachusetts (2018)). This of course brings with it an additional complication: that of the coordination of myriad, diverse land use managers. The majority of green bonds to date have been based on the credit of the issuer and not on the project-based revenue.

Barrier: Evidence that investors are willing to accept lower than market rate return is lacking. Overall, investors are still focusing on characteristics that match their general objectives (e.g. risk-return, duration etc.) when deciding on their investment and it is the green bonds that match these objectives that have been popular (DuPont et al. 2015). As of yet, investors do not seem willing to pay a premium for green bonds (or to accept a concessionary return) that would allow cheaper financing for borrowers (Larcker and Watts 2019).

Opportunity: Potential to develop an Australian Forest Resilience Bond (impact bond). As noted in the previous section, an impact bond is not a true bond, but a contractual arrangement to raise money for a social or environmental project that produces benefits that one or more entities are willing to pay for, such as watershed protection or fire management in the case of forests. The scale of funds would be much smaller than a capital bond, and could attract philanthropic investors willing to accept a concessionary return and/or higher risk.

Barrier: Impact bonds are at a very early stage of development. Specific benefits would need to be identified, along with parties willing to contract for delivery of those services, and philanthropic/impact investors willing to provide the necessary capital.

4.3 Loans

Opportunity: Development of a sustainability-linked loan scheme for sustainable forestry investments. The sustainable loan market has developed more slowly than the green bond market, but there are signs that it is accelerating.³⁴ Several banks, including National Australia Bank (NAB), Australia and New Zealand Banking Group (ANZ) and Macquarie Bank, have partnered with the CEFC to offer discounts on investments in energy efficient technologies. An expansion of the CEFC remit or the creation of a similar green bank for sustainable land use change could provide similar incentives for financing sustainable forestry. The Federal Government is currently consulting on a proposal to support the delivery of its Billion Trees target through a new A\$500 million concessional loan scheme to be delivered by the Regional Investment Corporation.³⁵ If lower interest rates or other concessional terms were linked to specific natural capital outcomes, such a scheme could potentially leverage significant additional private finance.

Barrier: Measurement and verification of natural capital outcomes and risks is challenging. The interviews with banks revealed enthusiasm for the expansion of sustainability linked loans. However, one of the key barriers they mentioned was the issue of measurement and verification of social or environmental improvements. In addition, the banks would like to see evidence emerging of the links between better social and environmental management and financial returns. If such a link could be made it opens the possibility for banks to direct more money towards projects and companies with sustainable practices. In the absence of such evidence, sustainability-linked loans in the forestry sector are likely to succeed only with government subsidies.

Barrier: Demonstrating new cash flow from sustainable forestry is difficult. Demonstrating new cash flow from sustainable forestry projects is a significant barrier. This is common to all sustainable land use or conservation projects where the improvements may be seen in public rather than private goods. If organisations can measure and communicate the financial benefits of sustainable land use and conservation projects, there may be opportunities to bring in new types of investors and new sources of capital.

4.4 Public sector and philanthropy

Opportunity: Increased public funding for forest natural capital management.

Traditionally, finance for sustainable land use and conservation has come from the public sector, with the global figures showing the public sector accounted for 90% of total funding between 2009 and 2015 (Ward and Lassen 2018). A case could be made for increasing public funding for forest natural capital management in Australia, given that most of the benefits of doing so are public rather than private goods. Governments have the power to raise funds through general taxation, or to impose levies on certain beneficiaries, such as tourists. Public support could be provided through grants, subsidies, rebates on certain management costs, or tax incentives. Previous studies have found that current tax arrangements at all levels in Australia favour agricultural production over investing in private land conservation (Ward and Lassen 2018). Many other countries have tax arrangements more favourable to conservation: for example, in South Africa, taxation laws introduced in 2015 allow landowners permanently protecting their land to deduct 4% of the entire land value against their income each year for 25 years (Ward and Lassen 2018). In Tasmania, the large amount

³⁴ <https://institutional.anz.com/insight-and-research/the-rise-and-rise-of-green-loans-in-australia> (Accessed 18 December 2019).

³⁵ <https://haveyoursay.agriculture.gov.au/plantation-development-concessional-loans> (Accessed 17 December 2019).

of unreserved native forest held by smaller landowners could be a prime target for public support.

Opportunity: Landscape-scale collaboration between public, private and philanthropic organisations. Since the public sector is already a large land owner, as well as having a natural coordinating role, opportunities exist to create collaborative projects that would not otherwise be possible, operating across multiple stakeholders and locations. In addition, opportunities may exist for private landowners to collaborate with public sector organisations and philanthropic organisations. Such landscape-scale projects could provide opportunities to generate additional co-benefits, or to address landscape-scale issues such as resilience to extreme events or a changing climate.

Opportunity: Blended finance. Blended finance involves the strategic use of public or philanthropic funds to leverage private capital investment (Bass et al. 2019). The basic principle is that public or philanthropic funds cover the proportion of an investment (or risk) that is not currently commercially viable, thus enabling private finance to flow to projects that would otherwise not have an acceptable risk-return profile. Many different options are available, from grants and subsidies to loan guarantees and junior debt or equity. Often the role of blended finance can be to remove structural barriers to follow-on commercial investment, for example by providing proof of concept, building capacity, developing standards or other public goods that benefit future projects. The blended finance market is currently worth approximately US\$50 billion/year, and is expected to double in size over the next five years (Ward and Lassen 2018).

Opportunity: Working forest conservation covenants. Over the past 20 years, conservation covenants have been used to protect 96,000 ha of private forest land in Tasmania. These covenants typically prevent activities such as timber harvesting. However, the example of working forest conservation easements in the US suggests that there could be potential for improved natural capital management to be pursued alongside timber production under working forest conservation covenants in Australia. For example, this could require third-party sustainability certification for the production element, whilst also specifying protection of biodiversity and other natural capital values.

Barrier: Additional public sector spending depends on public opinion and the political and economic landscape. Public sector finance for ecosystem goods generally requires the government to forego tax revenue, which involves a trade-off with spending in other priorities such as schools and hospitals. The appetite for new government subsidies related to sustainable forestry in Tasmania currently seems to be limited. For example, the Forest Conservation Fund ended in 2009 and has not been replaced or extended.

4.5 Environmental markets and insurance

Opportunity: Generating and selling Australian Carbon Credit Units (ACCUs) in existing markets. Generating and selling ACCUs is currently available for both large-scale and small-scale forestry in Tasmania, and the risks associated with ACCU income streams can be mitigated with forest carbon insurance. Forestry growers in Tasmania and across Australia can currently generate and sell ACCUs through the Climate Solutions Fund - Emissions Reduction Fund auctions or in the secondary market. Detailed rules exist for implementing and monitoring carbon offsets projects. Two key methods determine eligibility of plantation

forests for ACCUs³⁶, they are 1) to sequester carbon through the establishment and maintenance of a new plantation, and 2) to increase sequestration of carbon by converting an existing plantation from short rotation to long rotation. The establishment of a new plantation forest must be on land that has not had a plantation forest for seven years, and the conversion of a short rotation plantation can be a change from short rotation to long rotation part way through the cycle or following harvest of the short rotation plantation. These criteria were designed to meet the desire of the government for the carbon offset credits to be measurable and verifiable, based on evidenced methods with conservative assumptions. Demand for ACCUs is predicted to increase in the near future (Clean Energy Regulator 2019b) and the Australian Government's commitment to a \$2 billion Climate Solutions Fund extends their purchasing of ACCUs into the future. Demand for ACCUs comes from three sources: the Federal Government (through the Emissions Reduction Fund/Climate Solutions Fund), large emitters (via the safeguard mechanism, a regulation that requires the top 150 emitters to either reduce or offset their emissions) and voluntary buyers such as state and territory governments and businesses. The average auction price under the Emissions Reduction Fund has been approximately \$12 per tonne and spot prices in the secondary market have been approximately \$15-\$16 per tonne (Clean Energy Regulator 2019b, a).

Barrier: Growth in Tasmanian forestry Australian Carbon Credit Units (ACCUs) is limited under current rules. Forestry in Tasmania is already well-established, covering substantial areas of land, and new plantation opportunities are limited. Potential for the expansion of forestry would most likely occur on current agricultural land. However, the current guidelines require an assessment from the Minister for Agriculture on the potential adverse impact on agricultural production in the region (Clean Energy Regulator 2017).

Opportunity: Generating and selling forestry carbon credits in new voluntary markets. Several alternative methods have been proposed that have the potential to reduce emissions from the forestry sector. Examples of such methods include: increasing carbon stocks in degraded native forests or native forests under threat of degradation (e.g. using improved management methods to control invasive species or dieback); diverting forest residues to alternative uses such as biomass energy generation or composite materials instead of burning or leaving the residues to decay; and improved fire management (although current evidence suggests the potential may be limited (Bradstock et al. 2012)). Although these methods are not currently developed, they show the breadth of potential for forestry activities to generate increased carbon benefits if the financial incentives were available.

Barrier: Currently alternative methods are ineligible to generate Australian Carbon Credit Units (ACCUs). However, there may be future potential to sell into voluntary carbon markets if they were established with rules that allow such methods. A challenge to progressing these additional methods is the need to establish a robust evidence base to measure and verify carbon emission reductions from these activities. For example, there are difficulties with determining a baseline condition (the current situation in terms of carbon emissions) to then be able to quantify the improvements.

Opportunity: Generating biodiversity offsets. Biodiversity was raised by numerous interviewees as an area where financial opportunities could be developed. The Biodiversity Offsets Scheme in New South Wales is a potential model for Tasmania. The creation of a similar biodiversity offsetting scheme could help fund activities related to the creation and maintenance of habitat for Tasmania's unique flora and fauna.

³⁶ ACCUs can also be generated by maintaining a pre-existing plantation forest that meets the eligibility requirements of the plantation forestry method, but was established under a different method. See: <http://www.cleanenergyregulator.gov.au/ERF/>

Barrier: Biodiversity offset schemes generally require government regulation. The New South Wales Biodiversity Offsets Scheme resulted from regulation which requires developers and businesses clearing land to offset those activities. This regulation created the demand side of the market; without such regulation, this would depend on voluntary demand which is likely to be much smaller. In addition, no insurance products currently exist to mitigate the risks associated with investing in biodiversity offsets.

Barrier: Monitoring and measuring biodiversity values is difficult. Translation of biodiversity science into effective on-ground monitoring and measurement is challenging. The monitoring and measurement of biodiversity would require significant funding to determine reliable and verifiable changes in biodiversity from a baseline. Existing biodiversity offset schemes have been criticised for this lack of evidence (Nature Conservation Council of NSW 2016).

Opportunity: Voluntary environmental markets for other ecosystem services. An example of a voluntary water quality market exists in Australia: the recently launched Reef Credit scheme could provide a useful model for other ecosystem services provided by forests. The Reef Credit scheme is based around units of a quantified volume of nutrient, pesticide or sediment prevented from entering the Great Barrier Reef catchment, similar to ACCUs representing a unit of carbon emission reduction.

Barrier: Implementation of new voluntary environmental markets requires ingenuity, cost and time to set up and willing buyers. Land management changes in forestry that generate verifiable increases in carbon, biodiversity, water quality or other ecosystem services have the potential to be included in voluntary environmental markets. However, there are substantial costs and time required to generate both reliable measurements of environmental changes and to set up the voluntary environmental market. Voluntary environmental markets require a set of rules and guidelines regarding the eligibility, measurement and monitoring of activities to show evidence that the activities will generate the desired benefits. Importantly, they also require motivated and willing buyers of the ecosystem services to create the demand.



5. Conclusions and recommendations

Natural capital finance offers a variety of ways to fund environmentally sustainable management practices. It is a growing opportunity: trillions of dollars of new investment are required annually to meet Paris Agreement and SDG objectives, and businesses are increasingly taking climate change and other environmental risks into account across the spectrum of business activity. Sustainable forestry has been recognised as a market hotspot in terms of sustainable finance opportunities (Business and Sustainable Development Commission 2017).

We have highlighted a range of potential opportunities for the Tasmanian forestry sector to access natural capital finance, although there are also considerable barriers to be overcome (Table 3). The identified opportunities do not all apply to the same types of forest or forest owner. The largest-scale opportunities relate to the growth in responsible investment demand for new privately-owned sustainable forestry assets, which could be combined with a sustainability-linked loan scheme; and the potential to issue a green bond for improved natural capital management of publicly-owned native forests. However, interventions aimed at small-scale private native forest owners could also have a large cumulative impact, due to the size of this sector in Tasmania. Typically, such interventions would require some degree of government or philanthropic support, possibly combined with new revenue streams. Examples that could be explored include working forest conservation covenants; developing an Australian Forest Resilience Bond; increased public funding for forest natural capital management; collaborative funding approaches to achieve landscape-level outcomes; blended finance; and new environmental markets.

Tasmania has well-developed governance surrounding its forest practices that provide evidence for high levels of environmental stewardship (Nambiar et al., 2012). The well-developed sustainability practices of the Tasmanian forest sector could be regarded as both an opportunity and a barrier: a barrier because this sets a high benchmark against which to monitor environmental improvements or demonstrate future additionality; and an opportunity because the industry already collects a considerable amount of sustainability data for environmental reporting and certification purposes and is well placed to demonstrate sustainability practices.

Table 3. Summary of opportunities and barriers for natural capital finance to support non-timber forest values

Type	Opportunities	Main application	Barriers
Equity	<ul style="list-style-type: none"> - Likely growth in responsible investment demand for sustainable forestry assets - Potential for investment growth if additional financial returns are available through environmental markets, sale of conservation covenants or public or philanthropic incentives 	<ul style="list-style-type: none"> - Private plantations (new) - Private native forest 	<ul style="list-style-type: none"> - Lack of capacity, standards, methods and data for non-timber natural capital assessment - Reputational damage from MIS and the global financial crisis - Limits to growth as existing TIMOs already own and manage a large proportion of Tasmanian plantations

Bonds	<ul style="list-style-type: none"> - Potential to issue a green bond for Australian forestry - Potential to develop an Australian Forest Resilience Bond (impact bond) 	<ul style="list-style-type: none"> - Public native forest - Private native forest 	<ul style="list-style-type: none"> - Required scale of investment is large - Evidence that investors are willing to accept lower than market rate return is lacking - Impact bonds are at a very early stage of development
Loans	<ul style="list-style-type: none"> - Development of a sustainability-linked loan scheme for sustainable forestry 	<ul style="list-style-type: none"> - Private plantations (new) 	<ul style="list-style-type: none"> - Measurement and verification of natural capital outcomes and risks is challenging - Demonstrating new cash flow from sustainable forestry is difficult
Public sector and philanthropy	<ul style="list-style-type: none"> - Increased public funding for forest natural capital management - Landscape-scale collaboration between public, private and philanthropic organisations - Blended finance - Working forest conservation covenants - Partnerships with philanthropic organisations may allow private landowners to access funding that would not otherwise be available 	<ul style="list-style-type: none"> - Private and public native forest - Private native forest (small scale) 	<ul style="list-style-type: none"> - Additional public sector spending depends on public opinion and the political and economic landscape
Environmental markets	<ul style="list-style-type: none"> - Generating and selling ACCUs in existing markets - Generating and selling forestry carbon credits in new voluntary markets - Generating biodiversity offsets - Voluntary environmental markets for other ecosystem services 	<ul style="list-style-type: none"> - Private and public plantations (existing and new) - Private and public native forest 	<ul style="list-style-type: none"> - Growth in Tasmanian forestry ACCUs is limited under current rules - Currently alternative methods are ineligible to generate ACCUs - Biodiversity offset schemes generally require government regulation - Monitoring and measuring biodiversity values is difficult - Implementation of new voluntary environmental markets requires ingenuity, cost and time to set up, and willing buyers.

Although each opportunity tends to have its own specific barriers, there are a number of generic actions that the forest industry can take to translate opportunities into reality, and to remove barriers. We have grouped these under the headings of evidence, measurement and reporting; projects; and landscape-level coordination.

Evidence, measurement and reporting

- a. **Identify existing natural capital benefits.** Identifying and documenting the natural capital benefits provided by forest estates is a critical first step towards identifying potential high natural capital value areas and in communicating this to stakeholders, including existing and new investors.
- b. **Implement natural capital accounting and/or risk assessment.** For larger landowners, it may be practicable to quantify these benefits with the help of a natural capital accounting framework, such as SEEA (United Nations 2014), or a risk assessment

framework, such as the Natural Capital Protocol (Natural Capital Coalition 2016, 2018b). Increasingly, financial institutions are relying on natural capital accounting and risk assessment as a way of measuring and monitoring sustainability outcomes and exposures (Ascui and Cojoianu 2019). Some Tasmanian forest owners are already exploring natural capital accounting, and existing research projects³⁷ are developing forestry-specific accounting methodologies.

- c. Engage with researchers and government.* For smaller landowners, the transaction costs of undertaking natural capital accounting or risk assessment at the individual estate level may be prohibitive. Nevertheless, a variety of broad coverage land and environmental data are available from research and government sources³⁸ and land-management decision support tools are currently being developed that could be used to assess natural capital benefits without detailed input from the land managers themselves.³⁹
- d. Communicate non-timber natural capital benefits from forest estates.* A change of focus away from wood fibre production towards management for the improvement of non-timber natural capital could help change the narrative surrounding the negative sentiment related to MIS in Australia and open further investment opportunities. Effective communication of the non-timber natural capital benefits from forest estates is key to this.

Projects

- e. Understand current and future financial opportunities appropriate to the relevant forest type and owner.* Identifying and defining eligible assets, activities and projects for different natural capital financing opportunities is essential for the alignment of specific projects/activities to the right funding mechanism.
- f. Identify new investible projects, activities and assets.* Eligible projects form an important part of natural capital financing. Identifying projects and activities that meet the needs of different types of investors is essential. Better understanding the language of natural capital along with the requirements of investors can open up opportunities for conversations about expanding project criteria in innovative ways (Business and Sustainable Development Commission 2017). The process of identifying suitable projects/activities needs to include market testing and the capacity to fast-fail and pivot in response to market signals.
- g. Develop an impact theory.* A theory of impact provides investors with an understanding of the overall sustainability impacts of a company (positive or negative), as well as the intended impacts of specific projects and activities (United Nations Global Compact 2019). It is important for substantiating how companies contribute to sustainability goals outside of pre-defined categories of eligible projects, activities and assets. It also provides a mechanism for monitoring the success of projects and activities on improving sustainability outcomes, particularly when linked to monitoring frameworks such as natural capital accounting. Key characteristics of an impact theory include: intentional (how and to what degree the project will contribute to sustainability), specific (describes the unique way in which a project will improve sustainability), relevant (targets where

³⁷ For example, O'Grady et al. 2018-2020: <https://www.agriculture.gov.au/ag-farm-food/innovation/rural-research-development-for-profit/approved-projects-round3>

³⁸ For example, <https://digitalagriculture.com/> (Accessed 19 December 2019) and <https://dpiw.tas.gov.au/land-tasmania/the-list> (Accessed 19 December 2019)

³⁹ For example in the UK <https://www.leep.exeter.ac.uk/nevo/> and globally <https://naturalcapitalproject.stanford.edu/software/invest>

investment is most needed to improve sustainability outcomes), intensity (the effectiveness of the proposed solution), comparable (allows comparison between similar types of projects), balanced (addresses positive and negative consequences of the project), measurable (using targets and indicators), and integrated (into the company's strategic management and governance procedures) (United Nations Global Compact 2019).

- h. *Map to sustainable development goals.*** A key underlying driver of much natural capital financing is delivery of the SDGs. Mapping projects and activities to SDGs is an important step in articulating sustainability outcomes. The Forest Stewardship Council Ecosystem Services framework provides some general guidance on SDGs affected by forestry activities (FSC 2018), and the PRI Market Map links sustainable forestry activities to SDGs (Principles for Responsible Investment 2018). More specific mapping is required to meet the needs of the Tasmanian forestry sector.
- i. *Engage with policy makers and regulators.*** Some natural capital finance opportunities, such as environmental markets, are more likely to succeed with the support of a strong regulatory framework. Where new markets, or extensions of existing markets, are envisioned, early engagement with the appropriate levels of government is necessary to ensure regulatory support.
- j. *Consider natural capital risk.*** A key criteria for natural capital financial investment is identifying the level of financial risk associated with investments (United Nations Global Compact 2019). Being able to document risks to natural capital and how the project/activity will reduce that risk, is an important step in obtaining natural capital finance.

Landscape-scale coordination

- k. *Understand landscape scale responses to natural capital risk.*** Some risks to natural capital require landscape scale approaches to reduce those risks, for example, bushfire management.
- l. *Implement landscape scale natural capital accounting.*** Natural capital accounting offers a consistent framework to measure and monitor progress towards achieving environmental aims and objectives across a variety of different scales, including at the business level (as described previously), regionally, or at the state or national level. Landscape scale natural capital accounting would allow a more complete picture of the benefits of forest natural capital.
- m. *Consider scale and connectivity benefits.*** The scale and connectivity offered by a cluster of projects can have benefits that go beyond the sum of individual project benefits. Governments can play an important role in identifying and planning to maximise these benefits.
- n. *Consider innovative ways of meeting scaling requirements:*** The scale requirements of many natural capital financing instruments will be difficult for the Tasmanian forestry industry to meet without taking a cross-sectoral approach. Even at the sectoral level, the scale may be too small. The industry should consider whether there is an offering that integrates across forestry, agriculture, energy and tourism in Tasmania, that may overcome the scale issue. For some opportunities, there may be prospects for partnering with existing operators (e.g. carbon farming companies or those interested in offsetting land degradation activities).

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