An Effective System of Defining Water Property Titles

Research Report

Australian Government
Department of Agriculture, Fisheries and Forestry
Land & Water Australia

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Foreword

In 1994, the Council of Australian Governments (COAG), comprising the Prime Minister, Premiers and Chief Ministers, and the President of the Australian Local Government Association, endorsed a strategic framework for the reform of the Australian water industry, focusing on efficient and sustainable water use and management. COAG agreed on the need to provide for market-based efficiencies in rural water industries and to improve the environmental health of rivers. A key aspect of the reforms was the development and implementation of clearly specified water entitlements and the separation of water title from land title.

The need to establish appropriate water-titling regimes promises to underpin the long-term productivity of irrigated agriculture and sustainable management of Australia's water resources. The nature of how those water entitlements are registered, their security, ease of transfer, cost of administration, and public accessibility of information on trades and pricing, will be fundamental to establishing public confidence in the operation of the entire water industry.

A complete system of water-property titles encompasses both the definition of the entitlements themselves as well as a system of registration of those entitlements. This report focuses on identifying the proper role of a water-titling and registration system. It addresses the technical details of developing a registration system across Australian jurisdictions that is nationally consistent in its approach but which utilises the resources of the States and Territories in its implementation.

COAG reaffirmed its commitment to water reform with its agreement , in August 2003, to develop a National Water Initiative to build on the achievements of the 1994 COAG strategic water reform framework. I commend this report as making a substantial contribution to a very important aspect of the Australian water reform agenda.

John Sheehan
President, Australian Property Institute, NSW Division

Executive summary

In July 2003, ACIL Tasman, in conjunction with Freehills, was commissioned by Land & Water Australia, on behalf of itself and the Department of Agriculture, Fisheries, and Forestry, to develop a workable system of water property titles in Australia.

Purpose of this report

The project is designed to "assist in future development of optimal water resource management and registration regimes". According to the project brief, the outcomes of the project were to include:

- the definition of water property and its relationship to existing property rights
- the development of an appropriate titling system that recognises links between water and land property, while enabling each to be flexible and independent
- the identification of issues associated with the development of a set of protocols for the use of water property, and the integration of independent water property within the existing regulatory system.

A complete system of water property titles encompasses both the definition of entitlements themselves and a system of registration of those entitlements. The focus in this project is primarily on developing the technical details of the registration system, rather than resolving the policy issues associated with defining the entitlements. Nevertheless, it is recognised that an effective system of registering entitlements depends, in part, on the nature of the entitlements themselves.

This report first develops a conceptual framework for the project, reviews current water property title systems across Australian jurisdictions, and identifies the proper role of a titling and registration system. This framework is then applied to develop the detail of an effective titling system for water.

Background

The focus of water-resource management in Australia has shifted over recent years, from the development of new water resources and further investment in infrastructure, to the re-allocation of water through trading and the provision of water for the environment. The trading has been compromised in the past by the entitlements to access water being intrinsically linked to the land on which the water was to be used – water could not be bought and sold separately from the land. Over recent years, this link between land and water has progressively been broken. By enabling water to be traded separately from land, it is more readily able to move to higher-value uses. A major impetus to this process was the 1994 COAG agreement, committing jurisdictions to water reforms.

Since the COAG agreement, there has clearly been significant progress towards the development of active markets in water. Nevertheless, there are concerns that the legislative, policy and regulatory frameworks for the definition and trading of water property entitlements could be more effective.

At its meeting on 29 August 2003, COAG agreed to a National Water Initiative including implementing a "robust framework for water access entitlements that encourages investment and maximises the economic value created from water use, while ensuring that there is sufficient water available to maintain healthy rivers and aquifers". This project is intended as an input into the process of achieving that goal, with a particular focus on the titling/registration system.

The nature of property rights regimes for different resources

The task of designing an effective system of registering a right needs to reflect the nature of what the right is and the characteristics of the resource in question.

Most of the water used in Australia is a classic example of a common-pool resource. The history of overexploitation and inefficient use of common-pool resources throughout the world is well-documented, and many believe a well-defined and secure property rights regime can assist in preventing overexploitation and inefficient use. Such a policy is being pursued with respect to water in Australia, where conditions of scarcity are becoming increasingly apparent in more and more of our catchments.

There appears to be growing consensus on the appropriate way of specifying water entitlements in Australia as access entitlements providing ongoing rights to a share of the resource. Thus, an interest in water can be considered as having three key components:

- **entitlement** – the long-term interest (share) in a varying stream of periodic allocations
- **allocations** – a unit of opportunity (usually a volume) as distributed periodically
- **use licence** – permission to use allocations with pre-specified use conditions and obligations to third parties.

Defining an effective titling system depends upon many variables, such as the physical nature of the asset or resource, the nature of the transactions that need to be administered with respect to the rights or entitlements, the extent of unbundling/divisibility of the resource, the value of asset involved, the cost of establishing and operating the titling system, and the extent to which the asset underpins investments.

The need to balance resource security and adaptive management

Without title that provides an appropriate degree of certainty of the right, the incentives for efficient trade and investment may be substantially undermined. The ability to use assets as collateral for loans is also affected by the security of title to a property right. Titling/registration systems can therefore play a key role in efficient market operation through underpinning the security of the property right – and the security, to the lender, of any use of the asset as collateral. Balanced against the need for secure title to facilitate efficient trade and investment, however, is the need for integrating effectively with natural-resource management processes and objectives.

Types of titling systems

There are many different titling systems in place for different resources, but all the systems that could be considered formal are essentially one of two types: a 'recording system', frequently known as a 'registers of deeds'; or a 'registration' system, more technically 'registers of rights'. The Torrens system that applies to land titles in Australia falls into the latter category. A fundamental principle of the Torrens system is that a person who becomes the registered proprietor of land will obtain an indefeasible title. No other record is necessary to prove that the right is held.

Torrens-type system proposed for water

It is proposed that a Torrens-based system should be adopted in relation to water rights, as it provides a much higher level of certainty of title to those dealing with the water entitlement and will ultimately be the most appropriate to facilitate trading and investment.

Existing water-licence registers maintained by responsible authorities originally constituted a record of licences. Such 'Old title' registers provide an appropriate way of recording and administering statutory-based privileges. However, as water entitlements are developing into divisible, tradeable and often highly valuable assets, and are being de-linked from 'Torrens title' land titles, registration systems now have an additional purpose – providing certainty of title and facilitating trading markets.

The analysis in this report leads to the conclusion that water-titling systems based on, but somewhat modified from, 'Torrens titles' for land should be established, in a manner similar to the way that Strata title and Community title was developed as a specific form of title within the broad Torrens title system. This conclusion rests not so much on the fact that water and land titles were previously linked, as on the underlying nature of the resource and transactions in it, which distinguish it from other tradeable entitlements such as fishing quotas or rights in the radio spectrum.

This position also reflects our on-balance assessment that, in the current setting, adopting a Torrens title system is likely to be a more efficient and effective means of managing the risks and transaction costs in dealing with them than alternatives such as relying on the advent of private title-insurance as an economic instrument. Considerations here include the existing familiarity and confidence in the Torrens system applying to land in Australia, the fledgling nature of the local private title-insurance market, the fact that many transactions will involve both water and land (where having different underlying titling systems for each may increase costs), and the difficulty in accurately assessing and pricing risks given the current status of State water-entitlement registers.

Some modifications to reflect nature of water entitlements

In the case of water, the key modification is that the underlying right provided by the entitlement is not the right to manage and use a piece of land defined by boundaries on the cadastre, or by airspace, but rather is the (firm) right to a share of a specified water resource available for approved purposes. Importantly, this is independent of whether the underlying entitlement provides a right to compensation for attenuation via a reduction in the water allocation. The issue of indefeasibility can, with a system of rights based around resource shares rather than volumes, be quite separate from the issue of whether compensation should be paid for attenuation of entitlements, and if so under what terms.

Proposed elements of titling system

What is proposed here is not necessarily radical overhauls of existing systems, but adoption of common principles and features of a titling system that are necessary to facilitate investment and water trading, while allowing for adaptive resource management. The key features of the proposed system are as follows:

- The register should provide a clear and unequivocal record of what property rights the underlying entitlements provide.
- Title should be 'indefeasible', and dealings in relation to water entitlements should take effect only upon registration of the dealing.
  - In addition to regulation by government, certain exceptions that are applicable to the indefeasibility of land title may also be appropriate; for example, where an entitlement or encumbrance has been registered as a result of fraud.
  - Provision could be made for a proportion of registration fees and/or water management charges to be put towards funding a State guarantee.
  - Legislation should specifically provide for the situations in which recourse can be had to the State guarantee. Compensation in this context would be limited to losses arising from the functioning and operation of the register, with compensation for attenuation of entitlements being a separate issue.
- The registration system should be administered pursuant to certain procedures and protocols similar to the land title office manuals and guidelines that exist in various States.
- There should be provisions to protect third-party interests:
  - By putting in place protocols which require the holder of a registered security interest to be notified of any dealings in relation to the water entitlement and other events affecting the water entitlement.
  - At a minimum, the entitlement itself; permanent transfers of the water entitlement; and encumbrances that affect the water right, such as mortgages and other security interests, must be registered.
  - Interests that can be registered in relation to land should be able to be registered in relation to water entitlements, unless the nature of water as a resource makes that interest inapplicable to water.
  - Lenders should be able to procure the registration of their interest independently of the holder of the water right. Protocols should, however, be developed in relation to this process, so that the holder of the right is sufficiently protected.
  - To ensure public and lender confidence in water entitlements, there must be a system for prioritising these competing dealings. An effective means of prioritising interests is to base priority on the order of registration. Registered interests would take priority over unregistered registrable interests. If a person fails to register an interest that is registrable, then that unregistered interest would be defeated by a subsequent registered interest.
  - There should be protocols in place that allow for the discharge of the security interest, in conjunction with the transfer of the entitlement to a new registered holder.
  - There should be mechanisms (such as caveats and settlement notices) to protect the interests of a purchaser between entering into a contract and registration of the transfer, as the lodgement of inconsistent dealings during this period will affect the purchaser's priority.
  - Protocols such as backdating need to be developed to deal with delays between date of lodgement for registration and actual registration of dealings.
  - Protocols could also be put in place to assist in the process of identifying unregistered interests.
- Appropriate transitional arrangements to ensure that existing titles and registrations of interest on those titles (eg. mortgages previously held over the combined land/water asset) are appropriately carried over into the new framework, where these assets have separate titles.
- It should be mandatory that registers be publicly accessible, including information on prices of trades.
- In order to track accumulation, trade, and use of water volumes accrued under water entitlements, a separate water-accounting system (distinct from the water entitlement register), is needed.

In our view, these features are more important than the issue of who administers the register. These are intended as a checklist of desirable features, regardless of whether the register is overseen by a water-resource agency, a land titles office, or a private irrigation company.

Water for the environment

To a large degree, resolution of the balance between the needs of users for resource security and those of adaptive environmental management is in the definition of the underlying entitlements themselves (eg. as a share of the water available for consumptive use), and the issue of compensation for attenuation of these entitlements, rather than in the technical details of the tilting/registration system.

To date, environmental allocations have predominantly taken the form of 'hard-wired' management rules such as minimum environmental flow rules. Such rules are taken into account in the hydrological modelling that defines what is then 'left over' for extractive users. Only these latter entitlements (ie. those for extractive users) are recorded on the titling/registration system, because the entitlements they confer are net of water set aside for environmental purposes.

Alternatively, or in addition to the 'prior right' model, environmental water allocations could be, and in some cases have been, defined in similar volumetric terms as those of extractive entitlements. Under the 'equivalent right' model, such agencies could become traders in the market in their own right, buying and selling water in pursuit of environmental objectives. It would seem that formal title to such entitlements held, for example, by an environmental agency, could be incorporated relatively easily into the water-entitlement titling system. Arguably, formal title to water entitlements (to be used for achieving environmental goals), provides a more secure allocation than does environmental flows specified in rules within subordinate legislation or other management instruments.

It would also be possible to 'reserve' part or all of the entitlements earmarked for environmental purposes in an analogous fashion to Crown land that is reserved for certain public purposes (eg. national parks). Just as parcels of Crown land can be brought within the Torrens title land register and issued with a certificate of title, so too could environmental water entitlements.

National consistency rather than single system

While there have been some suggestions that there should be a national approach to registering of water entitlements in order to facilitate interstate trade, a uniform national system would be a large undertaking, and there are real questions about whether the costs of the changeover would deliver commensurate benefits. Nevertheless, there would, in our view, be significant benefits from a more-consistent approach across jurisdictions that made for more seamless trading. In this sense, a 'national' system of water rights does not have to imply a single national register. Rather, what can and should be nationally consistent are the principles and systems on which the titling systems are based.

Other options that could be explored to facilitate interstate trading include: linkages between individual jurisdictions' registers (eg. via a 'front-end', computer-based search facility); area-based registers within regions where significant interstate trade occurs (ie. Murray–Darling Basin, Border Rivers); streamlined regulatory approvals processes for interstate trades; and adoption of a 'tagging' rather than an 'exchange rate' approach to interstate trades.

Transitional approach to implementation

Finally, it needs to be acknowledged that the detailed design and implementation of a titling system for water is, by its very nature, likely to be an ongoing exercise. In some areas, it may take considerable time to convert all existing water entitlements into clearly specified tradeable entitlements (eg. catchment planning processes may take years). In addition, there may be merit in a system that guarantees title in accordance with the register, conditional on the initial registered title being valid. Provisions could exist for registering these searches as they occur – essentially on a needs basis – and for governments then issuing a guarantee of absolute title. While the proposals in this report are designed to assist in the development of effective water-resource management and titling regimes, it is recognised that adoption of robust water-entitlement registration systems is likely to occur gradually, rather than being a one-off initiative.

1 Introduction and background

1.1 Purpose and scope of this report

This project aims to develop a workable system of water property titles. The project is designed to "assist in future development of optimal water resource management and registration regimes". Specifically, a workable system of water property titles must be developed that:

- recognises the needs of both users and the environment
- is based on first-principles analysis
- recognises links between land and water, while enabling independence and flexibility
- can be integrated into existing regimes.

According to the project brief, the outcomes are to include:

- the definition of water property and its relationship to existing property rights
- the development of an appropriate titling system that recognises links between water and land property while enabling each to be flexible and independent
- identification of issues associated with the development of a set of protocols for the use of water property and the integration of independent water property within the existing regulatory system.

This report first develops a conceptual framework for the project and reviews current water property title systems across Australian jurisdictions. This provides the basis for developing the detail of an effective titling system.

The primary focus of this report is on titling systems for registering water entitlements held by private users (individually or collectively). While this predominantly relates to water used for extractive purposes, the report also considers how and to what extent environmental water could be encompassed within the system. While a detailed analysis of institutional and property right arrangements for environmental allocations is beyond the scope of this report, the proposed titling system needs to be seen within the broader context of the various forms of legal rights to water.

A complete system of water property titles could encompass both the definition of entitlements themselves and a system of registration of those entitlements. The focus in this project is primarily on developing the technical details of the latter, rather than resolving the policy issues associated with the former. Nevertheless, it is recognised that the design of an effective system of registering entitlements depends, in part, on the nature of the entitlements themselves.

Finally, it needs to be recognised that the detailed design and implementation of a titling system for water is, by its very nature, likely to be an ongoing exercise. While the proposals in this report are designed to assist in the development of effective water-resource management and titling regimes, it is recognised that the proposed system could not necessarily be introduced overnight.

1.2 Contextual background

Over recent years, increasing public and government attention has been devoted to managing our limited water resources in a more efficient and sustainable way. The focus of water-resource management has shifted from the development of new water resources to the re-allocation of water through trading and the provision of water for the environment.

In Australia, rights to control and use water are vested in the state, pursuant to legislation. Governments then provide conditional statutory entitlements to access water to users. In the past, however, these entitlements to access water were intrinsically linked to the land on which the water was to be used, and could not be bought and sold separately from the land.

Over the past two decades, however, this link between land and water has gradually and progressively been broken, allowing water to be traded as an asset separate to land, thereby enabling it to move to higher-value uses. This commenced with temporary trading of current season water allocations between irrigators within the same region, but has now extended to permanent trades of the underlying entitlements and to inter-regional and interstate trades.

A major impetus to this process was the 1994 COAG agreement by all jurisdictions to water reforms, including:

- separation of water entitlements from land title, clear specification of entitlements in terms of ownership, volume, reliability, transferability and, if appropriate, quality
- development of water markets so that water maximises its contribution to national income, subject to the physical, social and environmental constraints of catchments
- establishing formal allocation of water for the environment based on the best scientific information available
- consultation and public education on issues such as water use, pricing reforms, and water allocation and trading.

In the past decade, there has clearly been significant progress towards the development of active markets in water (separate from land) as a key instrument in achieving more efficient and sustainable use of water resources. Key initiatives have included the following:

- Jurisdictions have progressively converted water licences to 'new' more clearly defined, secure and tradeable entitlements.
- Allocation of entitlements is now generally being undertaken within planning frameworks with scientific input and community consultation designed to ensure more sustainable management of the resource. In most States, provision of water for the environment is now given priority over allocation of water for consumptive uses through these processes.
- Development of regulatory approvals processes and protocols for trades, designed to protect the environment and the interests of third parties from adverse impacts that may result from certain trades.
- Establishment of institutional arrangements to reduce the 'transaction costs' of undertaking trades (eg. provision of information about the price of trades, development of centralised exchanges etc.).

The resultant development of water markets in Australia has generated considerable benefits from the transfer of water from low-valued to high-valued uses. Nevertheless, there are concerns that the legislative, policy and regulatory frameworks for the definition and trading of water property entitlements could be improved. Key issues raised by various stakeholders include:

- whether the specification and/or conversion of water entitlements within periodic water plans has appropriately balanced the need for secure property rights for productive economic activity with the need for adaptive management of the environment as scientific knowledge improves over time
- whether compensation should be payable where conversion of entitlements has resulted in perceived attenuation of pre-existing entitlements to water, and the level of such compensation
- financial and legal implications for landholders and their creditors resulting from separating title to land from water; in particular, the establishment of water entitlements as property rights separate from land, sometimes with less access to water than had previously been assumed and with more explicit acknowledgement of potential for attenuation in the future, has raised concerns about the underlying security of water rights as a basis of provision of long-term financing
- whether the entitlement conversion processes have provided adequate allocations for the environment
- the social and economic impacts of trading water out of particular regions
- whether existing institutional and regulatory arrangements allow for timely and cost-effective trading in water entitlements.

Clearly, as the market matures, it will be increasingly important to have efficient systems and processes for registering property rights that provide security of ownership and are able to underpin efficient trade and investment. At the same time, however, there are concerns that the operation of the market does not compromise the ability of government to undertake adaptive natural resource management. For the purposes of this report, adaptive natural-resource management refers to "the process of continually reviewing and setting aside water for environmental purposes as conditions change over time, such as in the understanding of environmental needs".[1] It can also be reasonably viewed as taking in the natural processes of policy changes in respect of resource use and management that will emerge with new information or more cost-effective technologies – any of which can have implications for effective access rights. For example, effective rights might be influenced by changes in dam management or structures designed to mitigate flood risk; by controls designed to manage thermal pollution of water releases; or by restrictions on discharge rights that may influence use options; as well as by explicit decisions in respect of environmental flows.

[1] Productivity Commission (2003)

At its meeting on 29 August 2003, COAG agreed to a National Water Initiative including implementing a "robust framework for water access entitlements that encourages investment and maximises the economic value created from water use, while ensuring that there is sufficient water available to maintain healthy rivers and aquifers". The details are to be developed for COAG's first meeting in 2004. This project is intended as an input into this process, with a particular focus on the titling/registration system.

1.3 Approach

In accordance with the brief, the analysis in this paper is based heavily on first principles, and our view that the titling system needs to be based on a sound conceptual framework.

The proposals for the detailed design of the titling system, however, are also aimed at ensuring that it is capable of practical implementation.

The preparation of this draft report has been undertaken primarily as desk-top research and analysis, drawing on the literature and other public information and reports.

1.4 Structure of this report

Chapter 2 provides a conceptual framework for property rights and associated titling/registration systems.

Chapter 3 then reviews existing systems of water entitlements in Australia within this framework, and identifies emerging trends in the definition of the underlying entitlements.

Chapter 4 describes existing titling/registration systems for these entitlements.

Finally, Chapter 5 develops proposals for the detailed design of a water-titling system.

Several attachments provide more-detailed information on the terms of reference for this project, titling systems applying to other natural resources and other assets, and the nature of current water-entitlements in Australia.

2 Conceptual framework for water property titles

2.1 Introduction

The objective of this study is to develop a water property titling system that is likely to maximise the long-term value of water resources. Given that water has value in both consumptive and non-consumptive uses, this requires a titling regime that provides sufficient certainty for investment in productive activities and permits water to trade to its highest value use, while at the same time allowing for water to be allocated to non-consumptive uses, including the environment, where this represents the socially most-valuable use. Accordingly, this report offers a public policy assessment of what type of water property titling system would be welfare maximising and in the overall long-term public interest, rather than being an assessment of the current legal position.

In fulfilling this objective of maximising the value of water resources and the long-term public interest, it is important that the conceptual framework for water property rights and the associated titling system is fully appreciated and understood. This chapter provides such a conceptual framework. It draws on a wide body of the theoretical literature, including contributions from disciplines as diverse as economics, politics, law and ecology. Through an analysis and critical review of the literature, the conceptual grounding of this study emerges.

2.2 Definition of property rights

The task of designing a more-effective system of registering a right cannot proceed in isolation from what the right is. Indeed, the very composition of the right itself, in combination with the physical characteristics of the resource and the nature of the transactions in it, is likely to play a key role in determining the most-effective system for its titling and registration.

There is often great confusion when debating property and property rights due to the many ways in which terms such as 'property', 'property rights' and 'owner' are used. An appreciation of exactly what we mean by property is an important prerequisite of defining an effective system of titling water property rights.

From the outset, it is important to distinguish between property rights and property *ownership*.

As discussed by Dodds (1994), the centre of attention in discussion on property in legal circles is not something physical and tangible that we call property (eg. land, house, shares, fish, volume of water), but the *rights* that can be held over property. In this context, a right is a collection of entitlements that a person may have and that are protected by the government or under an agreement (contract). One can have property rights over a resource without being the owner of the resource, such as in a leasehold arrangement to real estate.[2] More generally, property rights in an asset or resource can be viewed as a spectrum from a minimal interest through to private ownership (acknowledging that even private, fee-simple title is subject to the Crown's absolute prerogative of cancellation).

In a private property situation, the owner is the person (or people) who legitimately hold the sufficient range of property rights, including rights of exclusion, transfer and use. It is generally rights of alienation that define the legitimate owner, even though rights of alienation are only one of the many rights than can be attached to property.

The distinction between ownership and rights is very relevant to water because the bundle of rights that have been allocated do not collectively amount to a legal *ownership* of the underlying resource, in the pure, private-property sense of the word. Such ownership effectively rests with the Crown (ie. the States) on behalf of the community, and has been assumed to remain there. The property rights of interest here relate to certain rights to access and to use the water available from the resource under prescribed circumstances.

[2] In a legal sense, all that one owns under a lease arrangement are the rights specifically designated by the lease itself, not the underlying property. One can own a property right without owning the property.

This distinction has important implications for the design of an effective titling and registration system by which the rights are administered.

Some alternative definitions of 'property' rights are presented in Box 1. In essence, a property right encompasses both the definition of the 'resource', and the nature of the rights in relation to the resource. Sheehan and Small (2002, p.16) observe:

> … all "property rights" result in the conferral of three qualities (or capacities):
>
> 1. a management power;
> 2. an ability to receive income or benefits; and
> 3. an ability to sell or alienate the interest.

These definitions and the foregoing discussion highlight a number of other key observations pertinent to the conceptual framework for analysis of property rights regimes.

Property rights derive not just from formal title but also from other laws and rules that may apply. For example, the ability to use land over which one has title is usually qualified by planning laws or through contracts agreed between parties. Thus, while one may have ownership over an asset by virtue of holding a formal title to it, this does not in itself define the property rights that one has in relation to that asset.

Any property right therefore needs to be understood in the context of the broader set of laws, regulations, private contracts, and other formal or informal arrangements (eg. customs) that affect the use or other actions in relation to the asset or resource. In the current study, for example, the rights to water held by individual irrigators under licences cannot be viewed in isolation from other laws, regulations or licences governing the use of that water. This issue is explored in more detail later.

A property right is not merely asserting claims over a resource.

As discussed by Meinzen-Dick and Pradhan (2002), a claim is not a legitimate property right unless the claim is accepted and legitimised by a larger collective group. Typically, this claim legitimisation is the role of statutory law and government, though in some places in the world, the state may be only one of several legitimising institutions.

Box 1. What is a property right?

Tan (2002b):

Property is an institution of law that defines the relationship between a legal person and the thing or resource in question…Property is largely expressed through the power and authority allowed to persons over the resource. So the term is a convenient short form to 'a quantum of socially permissible power exercised in respect of a socially valued resource.

National Competition Council (2001):

A 'property right' exists when the community supports and protects the exclusive use and enjoyment of an entitlement and allows that entitlement to be traded for value. …However, it is also common that there are limitations placed on the enjoyment of property rights such that they are rarely unqualified or absolutely certain.

Libecap (1994, p. 1):

… the right to exclude non owners from access, the right to appropriate the stream of rents from the use of an investment in the resource, and the right to sell or otherwise transfer the resource to others.

Johnson (1994, p. 79):

… the exclusive authority to determine how and by whom a particular resource is used. More broadly, property rights may be seen as a bundle of separate and distinct rights over a particular good – including at least the right of personal use, the right to demand compensation as a prerequisite for its use by other people, and the right to transfer any or all of these rights to others (either permanently by sale or temporarily through some form of contractual arrangement). Property rights may be exercised by governments through their designated officials (public ownership or public property) as well as by private individuals and other sorts of non-government organisations (private property).

Generally, there are limitations and/or obligations placed on the enjoyment of property rights, such that they are rarely unqualified or absolutely certain.

Most property rights are subject to regulations. Property rights, even title as 'secure' as Torrens title rights over land, are not immune from subsequent legislative or regulatory modifications, or from activities authorised on other properties that could restrict the practical rights and limit the value of the title. In some cases, compensation provisions may apply, but there are many exceptions – such as modifications to buildings codes, approval of construction on a neighbouring property etc.

Often regulations are imposed on the use of property to protect the rights of other property owners.

Dodds (1994), Eckersley (1996) and Bell and Lowe (2000) point out that regulations by the state are actually a precondition of property rights. For example, even property owners themselves may seek increased regulation on the use of property when it is clear that their right to the use of their property is diminished by the unrestricted exercise of property rights of others. The dependence upon regulations is particularly needed by the property owner who may suffer from a problem, but cannot prove liability at common law due to the collective nature of the problem (as with many cases of water pollution).

Regulations may also, however, be seen as undermining property rights. Pilon (1995) argues that property is not the physical matter that makes up an estate, but the right to use that estate without permission or permit (so long as that use does not interfere with the right of another to do the same with their property). With respect to land, he points out that it is not the physical entity that gives land value. Rather, it is the potential uses of the land. He argues that, when government regulates and takes away the uses that go with private property, it has effectively taken away 'the property' and the owner is left with nothing but "the empty shell of ownership".

This notion that regulating the use of private property is paramount to actually taking the physical unit from the owner is increasingly being recognised in the United States as a 'regulatory taking' (Stedfast 1999). According to Oswald (1999), a regulatory taking occurs when the government, without formally exploiting its powers of compulsory acquisition, enacts laws or undertakes actions that result in a "de-facto taking of private property for public use". Concern over regulatory takings in the United States has led to the introduction of distinct property-rights legislation in many States. Such legislation requires government to assess whether any proposed regulation equates to a regulatory taking in accordance with Supreme Court standards for takings, or to pay the property holder compensation if a regulation decreases the value of the property beyond a certain percentage (usually 5–10%).

Advocates of property-rights legislation suggest that it creates certainty in property law and prevents a small number of individuals from bearing the cost of social reforms and public interest initiatives, while critics of the legislation argue that it merely forces the general public to pay property owners not to cause harm to others (Oswald 1999).

The legal position and associated literature in Australia needs to be distinguished from that in the United States.[3] Nevertheless, the issue of compensation for reduced value of property rights as a result of government policy is one that has been prominent in the recent debate about water rights in Australia. While the legal basis for claiming compensation for changes made to water entitlements (ie. changes that have occurred as governments have sought to impose caps or claw back water to protect the environment) appears problematic,[4] the policy issue here is whether compensation *should* be paid. Provisions for compensation can affect the security of property rights, and hence have implications for efficiency and for the associated titling system. This issue of how compensation can affect the security of a property right is explored in more detail in Section 3.2.4

Property rights can be seen as comprising a 'bundle' of individual rights.

As noted above, the most commonly identified components are the right to use the resource, the right to exclude others from using it, the right to the income it produces, and the right to alienate it. In a similar vein, Schlager and Ostrom (1992) identify five distinct elements of property rights of particular relevance to natural resources:

- access – the right to enter a defined physical area and enjoy non-subtractive benefits, such as appreciate views or enjoy a walk
- withdrawal – the right to obtain resource units or products of a resource system, such as mine soil, catch fish, or consume water

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[3] Under section 51 (xxxi) of the Federal Constitution of Australia, the Australian Government has the power to make laws for the acquisition of "property on just terms from any State or person for any purpose in respect of which the Parliament has power to make laws". While State constitutions do not impose such an obligation, State governments have enacted legislation to compensate for acquisition of property.

[4] For a discussion of the issues see Tan (1999).

- management – the right to regulate internal use patterns and transform the resource by making improvements, such as removing vegetation, cultivating soil or erecting a building
- exclusion – the right to determine who will have access rights and withdrawal rights, and how those rights may be transferred
- alienation – the right to sell or lease (trade) management and exclusion rights – this is the right that typically defines ownership of the resource

Property rights can include any of the above rights, while outright ownership will typically entail all of them. Property rights exist whenever there is a legally defensible interest in some thing, even when that interest is not complete. Thus, Ostrom (2000) observes:

> The rights of access, withdrawal, management exclusion and alienation can be separately assigned to different individuals as well as being viewed as a cumulative scale moving from the minimal right of access through possessing full ownership rights.

Table 1 illustrates how the bundle of rights held by an individual or group can vary according to the tenure position they hold.

The distinction between these tenure types is not always clear. In the case of water, the full range of rights to the water resource effectively rests with the Crown. The person holding title also has a range of rights, but their full range of rights, particularly the right of alienation, relate to their title, not to the water resource itself. Insofar as a person holding title has the right to trade that title (ie. a right of alienation), they own the title. However, this does not mean they 'own' the water resource. Furthermore, any trade that occurs is subject to the approval of the relevant resource-management authority. In this way, the state retains the right to make the ultimate decision on alienation. The title holder is therefore more properly placed somewhere between an owner and a proprietor of the water resource, according to Ostrom's classification.

A lack of any one of these rights does not necessarily constitute an insecure property-rights regime. Rather, the security of the property-rights regime depends more upon the security of the rights that are held, rather than the number and breadth of those rights. An effective titling and registration system for fluid and common-flow resources, such as water, must be able to efficiently accommodate different combinations of these rights in a secure manner, not just the overall bundle that constitutes true ownership of the resource.

In a similar vein, Scott (1999) observes that, when people speak of a 'complete' property right, they are referring to the characteristics of property rights all held to their fullest possible extent. He identifies the characteristics of such property rights as exclusivity, duration, transferability and security, flexibility and divisibility.

Various types of spatial and temporal unbundling of property rights are possible.

For example, a property right may be temporarily assignable to another party (eg. leasing), a proportion of it traded or leased, or various derivative and/or option contracts be developed over an underlying asset. As discussed in more detail in the following chapter, in the case of water entitlements, traditional water entitlements can be thought of as comprising – or may be able to be unbundled into – the right to a volume of water, the right to have the water delivered to a specified location, and the right to use the water at a defined site.

2.3 Property rights and the public interest

According to Bromley (1991), property-rights regimes are arrangements that are established to control the use of resources; comprising of property rights, the entitlements defining owners' rights and duties in the use of the resource, the duties of others to the resource and the resource user, and the rules under which those rights and duties are exercised.

Table 1. Bundles of rights associated with positions.

	Owner	Proprietor	Claimant	Authorised user	Authorised entrant
Access	X	X	X	X	X
Withdrawal	X	X	X	X	
Management	X	X	X	X	
Exclusion	X	X			
Alienation	X				

Source: Ostrom and Schlager (1996, p. 133).

The property-rights regime governing the allocation and use of a resource will have major bearing on the value that a society derives from that resource. In particular, the incentives and risk allocation inherent in the specification of property rights affects how individuals use a resource in pursuit of their private interests and whether this is in the overall public interest. Different property-rights regimes can be viewed as a spectrum, with private property at one end, public property at the other, and various mixes of the two in between.

2.3.1 Private property

Private property is fundamental to a capitalist mode of production and, according to some, crucial to a nation's wealth and standard of living. As early as the seventeenth century, John Locke (cited in Oswald (1999)) stressed the crucial role that private property plays in supporting a society. He argued that, unless private individuals could be assured that their property rights would be protected by law, then they would have little incentive to develop their resource or engage in trade with others. Across many spheres of economic activity, private-property rights have enabled resources to be used highly efficiently and productively.

Economic theory suggests that efficient markets, in an ideal world, require private-property rights that are:

- clearly specified – so that owners and potential entitlement holders understand exactly what benefits and obligations the entitlement brings
- secure – the entitlement is not subject to modification or extinguishment at the discretion of others without due compensation
- exclusive – the direct benefits and the costs associated with the use of the entitlement accrue solely to the holder.
- enforceable and enforced – it must be possible to determine when an entitlement has been infringed and to have legally binding ways of preventing this or providing redress
- transferable and divisible – the entitlement can be traded in whole or in part to others.

This provides a theoretical benchmark for assessing whether private-property rights regimes currently in place or being developed possess, as far as possible, the features needed to ensure that market transactions will provide the appropriate incentives to allocate scarce resources to their most valuable use.

However, these theoretical principles need to be qualified by recognition of various market failures when dealing with a private-property rights approach, including public goods, externalities and transaction costs (including the cost of actually defining and enforcing private-property rights). Private-property rights should not be seen as a panacea to *all* problems of inefficient natural resource use and environmental degradation, particularly where collective action from a number of private individuals or groups is required to manage a problem. Collectively, the issues of public goods, externalities and free-riding come under the banner of market failure.

One reason why markets may fail to lead to socially optimal outcomes is the concept of **public goods**. Unlike private goods exchanged in a free market, a public good is:

- *indivisible* – meaning it cannot be broken up and its benefits sold individually. One person's enjoyment of a public good, such as clean air or a pleasant view, does not subtract from the possibility of other people enjoying the same good. It is joint or non-rival in supply
- *non-excludable* – meaning that the benefits of it cannot be excluded from those who do not provide for it. The provision of public goods, such as clean rivers or healthy fisheries, are either provided for all or for none.

The provision of a public good can come only through the collective cooperation of all those with the power to influence it. Yet, knowing that they will be able to enjoy the benefits of a public good whether they contribute to it or not (because of the non-excludability characteristic of public goods), and knowing that their contribution will not greatly influence the likelihood of the public good being provided or not, there is an incentive to free-ride at the expense of the rest of the public.

The economic problem when people free-ride in the provision of a public good is that they do not have adequate incentive to reflect their demand for the good. That is, the problem of free-riding is one of a lack of effective demand for that good. The true value of such goods or resources will not be represented in a market. Arguably, healthy rivers represent a public good whose value to the community will not be adequately signalled through the market, with the consequence that it is under-provided.

A closely related issue here is the problem of **externalities**, or effects that are external to the decision-maker. Externalities are imposed on third parties who have no say in the decision-making process; hence, they do not tend to be accounted for in free-market situations. Externalities are often at the heart of collective environmental problems where there is a spatial or temporal separation of cause and effect, such as many forms of water pollution, when those who cause the problems do not experience them to their full extent, and spill-over costs are also imposed on upon third parties. In effect, the absence of clearly defined

property rights for the environment leads to its overuse. It is concern about external impacts that underlies, for example, the requirement for water trades to be approved by government departments responsible for water-resource management (eg. to prohibit trades that might exacerbate salinity).

Pure, private-property rights regimes may not always be the most efficient approach where there are high **costs** involved with transactions and trade, and/or in actually defining and the enforcing the rights. While it is easy to put a fence up and define the boundaries of immobile resources such as land or a building, it is less straightforward when mobile or fluid resources are involved, such as river water, air or ocean fisheries. With improved technology, it may be possible to extend a pure, private-property rights regime to more resources, but transaction and administration costs may make it impractical. There are alternative property rights regimes that, under certain circumstances, may be more efficient in maximising welfare.

2.3.2 Alternative property-rights regimes

There are many suggested solutions to public good and other 'market failure' problems that offer fundamentally different conclusions as to the best way to provide individuals and groups the incentives needed to manage resources in a way that maximises the public interest.

Theorists from the right (Elkington 1987; Anderson 1991; Moran 2003) tend to argue that the solution is to remove the 'public' from the 'good', and allocate private-property rights to more of the world's resources. They argue that it is not market failure that leads to sub-optimal outcomes with respect to public goods. Rather, they argue, it is the result of a failure of governments to allow markets to work, because private-property rights are often lacking or insecure, or have not been extended to enough of the world's resources. For example, Smith (1981) argues that "the only way to avoid the tragedy of the commons in natural resources and wildlife is to end the common property system by creating a system of private property rights".

Conversely, theorists from the left tend to argue that only government control, through either regulation or state ownership of resources, can provide individuals and groups with the incentives to cooperate in the provision of public goods. The logic is that, if private individuals cannot manage resources in the public interest, then public management of that resource is necessary. Indeed, this is part of the logic behind state and national parks.

The options are not merely private versus public property. Steins and Edwards (1999) describe the four distinct ways that property can be managed:

1. private property, where the property is owned by a private individual or group
2. state or public property, where access rights to the resource are held in trust by the state
3. common property, where a set of rules is present to govern access to, allocation of, and control over the resources
4. non-property (open access), which refers to a free-for-all situation in which there are no rules regulating access to the resource.

The distinction between public property, common property and open access is often blurred. Even though all three regimes tend to involve joint resource use by multiple individuals, there are several distinguishable characteristics of the three regimes, in terms of who exercises the rights, and for whose benefit (see Hanna et al. (1995)).

- Under open-access conditions, or non-property regimes, there is no ownership assigned at all. The resource is therefore open to all, and the only claim on the resource is the point of collection and/or consumption.
- Common property, by comparison, is owned by a clearly identifiable group of people who, collectively, have the clearly designated right to exclude non-owners from the resource. There exists the duty to maintain the resource through constraints placed on use, and resource use is subject to being consistent with the collective interests of the owners.
- In a state property regime, ownership is by the citizens of the state, and control of use is assigned to a state authority or agency. Citizens have the right to use the resource within rules, and the responsible authority has a duty to ensure rules of use promote social objectives (Veeman and Politylo 2002).

Many of the concepts falling under the banner of 'market failure', such as public goods, externalities and transaction costs, which are behind many regulations over the use of private property, are also at the heart of the problems of open-access resources. Ostrom (2000) points out the following three potential sources of inefficiency of the **communal use** that is allowed for under open access, as well as many forms of state and common property:

- rent dissipation – because no one owns the products of a resource until they are captured, and everyone engages in an unproductive race to capture these products before others do
- high transaction and enforcement costs – expected if communal owners were to try to devise rules to reduce the externalities of their mutual overuse
- low productivity – because no one has an incentive to work hard in order to increase their private returns.

It is important to recognise that no property rights institution offers a guarantee for efficient use and a guarantee against overexploitation. When any type of property right exists – be it private, state or common property – the level of any overexploitation depends on how well the property-rights regime copes with problems of allocating the costs and benefits of managing and governing a particular resource. According to Ostrom (1990), property rights defining who has access, how much can be harvested, who can manage, and how rights are transferred are "a necessary but not sufficient condition" for avoiding overexploitation of a resource.

Pearce et al. (1991) elaborate on the distinction between **common property** and **open-access resources**. They point out how economic theory predicts that common property resources run the *risk* of being overused, while open-access resources are *very likely* to be overused. This conclusion has historical support. As Walker (1994) points out, subsistence economies with true communal property systems have proven to be very durable historically. Quiggin (1984) contends that common property structures can indeed involve effective rights of exclusion, and that, in many cases, they have outperformed pure, private-property rights regimes in agricultural systems. He points out an inaccurate conception of common property through examples such as an uncritical acceptance of Garret Hardin's often cited historical parable "The Tragedy of the Commons"[5] (Hardin 1968), which paints a gloomy picture for the sustainability of 'commons'.

Regimes with open-access characteristics do not occur only through default (ie. through the absence of any entity successfully claiming ownership). Ostrom (2000) explains how characteristics of an open-access regime can also result from deliberate public policy to ensure access to a resource for all citizens, generally provided for in the interest of equity. Further, they can also result from the ineffective exclusion of non-owners by the owners.

In between the private and public-property solutions, lies a host of market-based and regulatory options that involve different levels of government involvement in resource management. In addition to a pure, private-property approach, private use of resources can also be facilitated through the provision of leases, licences and equivalents. A **lease** and a **licence** are generally held to be two different things; a lease generally confers a right to exclusive occupation or use of a resource, whereas a licence confers a right to use the resource for specific purpose only. The legal nature of these instruments also varies; while a lease is a form of real property, a licence is a personal right that cannot be freely transferred to others.

In many circumstances, a lease arrangement comes with a similar bundle of rights as fee-simple ownership, the main difference being that a lease is limited by finite tenure. Whereas fee-simple and leasehold title give individuals the right do anything that is not specifically prohibited by statute, a licence gives the individual the right to do only what is specifically prescribed on the licence. Of course, these are general trends only, and the details contained within a tenure document define the precise nature of the rights and the obligations, more so the document's label. As explained by Martin and Verbeek (2002), leases, licences, exploration permits, options and transferable contractual interests are all mechanisms of an effectively functioning property-rights institution.

2.4 The nature of the resource and effective property-rights regimes

With so diverse a range of theoretically available property-rights options, the question remains as to what characteristics of a resource make it more or less suitable to different approaches to property-rights. In turn, this influences the design of an effective system of titling and registering those rights. Veeman and Politylo (2002) warn that a failure to design property rights regimes that are context-specific, which are incompletely defined, insecure, and inflexible to changing social, economic, and environmental conditions will likely result in resource use that cannot be sustained. Moreover, failure in any of these dimensions could result in resource-management regimes that are not socially desirable, from both efficiency and equity perspectives.

[5] In "The Tragedy of the Commons", Hardin applies the logic of the famous "Prisoner's Dilemma" game model to grazing land devoid of private-property rights. The 'commons' are said to be medieval grazing lands, with many herdsmen having access to the land to run their stock. Under this regime, the benefits of adding more cattle accrue to the herdsmen, but the costs of increased pressure on the land are shared by all fellow herdsmen. The individual herdsmen, by reaping all the benefits but suffering only a small share of the costs, conclude that adding more and more stock to the land is the rational approach. Yet, this is the conclusion reached by more and more herdsmen, and the commons are soon overgrazed to the detriment of all. The tragedy is said to reside in the fact that each herdsmen is "locked into a system that compels him to increase his herd without limit – in a world that is limited".

Different property-rights regimes may be appropriate for different types of resources, and the nature of the specific resource in question may affect transaction costs of defining and enforcing private property rights.

Common-pool resources

Some resources, typically mobile or fluid ones, are what economists call 'common-pool resources'. This is not to be confused with a common-property regime, which, as discussed above, is a term referring to the ownership status of the resource rather than its underlying characteristics. Common-pool resources are composed of a resource system and a flow of resource units. The resource system (or stock) is what generates a flow of resource units or benefits over time. While it is easier to define the boundaries of immobile resources such as land or a building, it is more problematic when mobile common-pool resources are involved.

Common-pool versus public-good resources

The distinction between common-pool resources and public goods is pertinent to defining an effective property-rights system. As with public goods, it is impossible or impractical to exclude individuals from using common-pool resources either through physical barriers or legal instruments. However, unlike with public goods, common-pool resources *are rival in consumption*, in that the benefits consumed by one individual subtract from the benefits available to others. The characteristics of most lakes, rivers, irrigation systems, groundwater basins and commercial fishing stocks are all such that they are considered common-pool resources once conditions of scarcity are evident. Conversely, non-consumptive uses of water, such as appreciation of a river's aesthetic value or its wildlife or certain recreational uses of lakes and rivers, would more properly be considered true public goods.[6] Whereas water *quantity* has common-pool characteristics (in that there is a potentially finite stock and is therefore rival in consumption), water *quality* displays more of the attributes of a public good.

The problems with treating common-pool resources, such as water and fish, as open-access are well-known and need not be repeated here. To avoid the many problems of treating common-pool resources as open-access, a solution of 'privatisation' is often proposed. As noted by Ostrom (2000), what private ownership usually means in regard to mobile common-pool resource units is individual ownership of *withdrawal rights*, not ownership of the resource itself.

Water rights in Australia, for example, are generally associated with the allocation of a particular quantity of water per unit of time, or the allocation of a right to take water for a particular period of time or at a particular location.[7] Once again returning to the bundle of rights associated with tenure positions outlined in Table 1, a withdrawal right and rights of management make such farmers *claimants* on the resource. However, such rights still fall well short of the bundle of rights that constitute ownership of the resource system, in the same way that a fee-simple title to land involves land ownership.

Similar withdrawal or access rights have been established for other natural resources, particularly for those in fixed supply or where there are concerns to ensure the resource is sustained into the future (property-rights regimes for fisheries and the radio spectrum are outlined in Attachment B). Rather than allow open-access, pure private-property rights, or public-ownership regimes over the resource, resource managers have sought to ensure sustainable management of these resources, while permitting them to be utilised in productive activities, by allocating withdrawal rights to private users that, in total, equate to the sustainable yield or allowable cap on use of the resource.

More recently, greater use has been made of market-based mechanisms for allocating these resources, by making these withdrawal or access rights tradeable. The idea here is to ensure, within the overall caps on resource-use imposed by the resource manager, that the maximum value of the resource is achieved by enabling those who value it most highly to gain access to it. By adding the key element of alienability, the incentives of the property rights regime are considerably enhanced. This approach is evidenced in tradeable fishing quotas, tradeable spectrum rights, emissions trading, and, increasingly, in water.

In considering appropriate forms of property rights, it is instructive to consider the nature of land as opposed to water resources. Clearly, land and water are inextricably linked physically through the hydrological cycle, and have been historically linked by title. However, just because water and land have been linked both physically and in title, it does not automatically follow that the system of entitlements should be identical.

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[6] Unless a competitive situation is created through, for example, congestion or a lack of space for viewing.

[7] In addition to the individual rights to water that farmers may hold in an irrigation system, they may also jointly own – and, therefore, govern and manage – the irrigation facilities themselves.

While both are natural resources with significant economic and environmental[8] value, water is a fundamentally different resource to land in several important ways:

- Water is a mobile 'common-pool' resource – it cannot be easily or practically contained within fixed boundaries.
- 'Delivery' may be a constraint to water trading – land is a static resource and there are no physical limitations of a delivery system to act as a constraint on the sale and transfer of land. In contrast, the physical limitations of any water-delivery system (eg. channel capacity) will dictate how much water can be transferred to any location within a specified time frame, acting as a limit on the trading of water rights.
- Quality issues are shared amongst resource users – for example, water pollution affects all river users, whereas land degradation can be limited to within property boundaries.
- Management of a water resource, such as the construction of a dam or a levee bank, affects all resource users, whereas the results of land management, such as the erection of a building, are more likely to be confined within the boundaries of the property.
- Water is variable in nature – the size of the water resource will vary according to climatic variables, land-use practices in the catchment areas and the nature and extent of the water use of others.
- Water is more divisible – the water resource can be broken up more easily than land, across both time and space.
- Externalities – the capture, delivery and use of water arguably has greater and more widespread spill-over effects (on the environment and on other users) than the use of land.

For these and other reasons, the property rights regime that has applied to water has a broader mix of private, common and public-property characteristics than has land. In the words of Cleary (2003):

> Water is a community resource that is held and managed in trust for the community by the government. It is a key natural resource that is not static in time nor place. Water management and use can have cumulative, widespread and, in some instances (such as contamination of aquifers), irreversible impacts. For these reasons, water has never been, and should not be, owned outright by individuals.

The following chapter examines in more detail current and emerging arrangements in defining property rights in water that seek to harness the economic incentives of private-property rights while enabling effective ongoing management of the resource and the environment.

2.5 Role of titling/ registration systems

The discussion thus far has focused on the nature of rights and entitlements themselves. Although there is a clear link between the type of entitlements and the titling system that is appropriate, the ultimate focus of this study is on the legal/administrative system of titling and registration. As the final task in this conceptual framework, this section reviews the role of the titling and registration system of rights.

A **titling system** can be seen as the legal and administrative mechanism to underpin the operation of the property-rights regime. In the words of Small (2002) ,"property titling represents an administration mechanism to give certainty to the legal existence of a property right and thereby support its economic value". The term 'title' is taken here to refer to the legal instrument held as evidence of the right, rather than the right itself.[9]

As noted by Arrunada and Garoupa (2002), titling systems perform two main functions. First, they enforce titles; that is, they *enforce* current property rights. Second, they facilitate trade of land, thereby *creating* new property rights (ie. rights to trade).

The title to a property right can be crucial to the security and enforceability of the underlying property right. Without title that provides an appropriate degree of certainty of the right, the incentives for efficient trade and investment may be substantially undermined. Even though one person may value an asset or resource more than another, they are unlikely to be prepared to pay potentially considerable amounts of money to purchase it if it is not clear that they will gain secure rights to it. Similarly, the incentives for investment will be blunted if there is significant likelihood of future expected returns being expropriated. The title to a property right can therefore play an important role in providing the assurance to the right holder that the right is secure enough to warrant investment.

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[8] Land and water share important ecological roles. Just as particularly environmentally sensitive or special areas of land are taken off real estate markets for public purposes (as in national or state parks, nature reserves and Crown land), water in rivers also has an important ecological role to play. River water that is reserved for environmental purposes is increasingly being known as an environmental flow.

[9] While the term 'title' is generally used to refer to private ownership, for the purposes of this report we assume that this 'ownership' might be ownership of a lesser property right.

The ability to use assets as collateral for loans is also influenced by the **quality of title** to a property right. If there is uncertainty over the legal existence of a property right over an asset, or the ability to have and protect an interest (eg. a mortgage) in that asset, its capacity for use as collateral for financing productive activity will be reduced. The cost of finance will thus be higher than it would otherwise be. Either the lending institution has to bear the costs of satisfying themselves that the rights are genuine (or through paying premiums for lender's title insurance, if such a product were available), or the uncertainty has to be reflected in an adjustment to the real worth of the right. Either way, the ability of rights to an asset to be translated into collateral will be reduced.

Titling/registration systems can therefore play a key role in efficient market operation through underpinning the security of the property rights and through lowering transaction cost (eg. reducing the need to verify title).

Balanced against the need for secure title to facilitate efficient trade and investment, however, is the need for property-rights regimes to be sufficiently flexible to adjust to society's needs. This is a particular issue in the case of natural resources, where the titling system needs to be able to provide for adaptive management as scientific information improves. For example, governments may wish to maintain the flexibility to adjust levels of environmental flows in the future (and, by default, adjust the levels of water available for consumptive use), should an improved understanding of the links between different levels of environmental flows and the realisation of aquatic or riparian environmental values suggests that current levels of environmental flows are inadequate or excessive. Such adjustments could be effected through regulatory or planning instruments, or through active market transactions, within policy guidelines, by some form of 'environmental trader'.

While there is a considerable body of literature on the nature of underlying property rights and the importance of secure title, there is less on the precise nature of the titling system appropriate for different types of assets or resources.

Most of what is available on this subject relates primarily to titling systems for land. Arrunada and Garoupa (2002) describe two essentially distinct types of formal titling systems in place for land:

- a 'recording system' – often known as 'registers of deeds' or 'old title'
- a 'registration' system – more technically a 'registers of rights'.

The Torrens system applied to land in Australia falls into the second category (see Attachment B for a fuller description of the Torrens system), while the land titling system in most of the United States is a 'recording' system.[10] As an adjunct to this system, a substantial title-insurance market has developed as means of managing various risks associated with quality of title under this system.

A fundamental principle of the Torrens system is that, subject to certain exceptions, a person who becomes the registered proprietor of land (*bona fide* and for consideration) will obtain an indefeasible title. Essentially, this means that the registered proprietor's title in that land cannot be affected or defeated by any existing estates or interests, other than registered interests that are noted in the Register. The Register is intended to provide a record of all dealings with respect to particular land. Accordingly, a purchaser should have only to search the Register in order to ascertain the state of the title and should not have to go behind the 'curtain' of the Register.[11]

Under the 'old title' system, in order to verify a proprietor's title to the land, a person intending to deal with the land (eg. a purchaser) had to rely upon written records of previous dealings in relation to the land. Before the introduction of the current Torrens systems, an attempt was made to overcome the problems associated with the 'old title' system by the enactment of registration of

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[10] See Young (1994). The Torrens system was introduced in 21 American States between 1895 and 1915. It was subsequently repealed in six States due to lack of use. At the time of the article, there were only four American States where there was significant current activity under the system. In at least one of these States, the use of the Torrens system is by reason of historical events more than anything (ie. a fire destroyed records of land holdings and the Torrens system was used to restore certainty). Several factors are said to have led to the failure of the Torrens system in the USA. One of the main arguments is that there were vested interests opposed to it, particularly amongst title-insurance companies. Other reasons that are put forward are that the administration of the system in the US has been slow and inefficient, and that the initial registration of interests involves expensive judicial proceedings. The author suggests, however, that the main reason has been the opposition of title-insurance companies, whose business are very profitable. The author notes that the Torrens system has, nevertheless, always had its supporters in the US.

[11] As is noted in Attachment B, notwithstanding that the Torrens system is intended to be a system of title by registration, some provision is made for interests in land existing outside the Register.

deeds legislation in each State. Essentially, this provided for a facility for the registration of deeds and other dealings in relation to land. In comparison to the Torrens system, however, title was not conferred by registration, and registration could not cure defects in the chain of title.

The perceived advantages of the Torrens title system are that it reduces the transaction costs associated with verifying title and provides a greater quality of title that is more conducive to investment and the provision of finance using land as collateral. It needs to be recognised, however, that there are alternative potential approaches to managing these risks (eg. title-insurance market) as have emerged in other countries.

In addition, it does not necessarily follow that a Torrens land-titling system is appropriate for all types of assets or resources. At present, different titling/registration systems apply to assets such as land, water, cars, shares, and other natural resources such as fishing quotas and logging (the titling systems for many of these are described in Attachment B). In other cases, there is no formal or public titling system, and ownership is essentially determined by possession. Table 2 provides brief summaries of the titling systems that apply to different resources, and the characteristics of those resources and the rights attached to them.

This suggests that the design of an effective titling system is likely to vary according to nature of the right being administered, and with other factors such as:

- the physical nature of the asset or resource
- the nature of the transactions that need to be administered with respect to the rights or entitlements (eg. frequency/lumpiness of transactions, need for quick settlement)
- the extent of unbundling/divisibility of resource
- the value of asset involved
- the cost of establishing and operating the titling system
- the extent to which the asset underpins investments.

Table 2. Titling systems for different resources.

Resource	Water	Land	Fish	Shares	Public forest	Spectrum
			Nature of the resource			
Fixed or fluid	fluid	fixed	fluid	fixed	fixed	fixed
Size of resource base in nature	variable	fixed	variable	variable	variable	fixed
Consumptive or non-consumptive use	both	non-consumptive	consumptive	non-consumptive	consumptive	non-consumptive
Renewable or non-renewable	renewable	N.A	renewable	N.A	renewable	N.A
Divisibity	high	low	moderate	high	high	moderate
Rivalrous in supply	yes	yes	yes	yes	yes	yes
			Nature of the right (in Australia)			
Frequency of transactions	frequent	infrequent	infrequent	frequent	infrequent	infrequent
Consistency of availability	moderate	high	moderate	high	low	low
			Nature of the titling system (in Australia)			
Register or record system[a]	record	registry	record	record	record	registry
Ability to register security interests	some	yes	no	yes	no	no
Digital or hardcopy records	both	both	both	digital	both	digital
Fee charged for public access	yes	no	yes	no	yes	no
Online access	no	no	no	yes	no	yes

[a] Most resources have some sort of register for administration and resource-management purposes, but the criterion here is whether the register provides the ultimate evidence of the right (as in the Torrens system).

Thus, in the case of land, which is a fixed resource, often of considerable value, subject to full private ownership and which forms the basis for investments in other assets or activities, and which is traded relatively infrequently in large 'lumps', it may be appropriate to give greater weight to the security and robustness provided under the Torrens title system. At the other end of the spectrum, establishing any sort of formal titling system for ownership of newspapers would not be efficient, given their relatively low value, their exclusive use as a consumption good rather than for investment. Our view of an appropriate titling system for water entitlements is developed further in Chapter 5.

3 The nature of water entitlements

Against the background of the conceptual framework outlined in the previous chapter, this chapter provides an overview of the current and evolving nature of water entitlements in Australia. While it is beyond the scope of this report to define the optimal specification of the underlying entitlements themselves, some observations on this are made, and emerging trends in the definition of entitlements identified. This sets the scene for a discussion, in the following chapter, of the nature of the associated titling system for these water entitlements.

3.1 Current arrangements

The current arrangements governing rights over water resources in Australia reflect the evolution of law over centuries and adaptations to Australian circumstances.

As observed by Tan (2002b), under English common law (in turn derived from Roman law), running water was recognised as *publici juris* (of public right), or as public *and* common, and rivers were not recognised as public property. However, the 'Riparian Doctrine' evolved to give common-law rights to owners of land bordering a waterbody to use the water if that use did not interfere with its use by other riparian landholders.

Under the influence of Alfred Deakin, early Australian statutes sought to limit riparian rights. However, in contrast to land, the common law did not confer absolute ownership of water, but defined rights and duties in respect of water resources in terms of the right to the use and flow, and to the control of water resources. This concept was carried over into the water legislation enacted throughout Australia at the end of the 19th century.

Rights to use water were then granted by the Crown, in the form of statutory privileges (such as licences and permits) to take water. These entitlements are therefore in the most part 'statutory entitlements' rather than property or proprietary rights in the legal sense (Tan 2002a). Typically, rights to use water were granted for defined types of users (eg. irrigators) and types of uses (eg. irrigation or urban supply). While some entitlements were devolved to individuals (eg. individual irrigators), others were held by entities at the bulk supply level (eg. irrigation cooperatives or urban water supply authorities). Rights to use water also varied according to the source of the water (eg. regulated rivers, diversions from unregulated rivers and streams, groundwater systems and overland flows).

These traditional **statutory rights** to water provided limited security and were not divisible or transferable. This contrasts with an estate in fee simple for land granted by the Crown, which is akin to absolute ownership. Thus, the Chief Executive Officers' (CEOs') Group on Water (2003, p.4) contended that:

> Many people hold the view that water is like land, and by analogy, changes to water entitlements must by law always be compensable as are dispossessions of land…Rights to water do have *a few similarities* to rights in land, e.g. *both* can be modified by regulations. But the analogy to land breaks down because water is a variable and mobile resource, which has strong public good characteristics. Thus in every State the "right to the use and control" of water has for over a century been clearly vested in the Crown. States then allocate "entitlements" to use the water to individuals. For this reason the CEOs' Group on Water is of the view that the use of the term water "property right" in itself causes false perceptions and prefers to use the term water "**access entitlements**". [emphasis in original]

These '**access entitlements**' typically encompass withdrawal rights tied to resource units (ie. annual allocations of water) from the common-pool resource of rivers or storages (as discussed in Chapter 2), rather than ownership of the resource itself. These withdrawal rights are conditional, in the sense that the actual allocation of water each season depends on the volumes available each year (itself a function of climate, catchment land uses etc). While these withdrawal rights were issued for specified periods, and were always able to be legally amended or cancelled at any time, without payment of compensation, there was an expectation of automatic renewal.

Old forms of entitlement were typically attached to land, had uncertain security and were often improperly defined. This meant that trade in water entitlements was difficult or impossible. Since the 1994 COAG agreement, there has been a thrust toward a new set of entitlements that clearly defines the property rights to water in terms of volume and security of supply, thereby enabling trade in entitlements. However, this process is by no means complete.

Generally, water entitlements have been separated from land titles; however, there still exist restrictions in some jurisdictions that prevent those without land from holding water entitlements. The freedom with which entitlements can be traded also varies between States, with some States requiring approval for all trades.

The current system of entitlements across Australia is therefore in a state of transition, as jurisdictions progressively convert from 'old' forms of licensed entitlements to 'new' entitlements. Each of the States is at a different stage of the conversion process (as detailed in Table 3). In some cases, the process of converting previous licences into well-specified entitlements may take many years; indeed, some rights to water may never be converted.

As part of these processes, allocation of entitlements is now generally being undertaken within broader planning frameworks involving scientific input and community consultation, designed to ensure more sustainable management of the resource. In most States, provision of **water for the environment** is now being given increasing priority over allocation of water for consumptive uses through these processes. Allocations of water for the environment have generally taken the form of management rules imposed on water authorities (eg. minimum environmental flows), although in some cases quantified water allocations defined in similar terms to those for extractive use have been established.

In summary, rights to water in Australia stem from a complex system of statutory and common-law rights within the ambit of regulatory resource-management regimes overseen by State governments. These rights can be loosely categorised (Productivity Commission 2003) into:

- stock and domestic (riparian)
- surface water rights
- harvest rights for overland flows
- groundwater rights
- Indigenous rights
- environmental flow or allocation requirements.

Together, these establish various forms of 'property rights' to water with elements of **private, common, and public property**. A more detailed description of the entitlement regimes in each jurisdiction is at Attachment C. As noted by the Productivity Commission (2003), however, no jurisdiction has established a system with the characteristic of 'universality'; that is, where the entire resource is encompassed by the rights to its use. As noted by Gardner (2003), if rights to certain water sources are excluded from regulation by a system of rights (akin to 'open access' or 'non-property' discussed in Chapter 2), then they may be exploited and depleted, which will affect the availability of other interdependent water sources that are regulated by a system of rights.

As Gardner (2003) also notes, however, this is not the same as saying that all rights are, or should be, the same. Indeed, it may not be feasible or desirable to define all rights to water (eg. environmental allocations) in the same way (eg. in volume/reliability terms), or it may entail considerable cost and/or time to do so. For the purposes of this report, the focus has been directed towards property-titling regimes for those water entitlements that are intended to be or have been converted into well-defined and specified tradeable assets.

3.2 Emerging directions

3.2.1 Introduction

A prerequisite to developing an effective water property titling system is that the underlying entitlements themselves are defined in a way that maximises the value of society's scarce water resources. As observed earlier, given that water has value in both consumptive and non-consumptive uses, this requires a regime that:

- provides sufficient certainty for investment in productive activities and facilitates water to trade to its highest value use

but also

- allows for water to be allocated to non-consumptive uses, including the environment, where this represents the socially most valuable use.

Most observers would agree that the changes to water-entitlement regimes over the past decade or so have generally made progress towards this objective.

Broadly speaking, the newer forms of water entitlements that jurisdictions are progressively establishing possess most of the features (or reasonably close approximations) needed to ensure socially optimal outcomes from trading in entitlements identified in Chapter 2. The following are examples of those features:

- Those entitlements that have undergone a conversion process (often in the course of developing resource management plans) are much more clearly specified in terms of volumes and reliability.
- The fact that new entitlements have been established with explicit consideration of sustainable resource management, with defined and predictable processes for review (and, in some cases, compensation if reduced during the life of a plan), could reasonably be said to make them more secure than previous entitlements that were always subject to potential attenuation by government.

- Current water-access entitlements provide for many, but not all, of the benefits and costs of ownership and use of the entitlement to accrue to the entitlement holder.
- The newer forms of water-access entitlement are generally enforceable and enforced (eg. through more widespread metering).
- There has clearly been significant progress in all jurisdictions towards introducing water-access entitlements that are readily transferable.

In addition, many steps have been taken towards putting water allocation and use on a more ecologically sustainable footing. This has occurred through measures such as primary allocations of water to the environment, allocations of consumptive entitlements within sustainable yields determined through catchment planning processes, and the imposition of 'caps' and regulatory processes designed to address environmental impacts of water use and trading.

Conversely, some aspects of current water entitlements have been seen as sub-optimal:

- In some jurisdictions, adverse impacts from return flows have occurred through defining entitlements in gross rather than net terms, resulting in water efficiency savings being used to expand irrigation and reducing return flows that benefit the downstream environment and users.
- Remaining constraints on trading water entitlements (eg. restrictions on trading between uses and prohibitions on permanent trades out of certain irrigation districts) inhibit potentially valuable trading opportunities.
- The large number of different types of entitlements that exists might itself be an impediment to trade.

Perhaps the most debated issue has been resolving high-level allocation of water between consumptive and non-consumptive uses, and whether the mechanisms for doing so appropriately balance the needs of users for resource security and those of adaptive environmental management. Central to this debate has been whether 'compensation' should be paid to entitlement holders where their actual or perceived property rights have been attenuated.

Considerable work is being undertaken in other forums towards developing a 'best practice' approach to specifying entitlements designed to address these perceived deficiencies.

Without seeking to duplicate that work in this report, design of a titling system needs to be firmly grounded in an appreciation of the underlying entitlement. The main purpose here is to identify the likely form of these entitlements, given emerging policy developments. The focus is on those aspects of entitlements considered to have important implications for titling system design.

Young and McColl (2002) argue that a robust system of defining, allocating and managing the use of natural resources needs to facilitate:

- resolution of resource allocation between consumptive use and the environment, among consumptive users, and of issues related to distribution and use
- secure, economically efficient and low-cost trading and administration
- assignment of risks, making it clear where responsibility lies, under what circumstances compensation is due, and specifying the processes for obtaining redress
- management of externalities associated with use – the interests of third parties, future generations and the environment – with minimum controversy.

They also suggest that a robust system must pass the conventional tests of efficiency and fairness in a changing world. For this to occur, the system must be built on a solid conceptual foundation.

3.2.2 Specification of entitlement

There appears to be growing consensus that the appropriate way to specify water entitlements in Australia is as access entitlements providing ongoing rights to a share of the resource. In the words of the CEOs' Group on Water (2003, p. 5):

> A water access entitlement should generally be viewed as a share of the resource available for consumption – which when considered over a number of years can be termed the "consumptive pool"…The size of the available resource will vary from season to season with weather and other factors. The allocation to an entitlement-holder during a season – which is like a dividend – will vary accordingly. Moreover, as a result of an agreed planning process, the flows to be retained in a river, the levels to be kept in an aquifer, or some other constraint might be altered, so that the *long-term* available resource, that is the consumptive pool – might need to change. But the access entitlement itself – the share of available resource – does not need to change at all. Water access entitlements should be firm entitlements held by and traded between individuals and other interests.

Drawing on the literature regarding common-pool resources (see Chapter 2), Young and McColl (2002, 2003) note that an interest in water can be considered as having three key components:

Table 3. Overview of States' water entitlements.

Water entitlements		**New South Wales**	**Victoria**	**Queensland**	**Western Australia**	**South Australia**	**Tasmania**	**Australian Capital Territory**	**Northern Territory**
Governing legislation		*Water Management Act 2000*	*Water Act 1989*	*Water Act 2000*	*Rights in Water and Irrigation Act 1914*	*Water Resources Act 1997*	*Water Management Act 1999*	*Water Resources Act 1998*	*Water Act 1992*
Measure	Bulk water	Volume	Volume	Same as for 'individual use'	Same as for 'individual use'	Volume	Volume	Not relevant	Not relevant
	Individual use	Volume, except for unregulated streams.	Depends on type of entitlement.	Entitlements being converted to volumes.	Generally volume	Depends on type of entitlement	Volume	Volume	Volume
Duration	Bulk water	15-year licence for irrigation corporations. 20 years for town water.	Indefinite	See 'individual use'	See 'individual use'	Indefinite	Indefinite for Rivers and Water Supply Commission, 10 years for Regional Water Authorities	Not relevant	Not relevant
	Individual use	Generally 15-year terms	Water rights generally renewable after 15 years	Water allocations are indefinite; the licences they replace were typically for 3–10 years	Can be for a fixed or indefinite period – as detailed in licence	Indefinite	Normally 10 years	Licences typically valid for 1–5 years	Generally 2 years up to 10 years, but are renewable
Security	Bulk water	Town and major utility supply reviewed every 5 years	Subject to modification by the Minister under certain circumstances	See 'individual use'	See 'individual use'	High security	Similar to individual use	Not relevant	Not relevant
	Individual use	May be changed at the end of 10-year Water Sharing Plans; compensation may be payable for any other changes	May be changed without compensation if there is a water shortage	May be amended during review of Water Resource Plans every 10 years; otherwise, compensation is payable if allocation changed.	Licences may be changed at any time, with compensation payable where the burden of change is unfairly distributed	Generally high security, but conditions of access may be altered periodically according to Water Allocation Plans	Review of conditions after 5 years; most entitlements existing on 1 January 2000 cannot be changed	In accord with the, allocations may be reduced if deemed necessary by the Environment Management Authority	High

Table 3. (Continued)

Water entitlements		New South Wales	Victoria	Queensland	Western Australia	South Australia	Tasmania	Australian Capital Territory	Northern Territory
Reliability of Supply	Bulk water	Same as for individual users, with an additional measure of high security water	Varies, but specified for each bulk water entitlement	See 'individual use'	See 'individual use'	Full allocation available except in extreme drought	Water for household and hydro use very reliable, remaining water prioritised just above irrigation use	Not relevant	Not relevant
	Individual use	Depends on region, but typically quite low	Very high; typically 96–99%	Specified as part of Water Resource Plans	Varies depending on restrictions in drought periods	High reliability with full allocation available almost every year; volumes may be reduced by the Minister in extreme drought	Once environmental flow requirements are introduced, is expected to be low over summer months	Supply is highly variable: no guarantee	High, since Northern Territory's water supply not so developed as the rest of the country
Restrictions on trade	Bulk water	May trade on a temporary basis only after commitment to individual members met	Obligations to deliver water rights must be met first	See 'individual use'	See 'individual use'	Trade subject to agreement of all trust members	Trade will not be permitted on household water supplies; no specific restrictions on trade otherwise	Not relevant	Not relevant
	Individual use	Free trade within irrigation districts; trade between irrigation districts is subject to irrigation company rules	Trading zones mapped	Tradeable, but trades must not be inconsistent with Water Allocation Security Objectives	Must be approved by the Water and Rivers Commission or a local water management committee	Transferable subject to assessments	Water transfers require the approval of the Minister on a case-by-case basis	Allocations fully tradeable, licences not tradeable	Allowed within Water Control Districts but only after a Water Allocation Plan is in place
First priority water use		Environmental water	Stock and domestic rights	Not addressed in the Act	Water allocated to environment first in Allocation Plans	Environment	Domestic & livestock purposes, firefighting & councils supply for a water district	Stock and domestic uses in most sub-catchments	Not addressed in the Act
Licences divisible?		Yes	Yes	Yes		Yes		Yes	?

Note: 'Individual use' covers use of surface water and groundwater for purposes other than stock or domestic use.

- **entitlement** – the long-term interest (share) in a varying stream of periodic allocations
- **allocations** – a unit of opportunity (usually a volume) as distributed periodically
- **use licence** – permission to use allocations with pre-specified use conditions and obligations to third parties.

A key point here is that it is possible to specify a long-term entitlement that is itself clearly defined and secure, even though the volume of water associated with it each year may be uncertain.

Another key issue is how long should be the term of entitlement. As noted above, most existing licences and entitlements had finite terms, typically around 10 years, although in the past there was a general presumption of renewal. As pressures on the resource grew, this presumption often no longer applied, as governments sought to limit or reclaim water for the environment. Specifying entitlements as a share of the resource available for consumptive purposes (determined as sustainable through catchment planning processes), is seen by many as a mechanism for reducing this uncertainty while providing for adaptive resource management (but see further discussion below). Thus, it has been suggested that (High Level Steering Group on Water 2002, p.2.4):

> Water entitlements should be treated as equivalent to a 'lease in perpetuity' balancing the desire of water users for a secure property right and the needs of the community for adaptive management of natural resources. The holder is entitled to continuing access to the entitlement but the reliabilities and other parameters of that entitlement may be amended.

The Wentworth Group (2003) supported this approach, stressing the need to specify entitlements as a perpetual share of the available water in any season, rather than as a specific volume.[12] Recently, the National Water Initiative agreed by the Commonwealth and the States endorsed this position (Council of Australian Governments 2003):

> Unless fixed-term water access is required for particular purposes, access entitlements to be defined as open-ended, or perpetual, access to a share of the water resource available for consumption (subject to water users meeting their conditions of entitlement).

The above emphasis on consumptive use may prove too restrictive for some of the options for titling systems that might be considered in a wider resource-management setting. It is certainly feasible to think in terms of water rights held on behalf of the environment – and indeed some **environmental allocations** are already specified in this way (eg. bulk entitlements in Victoria). These could take the form of a share of the allocation to the environment and might reasonably be tradeable within this environment – or tradeable between consumptive and non-consumptive uses under certain conditions. This greater generality might prove more compatible with the development of a role for one or more environmental traders within the system. The question arises as to whether these entitlements are to be registered within the same titling system, and compatibility in approach could well support this. This issue is discussed further in the following chapter.

3.2.3 Unbundling and trading

Traditionally, the various elements of a water entitlement as identified above – namely the long-term entitlement, the periodic allocation of water, and the right to use the water at a site – tended to be bundled together within the water licence or entitlement. Other components of the 'property rights bundle' included the right to have the water delivered, the right to build, operate or have an interest in works to take and control the water, and the right to return the water to the environment. Moreover, the water-access entitlement was intrinsically tied to the land on which it was to be used.

As discussed previously, all jurisdictions have made the critical step of largely unbundling water-access entitlements from land as a way of unleashing value. While there are still some remaining linkages, it appears that there is an inevitable trend towards full separation.[13] Considerable benefits have already accrued from the spatial and temporal trading of water. This has encompassed both the ability to trade annual water allocations (ie. 'temporary' trades) and trade in the underlying entitlement (ie. 'permanent' trades).

Unbundling of water entitlements is now extending beyond the separation of water from land, and into separate property rights and instruments for each of the components in the water entitlement itself, as illustrated in Figure 1. For example, in Queensland, water allocations specifying entitlements to water are separated from site-use licences and from contracts with suppliers for delivery. Similar unbundling has occurred in New South Wales and South Australia, and has recently been foreshadowed in Victoria (Department of Sustainability and Environment 2003).

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[12] Of course, many existing entitlements denoted in volumetric terms with a specified reliability are, in effect, a share of the available resource.

[13] For example, in Victoria, where ownership of water entitlements is currently still limited to landowners, the Government's recent Green Paper discusses relaxing this restriction.

The rationale behind this further unbundling is to enhance the efficiency of the market by reducing the transaction costs of socially beneficial transactions that maximise the value of water. For example, as noted by Freebairn (2003), uncoupling (from idiosyncratic licences to use water in a particular location) water entitlements to make them tradeable geographically provides for greater homogeneity, and hence the basis for an effective market for water, with more buyers and sellers. Similarly, trading in rights to delivery capacity may, in some cases, be an efficient means of addressing channel-capacity constraints. How far it is sensible to go in 'unbundling' the various constituent elements will depend on several factors, including the costs of defining and trading in these 'unbundled' elements.

While the unbundling of water entitlements has the potential to improve the efficiency of water markets, it also has significant implications for the titling/registration system for those entitlements. For example, a system is needed to record transactions with respect to the underlying entitlement (ie. permanent trades) and to account for annual allocations of water under those entitlements and any 'temporary' trades. The extent of unbundling affects the nature of the right that is being registered, and also raises issues as to whether there is a need to link the registration systems for unbundled rights in some way. This concept is illustrated in Figure 2.

The titling system also needs to be able to cater for any future developments in the characteristics of market transactions that may entail further unbundling (eg. the timing of releases from dams at different times, or the development of various derivative products of value to water users as a risk-management tool).

3.2.4 Security/compensation for attenuation

Another key aspect of defining water entitlements is the degree of security of the underlying property right. This issue is one that has been prominent in the recent debate in Australia over whether compensation should be paid for changes made (or perceived to have been made) to water entitlements, as governments have sought to impose caps or claw back water to protect the environment. One question has been how best to balance the desire of water users for a secure property right and the needs of the community for adaptive management of natural resources.

While defining entitlements for consumptive use as long-term rights to a fixed share of the resource available for consumptive purposes is a quite clearly defined right, it still entails some uncertainty over future access to water. While risks associated with natural events such as drought clearly rest with users, the question arises as to who should bear the risk of decisions to re-allocate water from consumptive to non-consumptive uses. The CEOs' Group on Water (2003) states:

> It is in the process and framework for making changes to the consumptive pool – and so how much water an entitlement qualifies for its owner – that lays the key to proper reconciliation between security of tenure for investment and trading, on the one hand, and adaptability in the face of emerging environmental needs, on the other.

To date, water-entitlement holders have largely borne the risk of reductions in the consumptive pool. This is seen by many as appropriate, given the nature of these entitlements as conditional statutory entitlements granted by government, since rights to use and control water vest with the Crown. Approaches to minimise the sovereign risk associated with potential administrative re-allocation of water by government include the setting-out of clear processes and timetables for allocation of water through catchment water planning. Modest reductions in the aggregate regional consumptive pool have tended to be at least partially offset by rises in the unit value of shares in the pool – a feature that tends to lend more support to asset backing than to enterprise cash flow.

Nevertheless, the potential for attenuation of an entitlement in the future does influence the incentives for long-term investments dependent upon access to water. This has been reflected in calls for compensation to be paid to entitlement holders if their entitlements are attenuated (or perceived to be attenuated), thereby providing greater security. One way to do this would be for existing entitlement holders to be paid fair market value for their entitlements if they are resumed by government for public policy purposes (akin to compulsory acquisition of land – see Attachment B). On the other hand, if compensation were payable by government for any attenuation of entitlements, it might have an incentive to under-allocate in the first place through overly conservative estimates of sustainable yield.

In analysing the relative merits of re-allocating water to the environment via administrative reduction in rights without compensation, as opposed to using market-based mechanisms (eg. an environmental agency purchasing water on the market), ABARE conclude that there is a trade-off between the adverse effects on investment if no compensation is paid under an administrative re-allocation and the efficiency costs of raising tax revenue if compensation is paid (Goesch & Hanna 2002). The authors also note that administrative re-allocation may entail significant negotiation costs and encourage rent-seeking behaviour.

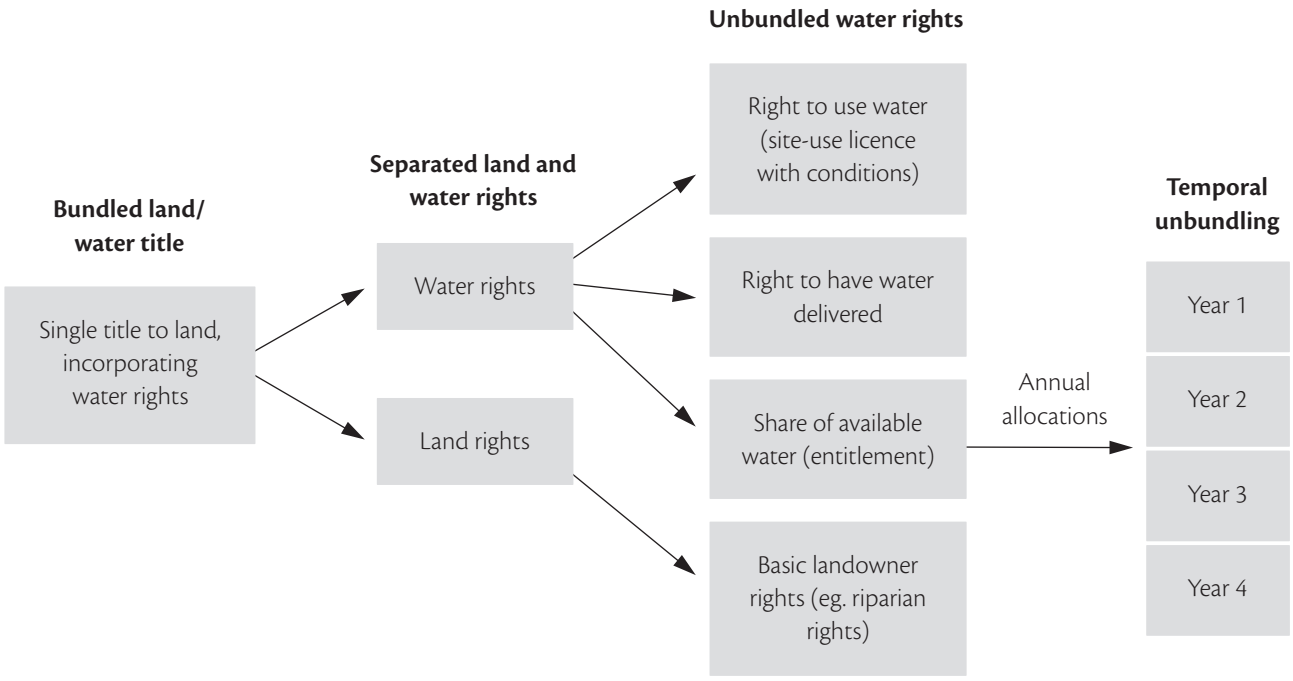

Figure 1. Unbundling of water rights.

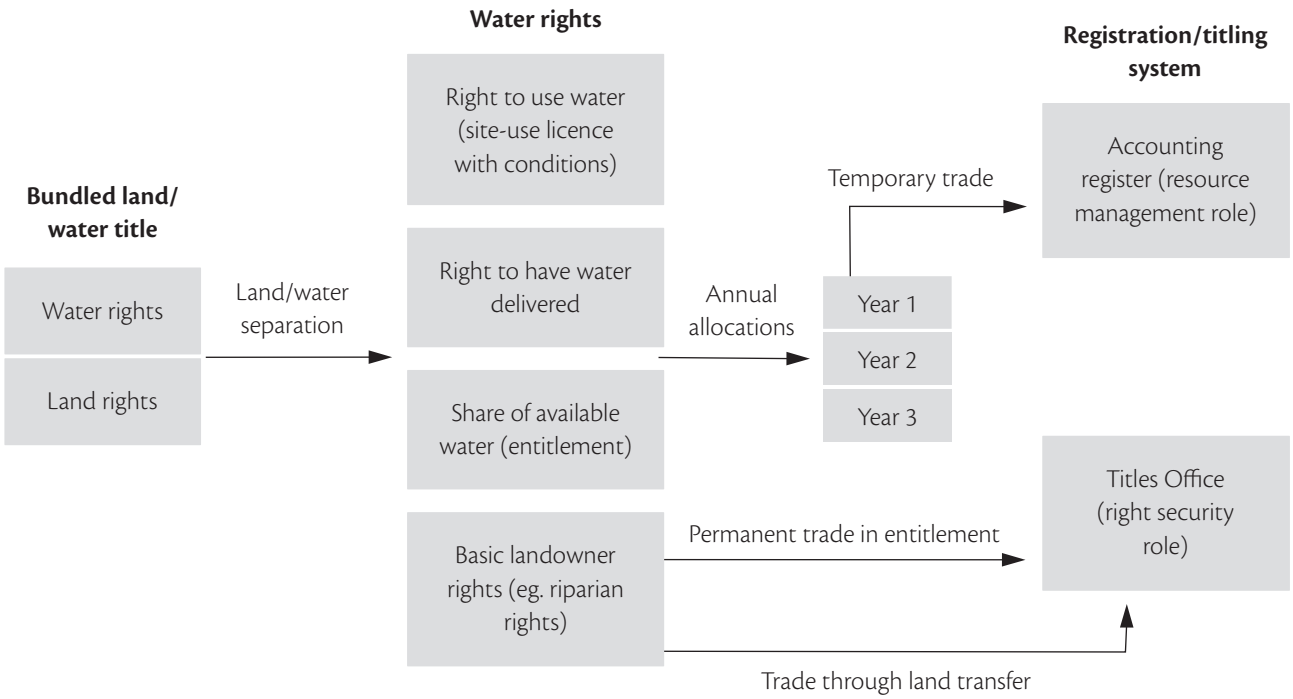

Figure 2. Water rights, trading and titling systems.

In more recent times, there have been moves towards providing some recompense for water users affected by reductions in their entitlements. In both Queensland and New South Wales, for example, legislation now provides for the payment of compensation if users' entitlements are attenuated during the life of a water allocation plan (which are for 10-year periods), although no compensation is payable for changes arising out of a review of a plan.

The Wentworth Group (2003) suggested that "we need a consistent system for registering water entitlements which provides the same guarantees and investment certainty as registers for land title". The National Water Initiative (Anderson 2003) agreed to provide for "a guarantee that governments will have to compensate users for changes in their entitlements resulting from changes in government policy" (eg. new environmental objectives).

While it is beyond the scope of this report to reach a recommendation on this issue, the titling system to apply to these entitlements should be able to accommodate any decisions on this matter.

3.2.5 Assignment of risks

An underlying theme in the evolving definition of water entitlements is how risks should be assigned. Clear and appropriate assignment of risk is a prerequisite for maximising the value of water resources.

Water entitlements entail a number of different risks.

First, the resource is characterised by considerable uncertainties that will affect the volumes of water delivered to the entitlement holder in any given year. **Hydrological and climate risk** mean that how much water is available from year to year will depend on variables such as rainfall and catchment land use. Provided that the reliability of the entitlement is clearly specified, however, this risk is quantifiable and is and has been managed by entitlement holders.

Another key risk is that of **market risk**; the value of water entitlements is likely to vary over time in accordance with supply and demand, reflecting both hydrological and economic factors (eg. the fortunes of water-using industries). Again, water users can and have managed these risks.

To a greater degree than many other assets, water entitlements are also subject to **regulatory and/or sovereign risk** associated with decisions by water-resource managers and other regulatory authorities. These include:

- decisions on annual water allocations
- decisions on whether trades will be approved
- decisions to reduce the volumes of water available for consumptive use (eg. by re-allocating water to the environment).

Some aspects of the water-resource management policies and processes adopted by State governments in recent years have sought to contain or clarify these risks through codification of decision-making processes (eg. clearer specification in water-resource plans as to how annual water-allocation decisions will be made).

On the other hand, the actual and/or perceived risk of attenuation of entitlements is higher than it was in the past. As discussed above, the sovereign risk associated with these decisions is currently largely borne by users and others (eg. mortgagees) with an interest in an entitlement. To the extent that governments commit to paying compensation if they attenuate these access rights, this risk will be shifted towards government/taxpayers. Of course, various intermediate options for sharing this risk are possible (eg. paying compensation if entitlements are reduced by more than, say, 10% over a defined period).

Further risks are associated with the titling system itself; for example, whether the register can be relied on as evidence of ownership of an entitlement, or whether there is a risk of another party claiming title or other interest in the asset. These risks are considered further in Chapter 5.

Ultimately, these risks will be reflected in the market (eg. the value of an entitlement subject to high or uncertain risks will be discounted accordingly) and/or the terms and conditions of lending will be adjusted if water entitlements are perceived as poor security as collateral for loans. There would appear to be a growing awareness, however, that if risks are inappropriately assigned or not clarified, the full potential benefits of investment and trading in water resources will not be realised.

4 Existing water titling/registration systems

4.1 Introduction

The ultimate focus of this study is on the legal/administrative system of titling and registration of entitlements to water as an asset separate from land, to which it was previously tied.

This chapter provides an overview of the current arrangements for the titling and registration of water entitlements in Australia. This is undertaken as a precursor to Chapter 5, where the detail of an effective titling system is discussed.

In order to record ownership of water rights, a system of titling and registration is required. Different systems are in place throughout Australia. Table 4 summarises the key features of the existing titling/registration systems in each State. Note that:

- some States have adopted systems akin to the Torrens land-titles system (with some variations, such as no indefeasibility)
- other States have departmental registers that are more in the nature of recording systems or 'old title' systems
- some registers are managed by departments responsible for water-resource management; in other cases the register is managed or will be managed by the Land Titles Office (or equivalent)
- the extent of public access to the registers varies.

Table 4 and the discussion that follows describe the current water-titling/registration system in each jurisdiction in more detail. In addition to the registers held at State level, private irrigation cooperatives also often hold registers of the water rights held by their members.

4.2 New South Wales

Existing water licences in NSW are being progressively replaced with 'water access licences', as regulated by the *Water Management Act 2000 (NSW)*. The new water-access licences separate, from land title, the rights to access water, and also separate the right to water from the approval to construct or operate works and to use the water on a specified parcel of land. Each water-access licence will specify rights to a share of the available water in a river or aquifer, expressed as a volume (with the Department of Land and Water Conservation specifying what percentage of the volume is available at the start of each water year) in accordance with rules specified in the relevant water-sharing plan. A separate water-allocation account will be kept for each access licence holder, with potential in some cases for water to be carried over as unused water allocations and used in subsequent seasons.

These newly issued licences (approximately 80,000 licences covering more than 80% of water extraction across the State) are to be listed on a register similar to that of the Land Title Register and managed by Land and Property Information NSW (Department of Land and Water Conservation 2003).[14] This register is to be publicly accessible, as dictated by the Act. It will record details pertaining to each access licence including: name of licence holder; the water-sharing plan to which the licence is attached; any trading actions and other essential information such as the share volume allocated to the licence. The register will also record third-party interests such as leases and mortgages.

The access licences can be held separately from land and can be traded or used as collateral for a mortgage.

Trading in access licences will require approval from the Minister under Section 71A of the *Water Management Act 2000*. The Minister does not have absolute discretion, however; rather approval is based on access-licence dealing rules, which are specified as part of regular management plans for each water-management area.

4.3 Victoria

The Department of Sustainability and Environment holds a register of all bulk entitlements in the State, as well as a register of licences held outside regulated irrigation schemes. As decreed by Victoria's *Water Act 1989*, each

[14] Access licences are to be issued when water sharing plans are gazetted. This has now been deferred until at least 30 June 2004. There have been 13 challenges to the plans.

Table 4. Water licence titling/registration systems.

Key features	NSW	Victoria	Queensland	Western Australia	South Australia	Tasmania	ACT	Northern Territory
Nature of system	Similar to Land Title Register, which uses a Torrens System[a]	Closer to 'old title' recording system	Electronic 'modified' Torrens-based System	Closer to 'old title' recording system	Closer to 'old title' recording system	Closer to 'old title' recording system	Closer to 'old title' recording system	Closer to 'old title' recording system
Centralised registry?	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Who manages register?	Land and Property Information NSW	Rural Water Authorities	Queensland Resource Registry	Water and Rivers Commission	Department of Land, Water and Biodiversity Conservation	Department of Primary Industry, Water and the Environment	Environment Protection Authority	The Controller of Water Resources
Register publicly accessible?	Yes	Varies	Yes	Yes	Yes – license information available on request	Yes	Yes	?
Interaction with resource-management function	Functions operate independently	Register managed by resource managers	Titling managed by QRR and resource management by NR&M with linkages between them	Both are the responsibility of the Water and Rivers Commission	Register managed by resource managers	Register managed by resource managers	Register managed by resource manager	Register managed by resource manager
Certification of title?	Yes	Part of current review	Yes	Yes	Yes[b]	No	Yes	Yes
Registration of third-party interests?	Yes	No	Yes	Yes	Yes	Yes	No	No

[a] The NSW Register has not yet been implemented.

[b] S.32 of the allows for a copy of the licence to be issued.

Rural Water Authority maintains a register of water rights in their district. This system diverges in several ways from a Torrens system, most notably because it is a decentralised register, and public access to these registers is not assured. Third-party interests (eg. mortgagees) are not formally registered on the entitlements. Trades are subject to requirements for a public advertisement (4–6 weeks) and statutory declarations, rather than Torrens system processes of formal notification of interested parties (see S. 226 of the Water Act and Regulations for Permanent Trades).

Recently, however, the Victorian Government has proposed reforms to the titling of water rights. The Department of Sustainability and Environment's Green Paper (2003) "Securing our Water Future", proposes that the Government ensure that registers are kept of all licences, and that all registers of water entitlements are publicly available. ACIL Tasman understands that consideration is being given to improvements to the registration system, taking into account the possibility of unbundling water entitlements into separate components covering water shares, rights to delivery, and site-use licences. One possibility being considered is a 'virtual' integrated system that links these unbundled rights to a computer-based register, with access available for each authority.

4.4 Queensland

As existing water entitlements are gradually separated from land, and managed according to the *Water Act 2000 (Qld)*, there is a need for them to be registered separately from land. Similarly to NSW, the registration of these new water allocations in Queensland is managed by the same body that maintains land titling, the Queensland Resource Registry (QRR). This is done under the auspices of the Queensland Government Department of Natural Resources and Mines (DNRM). Titling is recorded in their water-allocations register. This uses a computerised registry based on the Torrens system, and uses identical forms and similar protocols to land transactions. The water allocations register is similar to land registry in the State, except for certain provisions, listed below, that are not relevant to water or have been excluded for policy reasons:

- provisions regarding a person becoming an adverse possessor
- indefeasibility
- compensation for loss of title
- issuance of certificates of title
- provision for time-share schemes
- legislation preventing the sale of part of a lot
- provision for the lease of part of a lot
- provisions relating to covenants
- profit a prendre legislation
- sections regarding power of attorney
- an instrument does not transfer or create an interest in a lot until it is registered
- the protection of land-registry staff against civil liability.

The most significant of these is that the title does not provide for indefeasibility.

The register is publicly accessible, though search fees apply. Further, it is possible to search for licence information for an entire river or catchment. Any transfer, change, subdivision or amalgamation of water licences must be recorded on the water-allocations register before it will take effect.

However, the processes for dealing with transactions for water allocations depend on the nature of the transaction, and in particular on whether the proposed transaction raises any water-resource management issues that require approval by the Chief Executive Officer of DNRM.

A trade that involves simply a change in legal beneficial ownership, without any change to the water allocation itself, can be lodged directly to this register, without any need for approval from the CEO.

However, transactions that entail a 'change' to the underlying water allocation require the prior approval of DNRM because of their potential water-resource management implications. These include 'changes' that involve the water being transferred to a different location, subdivision and amalgamations. A dealing certificate from the CEO is required before the transfer will be registered by QRR. If the certificate is not lodged within 40 business days of its issue, it will lapse.

Several types of trades will be automatically approved, however, if they conform with pretested trading rules specified in the relevant Resource Operations Plan (ROP) for the catchment (developed using hydrological modelling). Trading proposals involving changes not contemplated by the trading rules will require a public process and further investigation before approval. The change rules may also specify some types of changes that are not permitted because they would require significant changes to the ROP itself.

A daily download from QRR to the DNRM's database is undertaken to ensure that the department's database is up to date for the purposes of licence compliance, charging etc.

Water allocations are transferred to the registers only once they have been formally declared, having been through the water-resource planning processes under the Act. At present, only two (from around 20) catchments have been through this process. In the meantime, all other licences and entitlements remain on the DNRM database. It is likely that transfer of existing entitlements to the QRR Water Allocation Register will take many years.

4.5 Western Australia

Western Australia maintains a centralised register of water licence holders. This is done to comply with amendments to the *Rights in Water and Irrigation Act 1914 (WA)*, passed on 10 January 2001. Maintaining the register is the duty of the Water and Rivers Commission, the body responsible for the management of water resources in the State.

In order to trade a water licence, an application to transfer the licence must be submitted to the Water and Rivers Commission. If trade is part of the sale of the landholding to which the licence is attached, it will be approved automatically. In any other circumstances, the Commission will assess the application before approving or refusing the transfer. In order to approve a transfer, the Commission needs to be satisfied that water-resource management objectives are met and that third parties are not damaged. Water-resource management objectives dictate that certain allocations, such as flows required to prevent damage to the water resource and to protect diversity, cannot be transferred. To ensure the protection of third parties with security in interests in the licence, their written approval is required as part of the transfer application. Other third parties affected by the transfer are entitled to be notified of the transfer and to make submissions, but only where that right is provided for in by-laws. If a transfer is approved, the register is amended accordingly. If it is refused, the applicant has the right to appeal against the decision within 21 days of being advised of it.

The register itself is electronic and publicly accessible, with a fee payable to obtain printed copies. However, the Commission makes no guarantee of the register's accuracy. The register contains details of:

- licence holder (name and address)
- type of licence
- volume of water attached to the licence
- time for which it is valid
- location and description of the land and water resource to which the licence applies
- details of security interests against the licence, eg. mortgages
- notes about any outstanding application to transfer the licence that has not yet been approved.

In addition to listing on the register, holders of water rights are issued with certification of ownership.

4.6 South Australia

Currently, water allocations in South Australia are listed on the Water Licence Register, which is the responsibility of the Department of Water, Land and Biodiversity Conservation. This is as specified in the *Water Resources Act 1997*.

In order to transfer or change a water licence, an application must be submitted to the Water Licensing Branch of the Department of Water, Land and Biodiversity Conservation. All transfers are subject to the approval of the Minister. However, the discretion of the Minister is limited, in that the decision must be in the public interest, must be consistent with the relevant water-allocation plan and must reflect regulatory requirements. Once approved, the register is adjusted to affect the change.

In the near future, it is likely that the Water Resources Act will be repealed when the "Natural Resources Management Bill 2003" is passed. The draft natural resources Bill specifies the formation of a "NRM Register", which would be concerned with the registration of all licenses, permits and selected action plans falling under the legislation of the Bill. The NRM Register would record not only the titling of all water rights, but also other matters that fall under the Bill's jurisdiction, including activities as diverse as the keeping of animals and action plans for land-management breaches. It is anticipated that the registration of water interests will be done through the Water Information, Licensing and Management Application (WILMA), an electronic database that provides Internet access to water-licensing information (Productivity Commission 2003). This system is expected to begin operating in April 2004.

The current Water Licence Register is not available for public scrutiny, but licence information is available on request. The introduction of WILMA in the near future should enhance public accessibility, particularly in remote areas. Holders of water rights in South Australia are issued with certificates.

4.7 Tasmania

In Tasmania, the register of licences and permits is the responsibility of the Department of Primary Industry, Water and the Environment. As in Western Australia and South Australia, this is the same department as is

responsible for the management of water resources in the State, and water rights are evidenced by certificates, though in Tasmania these certificates do not prove title. This register is publicly accessible, with the exception of information about demerit points accrued by licence holders. Demerit points can be charged to an individual licence holder who is in breach of the *Water Management Act 1999*. The register also acts to specify the priority of allocations.

Trade in licences must be approved by the Minister. Since the Minister is also responsible for the register, the registry is amended immediately following approval.

4.8 Australian Capital Territory

The ACT's *Water Resources Act 1998* stipulates that the Environment Management Authority, charged with the administration of the Environment Management Act and for the management of water resources in the Territory, is responsible for maintaining a register of licence holders. This register is to be available for public inspection. Before registration, parties are checked for outstanding fees and previous environmental offences. Once authorised, registration is accompanied by certification of title.

A draft Water Resources Strategy was released in November 2003, but it is unclear at present if that is likely to alter the current titling system.

4.9 Northern Territory

Although there is a water-licence register in the Northern Territory, at present it serves only administrative purposes. It is intended to use it in the future to facilitate the operation of a water-allocations market.

The current register is maintained by the Controller of Water Resources, appointed by the Minister of Environment and Heritage. There is no provision in the Northern Territory's *Water Act 1992* for the register to be publicly accessible.

4.10 Conclusion

There is clearly considerable variation in the water titling/registration systems currently in place in different jurisdictions throughout Australia. Collectively, the systems currently in place would appear to need further development before they could be seen as providing a sound and efficient basis for efficient markets and investment in the Australian water sector.

5 An effective system of defining water property titles

5.1 Guiding principles and key considerations

This chapter discusses the details of an effective system for defining water property titles, including identification of the principles on which a titling regime should be based, and specific technical details of what it should contain and how it should be managed.

The overarching aim is to ensure that the titling/registration supports the efficient operation of water markets by reducing transaction costs of trading and providing appropriate security over title, while at the same time integrating effectively with natural-resource management processes and objectives.

As discussed in Chapter 2, the most effective titling system may vary according to the form of the right being administered and other factors such as:

- the physical nature of the asset or resource
- the nature of the transactions that need to be administered with respect to the rights or entitlements (eg. frequency/lumpiness of transactions, need for quick settlement)
- the extent of unbundling/divisibility of resource
- the value of the asset involved
- the cost of establishing and operating the titling system
- the extent to which the asset underpins investments.

For the purposes of this report, it is assumed that the underlying asset that is the subject of the titling/registration system is a water entitlement specified in the form of an ongoing right to a share of the resource available for approved purposes,[15] as described in Chapter 3.

Notwithstanding the nature of the water entitlements as inherently less secure 'property rights' than fee-simple title to land, the question arises as to the most-effective form of 'titling' system for this asset. To answer that question, the following are among the matters that need to be considered. As water markets develop, the number, scope and frequency of transactions are likely to continue to increase. This reflects the more divisible nature of water entitlements, both in time and space, relative to land and some other natural resources. So-called 'permanent' trades in the underlying entitlements are likely to become increasingly important and require robust procedures to ensure security of title. At the same time, temporary trades of annual water allocations/assignments are also likely to continue to be a major part of market transactions, where the primary requirement is speed and efficiency, and where the underlying entitlement is not altered and does not change hands. In addition, other types of transactions such as leases and derivative/options contracts need to be adequately provided for.

In some parts of Australia, water entitlements now represent very valuable assets, and underpin often very large capital investments. This highlights the need for the titling system to provide appropriate 'quality of title' and for adequate protection of third-party interests (eg. mortgagees).

A key requirement is that the titling/registration system provide for an appropriate 'quality of title' for water entitlements. As noted in Chapter 2, the title to a property right can be crucial to the security and enforceability of the underlying property right. Without title that provides an appropriate degree of certainty of the right, the incentives for efficient trade and investment may be substantially undermined. Titling/registration systems can therefore play a crucial role in efficient market operation, through underpinning the security of the property rights and through lowering transaction costs (eg. reducing the need to verify title).

The ability to use assets as collateral for loans is also influenced by the quality of title to a property right. If there is uncertainty over the legal existence of a property right over an asset, or an interest in it (eg. a mortgage) to

[15] These purposes might be limited to extractive and consumptive uses of water. However, there may well be merit in recognising environmental flows and other non-extractive uses within the same system of title, especially if one wishes to foster some form of environmental trading.

be protected, its utility for financing productive activity will be reduced, and the cost of finance will be higher than it would be otherwise.

The High Level Steering Group on Water Report (2002) recognised that an important objective of registration systems is to ensure that entitlement holders can obtain secured lending at reasonable cost, subject to minimum transaction costs and risks on all parties, including the system operators. It suggested that any system adopted should be judged against specific criteria, including:

- the need to be cost-efficient in terms of administration and information handling
- the extent to which it allows for efficient lending at reasonable financing rates (ie. the assurance provided should be sufficient to minimise any loading of risk premiums)
- whether it involves an appropriate sharing and placement of risks and incentives (ie. those who benefit most by the arrangements should carry the costs; those that have the incentive to act irresponsibly should bear the penalties for doing so)
- whether it facilitates trade – creation of a cumbersome, inflexible procedure could discourage individuals venturing into the market.

These issues need to be balanced against the costs of establishing and maintaining the titling system, including those associated with any changes to existing systems. It is relatively easy to draw up a long list of desirable attributes of a water-titling system, on the assumption that they can all be delivered without cost. A key aim of recent water reforms has been to increase the efficiency of water use, and this concept of efficiency must include establishment and transaction costs, as well as operational gains.

However, any accounting for such costs needs to be set in a long-term context. The real, short-term cost savings in not establishing a system in which title can reasonably be guaranteed may well be more than offset in the longer term by growing transaction costs as the length of the transaction chains grows.

The following discussion outlines the details of an effective titling system for water, including how it might ensure:

- appropriate 'quality of title' through the nature of the titling system
- appropriate protection of security interests
- adaptive management of the environment
- cost-effective administration
- efficient market transactions of various types
- clear specification of entitlement
- public accessibility
- national consistency
- cost-effectiveness and practicality
- a suitable transition/implementation path.

5.2 Nature of titling system

Maintaining a register of rights is fundamental to protecting interests of the holder of the rights, and third parties. As detailed in the previous chapter, each State currently maintains some form of register of water rights. The registration system fulfils various purposes, including:

- facilitating adaptive management of the environment
- clearly specifying a registered holder's interest or entitlement
- management of associated revenue systems
- public accessibility
- facilitating efficient market transactions.

A registration system, if it is to be effective in the various purposes it is to fulfil, must provide certainty to

- those who own the interest the subject of the register
- those wishing to deal in some way with that interest
- those managing the resource that is the subject of the register.

In this context, the following are among the main issues to resolve:

- Should the system be based on a recording or registration system (ie. should it be an 'old title' or 'Torrens title' system, or some modification of these)?
- What protocols should apply to transactions in water entitlements?
- What interests should be able to be registered in relation to the water entitlements?
- How should registered interests over the water entitlements (eg. mortgages) be protected?
- Should titles be 'indefeasible'?

A registration system should be accurate, robust and secure, particularly when dealing with permanent transfers of rights.

A threshold issue in developing an effective titling system in relation to water is whether an 'old title' system or Torrens system should be adopted.

5.2.1 Old title

An 'old title' recording system provides notice to those searching the register that an interest or entitlement exists, but does not provide a guarantee of title. Registration of an entitlement is merely a record of the entitlement and does not have any effect on the quality of the title itself.

Notwithstanding this, registration under an 'old system' can still be used as a mechanism for attaining 'priority' over competing interests (assuming the registered interest has been validly created) and can substantially reduce the administrative costs and risks in tracing a title.

Under an 'old title' system, title is derived from a valid chain of historical dealings and not from registration itself. Hence, the act of registration is irrelevant to the issue of conferring title and does not mend any defects in the chain of title that may have occurred previously.

It follows that persons cannot rely on an 'old title' register as an accurate reflection of the quality of the title. Those wishing to deal with the entitlement are required to look behind the register by conducting searches to verify the validity of all previous dealings in the title.

Some arguments for an 'old title' system' include the following:

- The costs to government in establishing and maintaining the register may be lower.
- As there is no guarantee of title, governments will not be required to provide assurance funds, which lowers (agency) costs associated with the register.
- Robust protocols and procedures might minimise risk sufficiently, without the need for governments to guarantee title.
- The concept of indefeasibility is not appropriate to water entitlements because:
    - governments retain power to revoke the entitlement where the holder does not comply with the conditions on the licence or the requirements of relevant legislation
    - governments must have the power to vary the allocation under entitlements.

The following are some arguments against an 'old title' system:

- Certainty of entitlement can be achieved only by tracing, in an unbroken chain, all events and documents associated with the entitlement, back to the original grant of entitlement.[16] While this may not be a significant problem in the early development of water markets, as more transactions occur, confirming the chain of title in this manner will become more and more time-consuming and expensive on a transaction-by-transaction basis.
- Persons dealing with the title are unable to verify it in a certain and simple manner.
- The need to search the chain of title will require conveyancers and solicitors to undertake costly and time-consuming searches, and prepare historical abstracts of the state of the title over time. This will lead to greater transaction costs for transfers and dealings.
- The 'old title' register does not contribute to the quality of title.
- The 'old title' system has been proven unsatisfactory for land (which is why the Torrens system was introduced). It follows that there may be limited investor and public confidence in an 'old title' system, notwithstanding that water is a different resource.
- Where title is not guaranteed by the State, there may be less incentive for governments to devote the appropriate resources to maintenance of the register, and risk-management policies may be less stringent.
- An unwillingness of governments to guarantee title may affect public and investor confidence in the accuracy and efficacy of the register.

5.2.2 Torrens system

A Torrens-based system is a system of 'title by registration' rather than a system of 'registration of title'. Dealings take effect upon registration, rather than upon execution of the documentation relating to the dealing.

The concept of indefeasibility is fundamental to a Torrens system. Essentially, this means that, subject to certain exceptions, the title of a person holding a registered interest is not affected by, or subject to, any interests or dealings other than those that are noted on the register. Further, subject to exceptions, once an interest is entered on the register, the interest cannot be defeated by any

[16] In relation to the 'old title' land system, in all jurisdictions except South Australia statutory provisions were introduced in an attempt to reduce the length and complexity of searches required by a purchaser. In most States, the purchaser is required to establish the chain for a period of 30 years only, and is not deemed to have notice of any interests created before that date. Notwithstanding these provisions, the purchaser takes the title subject to any legal interests affecting the title, whenever they were created, based on the principle that a prior legal interest will always have priority over a subsequent legal interest. Hence, prudent purchasers would still search the whole chain of title to avoid the possibility of taking a title subject to a previous legal interest (Bradbrook *et al.* 2002, p 108).

other interests except those noted on the register. Further, once registered, a title cannot be set aside because of a defect that occurred before registration.

The basis of a Torrens system is that the register can be relied upon as an accurate reflection of the quality of title. Persons dealing with the title should not be required to look beyond the curtain of the register. Under the various Torrens statutes, the State guarantees the accuracy of the register.

Arguments for a Torrens-based system include:

- certainty is increased because title is based on registration and is not historical or derivative
- establishing quality of title is less time-consuming and costly, as one centralised search may be undertaken – and this benefit can be expected to grow substantially over time
- protocols and procedures are well-developed, and many of them will be applicable to registers of water entitlements
- formal procedures for registering dealings and changing the register ensure the integrity and credibility of information contained in the register
- existing information technology and expertise in relation to land titles systems can be utilised
- where there is a State guarantee of title, it is more likely that appropriate resources will be devoted to the maintaining the register
- greater public and investor confidence, particularly where title is guaranteed by the State
- there may be economies in having the same system for land and water, given that many transactions will entail both land and water together.

Arguments against a Torrens system include:

- higher costs to government in establishing and maintaining registers
- if title is guaranteed by the State, this has the potential to impose further costs on government
- formal procedures and protocols may reduce the speed at which transactions can occur and may increase transaction costs
- the concept of 'indefeasibility' is not appropriate to water, because of the regulatory control exercised by governments over water entitlements
- the risks associated with quality of title may be more efficiently managed via private title-insurance rather than through State guarantees.

It is worth noting that there exist, logically at least, some hybrid concepts. For example, the problem of a growing title chain to be searched might be addressed without an absolute guarantee, by a system that guarantees title in accordance with the register, *conditional on the initial registered title being valid*. This would leave a need to search the title chain before establishment of the register, but obviate the need to search a chain of growing length. Provisions could exist for registering these searches as they occur, and for governments then issuing a guarantee of absolute title. Such searches might be instigated for purposes of transfer, or for lodgement as security, essentially on a needs basis.

The merits of such an approach would depend on the scale economies in dealing with the guarantee issue in one hit, on the attitude taken to the responsibility for existing defects, and on the distribution of the costs of the searches and subsequent detection of defects.

It is likely that most non-fraud defects in the record will relate to errors that occurred within the established registration processes. One attitude to this might be that this is reasonably a responsibility of government that could be assumed by a once-and-for-all guarantee of title – without the need for a prior redressing of any defects in the chain of past transactions. There would still be scope for funding future compensation costs through ongoing management charges. It needs to be recognised, however, that any such decision entails a re-allocation of risks within the present system.

It is also worth recognising that the relative roles of government and market mechanisms for managing these risks will vary between the 'old title' and Torrens title systems. Under an 'old title' system, there is greater scope for a role for a private title-insurance market to develop, with title insurance playing a key role in the management of title risks. Under a Torrens system, such insurance is more likely to be limited to the exceptions to indefeasibility and any other 'gaps' in the guarantees inherent in the system.

5.2.3 Which system is appropriate for water entitlements?

Quality of title

A fundamental part of the COAG reform is the reformulation of water entitlements: from statutory privileges of limited security into entitlements that are divisible, tradeable assets.

'Old title' registers provide an appropriate way of recording and administering statutory-based privileges. However, as water entitlements are developing into divisible, tradeable and often highly valuable assets, registration systems now have an additional purpose: providing certainty of title and facilitating trading markets.

In recognition of this, the Wentworth Group of Concerned Scientists is calling for a consistent system for registering entitlements that provides the same guarantees and investment certainty as registers for land title.

While speed and efficiency are important, with respect to registering permanent transfers/trades of water rights, protecting quality of title should be the primary consideration.

Registration systems should operate on the premise that the register is an accurate reflection of the state of the title. Persons dealing with the entitlement should not be required to search the 'historical chain of entitlement'. Rather, they should be able to rely on the register as proof of the quality of title, subject to certain well-established exceptions.

It is proposed that a Torrens-based system should be adopted in relation to water rights, as it provides a much higher level of certainty of title to those dealing with the water entitlement and, ultimately, will facilitate trading and investment. Dealings in relation to water entitlements would take effect only upon registration of the dealing; that is, a system of entitlement by registration. This will provide a mechanism for ensuring that registers are complete.

The registration system should be administered pursuant to certain procedures and protocols, similar to the land title office manuals and guidelines that exist in various States. Formal procedures for registering dealings and changing the register, contribute to the integrity and credibility of information contained in the register.

This position reflects our on-balance assessment that, in the current setting, adopting a Torrens title system is likely to be a more-efficient and effective means of managing the risks and transaction costs in dealing with them than alternatives such as relying on the advent of private title-insurance as an economic instrument. Considerations here include the existing familiarity with, and confidence in, the Torrens system applying to land in Australia, the fledgling nature of the local private title-insurance market, the fact that many transactions will involve both water and land together, so having different underlying titling systems for each may increase costs, and the difficulty in accurately assessing and pricing risks given the current status of State water-entitlement registers.

This is not to say that private title-insurance would not or should not develop as a complement to a Torrens title system, as appears to be the case for land (see O'Connor 2003). Indeed, if Torrens title systems with indefeasibility are not adopted by State governments for water entitlements, it is not unreasonable to anticipate that wide-ranging title-insurance products will be developed and offered in the marketplace.

It is also recognised that, in the early stages of water markets, the ability to rely on the register as proof of entitlement may be of less significance. In these early stages, the 'history' of the entitlement is relatively brief, and verifying the chain of entitlement will not present a significant transaction cost. As more and more transactions occur, however, the 'historical chain of title' will lengthen and the task of verifying or demonstrating title will become increasingly time-consuming and costly. Requiring persons dealing with the entitlement to look behind the register to the historical chain of title has the potential, therefore, to significantly increase transaction costs. As water markets mature, the ability to rely on the register as proof of entitlement will become more significant.

The concept of indefeasibility in relation to water

There is often misunderstanding about the meaning of the term 'indefeasibility'. The term 'indefeasibility' does not mean that a title cannot be annulled, defeated or abrogated at any time in the future (Whalan 1982).

What the term does mean is that, if a title is examined at any given point in time, the register will provide an accurate reflection of the state of the title at that given point in time. A person dealing with the title at a particular point in time is not required to go 'behind the curtain of the register' and is entitled to assume, subject to certain exceptions, that the title is not affected by any other interests except those noted on the register.

The issue is whether such a concept is applicable to water entitlements. As noted in the previous chapter, to date no Australian jurisdiction has adopted indefeasibility in respect of its water-entitlements registers.

It is arguable that the concept of indefeasibility cannot apply to water entitlements, as governments wish, with good reason, to retain the power to cancel an entitlement where the holder does not comply with the conditions of the entitlement or the requirements of governing legislation. A further argument against the concept of indefeasibility is the power of governments to regulate the resource by varying the allocation under an entitlement and other conditions of the entitlement.

In order to clarify the concept of indefeasibility, it is useful to recap that, increasingly, water entitlements are being viewed as comprised of separate components, viz.:

- a long-term interest in a stream of periodic allocations (the underlying entitlement)

- the stream of periodic allocations which, following assessment of resource availability, have been distributed or made available for use or trade (the allocations)
- permission to 'use' the resource at a specific location subject to use conditions and obligations typically associated with the management of externalities (such as pollution and environmental degradation).

The concept of indefeasibility applies only in relation to the first of these components; that is, the underlying entitlement itself. A search of the register will provide conclusive evidence that, at the time of the search, a person holds an entitlement to a perpetual share of the available water resource, subject only to encumbrances registered against the entitlement (such as security interests).

A clear distinction must be made between the titling/registration aspect of water entitlements and the management of the resource.

If the entitlement is based around specified shares of a resource, the issue of indefeasibility is quite separate from the issue of whether compensation should be paid for attenuation in entitlements.

A Torrens-type registration system and the concept of indefeasibility will provide a mechanism for protecting the holder and third parties with a registered interest in the entitlement, and those dealing with the entitlement, as against other private parties who may be competing for interests in the entitlement.

Registration of an entitlement (or an interest in an entitlement) will not, however, protect against changes brought about by the resource manager (eg. changes in allocations following an assessment of resource availability, changes in the conditions attaching to the entitlement, or cancellation of the entitlement due to non-compliance with conditions). There may, of course, be other provisions constraining the scope for such changes, or involving compensation provisions. Any such provisions have implications for security of asset value but need not involve security of title.

There must be protocols in place that allow persons dealing with water entitlements to obtain access to relevant resource-management information, such as water-sharing plans and water accounts, which would not be reflected on the Torrens-based register of entitlements.

In addition to regulation by government, there may be other exceptions to the concept of indefeasibility (as there are with land). In particular, one exception (as with land) would be where an entitlement or interest in an entitlement has been registered fraudulently.

There may also be other exceptions to the concept of indefeasibility. For example, it may be that certain dealings do not need to be registered but a third party will, nevertheless, take an interest in the water entitlement subject to dealings of that kind (as is the case with certain unregistered interests in land). Dealings involving the allocation under the entitlement (such as seasonal water assignments) could be examples of interests that may still be enforced, notwithstanding that they may not need to be (or indeed able to be) entered onto the register.

State guarantee of register

If it is accepted that a Torrens-based system should be adopted for water, an issue arises as to whether the State should guarantee the integrity and accuracy of the register and provide an indemnity for loss suffered as a result of improper functioning of the register.

A State guarantee has the potential to lead to additional costs to government and may, therefore, be resisted.

In relation to land, it is arguable that claims under a State guarantee represent a relatively small proportion of the total number of land dealings. For example, in Western Australia during the period May 1990 to March 1999, 41 claims were lodged, which would obviously represent a relatively small number of dealings when compared with the total number of dealings registered in that nine-year period (Hammond 1999). The development of robust protocols and procedures to ensure the integrity and accuracy of a water register (as is the case with land) should ensure that a similar pattern would develop in relation to water-titling systems.

The costs of claims to the government must be weighed against the public and investor confidence that is instilled by a State guarantee of title. A State guarantee of title is a fundamental element of a Torrens-based system and inextricably linked to the concept of indefeasibility. Ideally, therefore, the accuracy and integrity of the register should be guaranteed by the State, as this will contribute to public and investor confidence in the register, and ensure that appropriate resources are devoted to its maintenance. Such a system would seem necessary to meet the requirement nominated by the CEOs' Group on Water Reform (2003, p.7) that:

> ...access entitlements are recorded in reliable registers, which enjoy public confidence and unambiguously define who holds them and under what terms.

As is the case with Torrens land statutes, it is preferable that the Registrar be given the power to correct minor errors and omissions in the register.

It will be necessary for the relevant legislation to provide specifically for the situations in which compensation is payable (as is the case with Torrens land statutes). The compensation provisions in the Torrens land statutes vary from State to State. Generally, however, there are four circumstances in which compensation may be payable, being:

- fraud[17]
- error, misdescription or omission in the register
- bringing land under the Torrens statute
- the registration of another person as the proprietor of the land, estate or interest.

Similar heads of claim may be applicable to a water entitlements register and could be provided for in the legislation. It is emphasised, however, that compensation in this context will be limited to losses arising from the operation and functioning of the register. It may be that States will provide compensation for attenuation in entitlements in certain circumstances, but such compensation would not be pursuant to, or related to, the State guarantee of the integrity of the register. The issue of compensation for regulatory attenuation in entitlements is an entirely separate issue to compensation in relation to the operation of the register, with only the latter being covered by a State guarantee.

Costs to government

It is recognised that the establishment and maintenance of a Torrens-based system may impose additional costs on government, particularly where title is guaranteed by the State. Governments have, however, committed to water reform (in particular the development of trading markets) and should therefore be prepared to adopt the most-appropriate means of facilitating that reform, notwithstanding that it may initially involve higher costs. This does not overrule the cost-effectiveness principle that should have primacy, but account should be taken of the costs and benefits involved in the future operation of the scheme (including impact on water-usage patterns) as well as initial establishment and administration costs.

It is accepted that, in the short term, the benefits of a Torrens-based system (such as the ability to rely on the register as an accurate reflection of the quality of title) may be of less significance. In the early stages of water markets, the 'historical chain of title' will be relatively brief and a Torrens-based system may be viewed as unnecessary, particularly given its potential to impose additional costs on government. As markets develop and the 'historical chain of 'title' becomes more complex, the need to undertake searches to verify the chain may represent a significant transaction cost and have a considerable effect on the efficiency of the market. It is contended that, in the long run, the costs of establishing and maintaining a Torrens-based system are likely to be outweighed by the greater certainty and efficiency provided by a Torrens system than by an 'old title' system.

It has been suggested that an 'old title' registration system, supported by rigorous registration and trading-approval processes to minimise risk to security holders, may gain favour with governments (High Level Steering Group on Water 2002). The rigorous registration and trading-approval processes needed to ensure appropriate quality of title under such a system would also impose costs on government, possibly no less than those of a Torrens-based system.

In any event, it should be borne in mind that it is possible for a State guarantee to be funded, at least to some extent, by users.

One option is for a proportion of registration fees to be put towards funding a State guarantee. In NSW, the Torrens Assurance Fund covering land is funded by a charge on each land dealing lodged (NSW Department of Information Technology and Management 2002). In the year ending 30 June 2002, the total revenue generated by these charges was $1,962,000, which exceeded the total payments from the fund in that year ($1,218,000).

Alternatively, water-management charges on water users could incorporate any additional costs of guaranteeing title. Some jurisdictions are already charging various fees in relation to water entitlements, such as licensing fees and fees on transfers and other dealings. These fees could be partly applied to the funding of a State guarantee.

5.3 What interests should be registrable?

The types of interests that are registrable must be clearly established. At a minimum, the following interests must be registered:

(a) the entitlement itself

(b) permanent transfers of the water entitlement

(c) encumbrances that affect the water right, such as mortgages and other security interests.

[17] In the Victorian statute there is no specific provision covering fraud.

5.3.1 Interests applicable to land

If it is accepted that a Torrens system is to be adopted for water entitlements, it follows that interests that can be registered in relation to land should also be so registered in relation to water, unless the nature of water as a resource makes that interest inapplicable.

For example, provision is now made in some States for water entitlements to be leased in the same manner as land. Generally, a lease of a water entitlement will transfer, for the term of the lease, all the rights and responsibilities of the holder of the entitlement to the lessee. For example, where there is an increase in the announced allocation during the term of the lease, that additional water would be available to the lessee. Leases therefore differ from arrangements such as seasonal water assignments, as seasonal arrangements relate to only the current water allocation, whereas a lease extends to all rights enjoyed by the holder of the entitlement. Leases must therefore be entered in the register, in order to be enforceable.

The various Torrens statutes provide that certain leases covering land may still be enforced, notwithstanding that they are not registered. Consideration will need to be given to whether certain leases of water entitlements will not need to be registered; for example, those that do not exceed a certain term. If certain leases do not need to be registered, it will be necessary to develop mechanisms for those interests to be protected against subsequent registrable interests. This could be by an annotation in the register (similar to the concept of a caveat under the Torrens land system).

Another example of an interest in land that may be applicable to water entitlements is the life estate. Essentially, a life estate is where an estate in fee simple is granted or transferred to the grantee for the period of the grantee's life (or, in some cases, the life of a person other than the grantee). Life estates can be registered in relation to Torrens land and are generally created by the holder of the fee-simple estate transferring the estate to the grantee for the period of the grantee's life. The holder of the fee-simple estate retains what is known as a reversion or remainder interest; that is, the right to possess and enjoy the property on the death of the grantee. Upon the death of the grantee, the entire fee-simple estate will revert to the holder.

A similar principle could be applied to water entitlements, whereby the holder of the entitlement transfers the entitlement to another party for the duration of that other party's life, with the transfer being entered on the register.

There are some interests that are applicable to land that will clearly not be applicable to water entitlements. For example, in Queensland, an easement cannot be taken over a water entitlement.

As is the case with the Torrens land-title system, trusts should not be entered on the register. It should be made possible, however, for declarations of trust to be lodged at the titles office and a Registrar's caveat lodged to protect the interests of the beneficiaries under the trust.

Powers of attorney provide a useful checking mechanism in that they allow the titles office to verify that an instrument has been executed under proper authority, thereby reducing the possibility of fraudulent transactions. Accordingly, it is preferable that a water-titling system allow for powers of attorney to be lodged.

5.3.2 Interests specific to water

It is foreshadowed that, as water markets continue to develop, it is likely that financial markets, together with water brokers, will develop derivative products for temporary water markets (ACIL Tasman 2003).

These arrangements are most likely to be contractual arrangements covering future seasonal allocations (such as an option to purchase a certain volume of an allocation in the future), and are not likely to involve the transfer of the obligations and rights under the entitlement itself. Accordingly, it is suggested that such arrangements not be entered on the register of permanent water entitlements. It will be necessary, nevertheless, to more fully consider the nature of the various products as they develop.

If such arrangements are not entered on the register, we need to consider how subsequently registered interests (such as a permanent transfer of the entitlement) will affect interests created under these arrangements.

Where the option or right under the contractual arrangement has not been exercised, it is suggested that a new registered entitlement holder should not be affected by the contractual arrangement, unless the existence of that contractual arrangement is noted on the register. In this regard, a concept similar to the caveat system covering unregistered interests in land could be adopted. This would enable the register to be annotated, such annotation alerting parties dealing with the entitlement to the existence of the contractual arrangement and preventing the registration of dealings in relation to the entitlement, unless those dealings were subject to the rights created under the contract. The onus would be on the person holding the option under the contract to apply to have such an annotation entered on the register. In the absence of such an annotation, the contractual arrangement could not be enforced against the new

registered entitlement holder, and the only remedy of the person holding the option would be to bring an action for breach of contract against the previous registered holder.

It is suggested that, where the option or right under the contractual arrangement has actually been exercised (for example, part of the entitlement holder's current annual/seasonal allocation has been assigned/transferred, pursuant to a contractual arrangement entered into at an earlier date), then the rights of the assignee to that water should not be affected by the transfer of the entitlement to a new holder during that season. The new registered holder should take the entitlement subject to the seasonal arrangement, notwithstanding that it is not entered on the register or the subject of an annotation on the register.

If there are to be other interests that are still enforceable notwithstanding that they are not 'registrable' and not protected by an annotation on the register, these must be clearly established.

Arrangements such as 'seasonal water assignments' (provided for in Queensland) and the assignment of water allocations from the water account of one water entitlement to another (as is possible in New South Wales) are examples of interests that may not need to be entered on the register of water entitlements or protected by an annotation on the register. In the case of a seasonal water assignment, notwithstanding that it is not entered on the register of water entitlements, the assignee's interest will not be affected in any way if the original water entitlement is transferred to another registered holder (ie. the new registered holder takes the entitlement subject to the seasonal water assignment).

If it is recognised that certain dealings will not be entered on the register, persons dealing with the holder of the water entitlement will need to exercise some level of due diligence to ascertain the existence of any unregistered interests. This process will be assisted if details of temporary transactions are publicly accessible (in Queensland, for example, water permits issued pursuant to seasonal water assignments are publicly searchable).

Protocols could also be put in place to assist in the process of identifying unregistered interests. For example, the seller/mortgagor of a water right could be required to provide a statutory declaration detailing any unregistered interests that affect the entitlement. Protocols of this kind exist in relation to land. It is commonplace, for example, as part of the sale of land process under the Torrens system, for purchasers to issue 'requisitions on title' to a vendor before settlement of the transaction.

As a general observation, temporary transfers of relatively short duration – or derivatives that allow for transfers of this nature – would have limited effect on the asset value of a permanent water right. Furthermore, in the context of lender interest in security, these durations may be too short to be of much significance and these classes of transfer have no implications for rights to secure ultimate title.

The same need not be true of transfers of longer duration, or of derivatives that allow for transfers over longer periods of time. These arrangements, and the timing and form of payments in respect of these rights, could influence the value of the asset remaining in the hands of the registered title holder. These types of transfers may also be less susceptible to discouragement through the timing demands involved in registration.

5.4 Certificates of entitlements

The Torrens land statutes have differing provisions with respect to when certificates of title must or may be issued.

Consideration needs to be given to whether certificates of entitlement in relation to water will be issued as a matter of course. If not, there should be mechanisms in place by which the holder of the entitlement, or the holder of a security interest, can apply for a certificate of entitlement to be issued.

Where a register is computerised, the certificate of entitlement in relation to a water right would effectively be a copy of the contents of the register entry for that particular water entitlement.

Provided a certificate of entitlement was kept up-to-date as changes in the register occurred, those wanting to deal with the right (including lenders) could rely on the certificate as proof of the entitlement, in the same way as they could rely on the register.

To ensure that certificates of entitlement are kept up-to-date, protocols that require the production of the certificate of entitlement before a dealing being registered should therefore be developed. Upon a dealing being registered, a new certificate of entitlement would be issued to reflect the amendments made to the content of the register.

Where a water entitlement is the subject of a mortgage, a certificate of entitlement could be lodged with a lender and its production required in order for any dealings to be registered against the entitlement (as is the case with land). Such protocols would ensure that dealings affecting the entitlement were not registered without the involvement and consent of the lender.

5.5 Protecting security interests

Those holding registered security interests over a water entitlement will be concerned by any dealings that affect their security.

Titling systems must have in place adequate mechanisms to protect registered security interests. Reducing the risk associated with lending against water entitlements will reduce the interest rate at which funds are loaned, thereby facilitating growth and investment in the water industry. Mechanisms to protect lenders will foster lender confidence in water entitlements and allow entitlement holders to more effectively utilise their assets as collateral.

5.5.1 Existing security interests in land

Traditionally, water entitlements were attached to land. The definition of 'land' in property law statutes had the result that, where a lender took security over land, this generally included the water entitlement. The separation of water entitlements from land creates uncertainty for lenders in relation to the status of these existing securities over land.

Accordingly, it is important that any titling system adopted provides mechanisms to deal with these existing securities.

There are varying approaches to dealing with existing securities. For example, the Queensland *Water Act 2000* does not provide for the automatic movement of the security interest from the land to the new water entitlement. In order to obtain a security interest over the water entitlement, the mortgagee is required to first give notice to the Department of Natural Resources and Mines. In order to maintain the same priority as was held on the land register, the mortgagee must then apply to have the mortgage registered on the water entitlements within 40 business days of the entry of the new water entitlement on the register. This approach provides more protection to the holder of the water entitlement, as there is no automatic transition from land to water, and lenders must enter into new mortgage documentation before being able to register the interest over the entitlement.

In contrast, the *NSW Water Management Act (2000)* provides for any existing interests in land to which a water entitlement is attached to become an equivalent interest in the new water entitlement created under the Act. The mortgagee has up to two years to register the mortgage and, in doing so, the mortgage will retain its previous priority. This approach is beneficial to lenders as it does not require them to prepare costly new mortgage documentation and has less potential to affect the lender/borrower relationship.

5.5.2 Who should be able to register a security interest?

In some jurisdictions (for example, Western Australia), only the holder of the water entitlement can apply to have a security interest entered on the register.

Where this is the case, in order to ensure that the interest is registered, the lender would need to enter into a contractual arrangement requiring the entitlement holder to register the security interest. Notwithstanding such a contractual arrangement, the entitlement holder may fail to register the security interest, in which case the lender would not be able to enforce their security interest against subsequent registered interests. Even where the entitlement holder did eventually register the interest, the delay in registration could result in the lender losing their priority in relation to subsequent registered interests.

To reduce the potential for lack of, or delay in, registration, and the risk of priority being affected, it is preferable that lenders be able to procure the registration of their interest independently of the holder of the water entitlement. Nevertheless, protocols should be developed in relation to this process, so that the holder of the right is sufficiently protected.

5.5.3 Protection against dealings

Those holding registered security interests over a water entitlement will be concerned by any dealings that affect their security. As previously discussed, one manner of protecting lenders is for a certificate of entitlement to be lodged with the lender, with its production required before a dealing can be registered.

Protection can also be achieved by putting in place protocols that require the holder of a registered security interest to be notified of any proposed dealings in relation to the water entitlement.

Lenders should be notified of any application to permanently transfer a water entitlement. The transfer should not be registered without the consent of the lender, as this would result in a situation where the lender was no longer holding effective security. In any event, where a water entitlement is being permanently transferred to another holder, it is unlikely that the transferee will be prepared to take that water entitlement subject to the security interest. Accordingly, the permanent transfer of an entitlement is likely to involve the discharge of the existing security interest, rather than the entitlement remaining subject to the encumbrance after transfer. There should be protocols in place that allow for the discharge of the security interest, in conjunction with the transfer of the entitlement to a new registered holder.

The registration of a security interest does not prevent the holder of the entitlement from subsequently dealing with the entitlement, for example by creating a lease over the entitlement. An issue, therefore arises as to the effect of these subsequent dealings on the lender's interest. Under a Torrens system based on priority by registration, the interest of the lender will take priority over any subsequent interest entered on the register. The lender may therefore exercise their rights without regard to the subsequently registered interest. The lender will be affected by a subsequently registered interest only in circumstances where the lender has consented to the subsequent dealing. Accordingly, if an entitlement holder wishes to create an interest in the entitlement that is enforceable against the lender, the consent of the lender must be obtained before registration of that dealing. The consent of the lender in these circumstances is therefore for the purpose of protecting the holder of the subsequent interest, rather than the lender.

5.5.4 Other events affecting the entitlement

Lenders will be concerned not only with dealings (such as transfers and leases), but also with other events affecting the water entitlement. Provision should therefore be made for the lender to be notified of such events (as is already the case in some jurisdictions). Examples are where the conditions attached to the entitlement are changed or where the resource manager proposes to cancel or suspend an entitlement.

In these situations, the entitlement holder is normally given the opportunity to make submissions to the resource manager, and the resource manager must consider these submissions before making their decision. It is arguable that a lender, as the holder of an interest in the entitlement, should be also be given the opportunity to be heard.

Security interests could be further protected by allowing lenders to remedy a default to prevent cancellation of a licence, or to reinstate a cancellation or surrender, provided the lender agrees to be bound by the same obligations as the licence holder. With respect to such measures, the need to protect the holder of the security interest must be weighed against the need for the resource manager to retain a certain amount of discretion in relation to the management of water entitlements.

5.5.5 Priorities

As water markets develop, it is likely that there will be competing dealings in relation to water entitlements. The absence of a suitable mechanism for prioritising dealings may result in entitlement holders being unable to use their entitlement as collateral, which will hinder the development of markets.

To ensure public and lender confidence in water entitlements, there must be a system for prioritising these competing dealings.

An effective means of prioritising interests is to base priority on the order of registration. A prior registered interest will take priority over a subsequent registered interest, unless the holder of the first interest consents to the subsequent interest having priority. Registered interests would take priority over unregistered registrable interests. If a person fails to register an interest that is registrable, then that unregistered interest would be defeated by a subsequent registered interest. Preferably, there should be statutory provisions to this effect, otherwise priorities will be determined under general law principles.

Priority based on registration will also provide a mechanism for ensuring that all registrable dealings are registered, thereby contributing to the completeness of the register.

Consideration needs to be given to protecting the interests of a purchaser of an entitlement between the time the contract is entered into and the time the transfer is registered. In situations where the consent of the resource manager is required, the interval between entering into the contract for sale and registration may be significant. This may result in inconsistent dealings being registered in the meantime and affect the priority of the purchaser.

As is the case with land, the interest of a purchaser of a registered entitlement under a contract of sale should be recognised as an interest that may be protected by caveat. A caveat can be lodged by a purchaser to prevent the registration of inconsistent dealings. It will also act as a notice to those searching the register that there is an existing contract in relation to that entitlement.

As well as a caveat, other mechanisms may be used to protect the interests of purchaser before registration. For example, in Queensland, Part 7A of the *Land Title Act 1994* enables a purchaser for valuable consideration to lodge a 'settlement notice'. The notice effectively 'freezes' the register by preventing the registration of any dealing lodged after the settlement notice is lodged. The notice will lapse after two months. The settlement notice is intended to operate in the same way as a caveat, but it is a less expensive alternative, as the Registrar is not required to provide notice to those holding an interest in the title. The settlement notice also has the advantage of preserving a place in the queue for registration.[18]

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18 For further discussion of settlement notices, see McCallum and Moore (2002, p. 182).

Mechanisms such as caveats and settlement notices could also be used to protect purchasers between the time of settlement and registration, if it is anticipated that the may be a significant delay in registering the transfer.

In circumstances where the consent of the resource manager must be obtained before a transfer or dealing being registered, processes should be developed to facilitate prompt registration after the consent is granted. For example, the regulatory consent to a dealing may be valid for only a certain time period, effectively ensuring that the dealing must be lodged for registration within that time period (as is the case in Queensland).

Consideration should be given to the potential for time lags between the date of lodgement for registration and the actual registration of dealings. In a computerised system, the time between lodgement and actual registration will be less than in a paper system, but there is still the potential for the delay where documents need to be examined or approved by the titles office before being registered. As is the case in relation to land titles, the date of registration should be back-dated to the date of lodgement. The priority of the dealing will therefore be determined by the date and time of lodgement, notwithstanding that there may be some delay between lodgement and the dealing being cleared for registration.

During the period between lodgement of a dealing for registration and actual registration, a search of the register should indicate that the entitlement is 'subject to dealing', so as to alert persons dealing with the entitlement of the lodged dealing (as is the case in Western Australia).

5.6 Facilitate adaptive management of environment

The titling system needs to ensure there are no unnecessary impediments to water being allocated to the environment, or restrictions on environmentally sensitive usage patterns being regulated.

To a large degree, resolution of the balance between the needs of users for resource security and those of adaptive environmental management is in the definition of the underlying entitlements themselves (eg. as a share of the water available for consumptive use), and the issue of compensation for attenuation of these entitlements, rather than in the technical details of the tilting/registration system.

The mechanism for integrating environmental allocations into the titling system will vary, however, depending on the approach adopted towards providing for water for the environment.

To date, environmental allocations have predominantly taken the form of 'hard-wired' management rules such as minimum environmental flow rules. Under this approach, water for the environment is seen as having a prior right of access over water for extractive uses. Such rules are taken into account in the hydrological modelling that defines what is then 'left over' for extractive users. Only these latter entitlements (ie. those for extractive users) are recorded on the titling/registration system, because the entitlements they confer are net of water set aside for environmental purposes.

Alternatively, or in addition to the 'prior right' model, environmental water allocations could be, and in some cases have been, defined in similar volumetric terms as those of extractive entitlements. Under the 'equivalent right' model, such agencies could become traders in the market in their own right, buying and selling water in pursuit of environmental objectives. Active trading could permit a resource manager flexibility to adapt the flow regime to changing information and hydrology conditions (see ACIL Tasman (2003) and Siebert *et al.* (2000)). Similarly, the Wentworth Group has proposed the creation of 'environmental water trusts' for stressed rivers and groundwater systems. These would hold environmental water entitlements, acquire additional water for the environment and manage the delivery and use of this water to achieve specified environmental outcomes.

It would seem that formal title to such entitlements held, for example, by an environmental agency, could be incorporated into the water-entitlement titling system relatively easily. This would achieve the objective espoused by the Wentworth Group (2003, p. 7) of providing "environmental flows with security entitlements that are commensurate with those enjoyed by other claims on water use". Arguably, formal title to water entitlements (to be used for achieving environmental goals) provides a more secure allocation than does environmental flows specified in rules within subordinate legislation or other management instruments.

While there may be benefits associated with the ability to trade environmental entitlements, it would also be possible to 'reserve' part or all of the entitlements earmarked for environmental purposes in an analogous fashion to Crown land that is reserved for certain public purposes (eg. national parks). The Victorian Government's recent Green Paper, for example, proposes establishing and giving legal recognition to an 'environmental reserve' that will set aside water to maintain the environmental values of the water system. Just as parcels of Crown land can be brought within the Torrens title land register and issued with a certificate of title, so too could environmental water entitlements.

5.7 Who should maintain the register?

The titling/registration system needs to take account of the fact that many transactions in water entitlements will require regulatory approval from the resource-management agency to ensure that they are consistent with environmental and other water resource management objectives.

This raises issues such as:

- should registers be maintained by government agencies responsible for water-resource management, or by separate titles offices?
- if the latter, what mechanisms should be used to ensure that title registration is coordinated with necessary regulatory approvals?

Water entitlements differ from land in terms of the regulatory and adaptive management role of the resource manager. An issue therefore arises as to what is the appropriate body to maintain the register.

The following are among the arguments for the land titles offices undertaking this role:

- They have established expertise in managing registers and dealing with registration.
- Many of the protocols and procedures applicable to land will be applicable to water entitlements.
- They already have suitable information technology systems in place.
- Public and lender confidence in the register is likely to be higher than in other agencies.
- It is generally accepted by the public that titling offices charge fees in relation to registration of dealings. Hence, there may be less resistance to fees being imposed for registration. (Fees imposed by a resource manager may be viewed more as a resource-management charge than as a fee for registration.)
- Registration of water entitlement is a separate issue to decisions about resource management and the allocation under the water entitlement.
- Some dealings can be registered without any involvement from the resource manager (eg. security interests and transfers where there are no changes to the water right except the registered holder).

Arguments for the resource manager to maintain the register include the following:

- The COAG framework is designed to separate land from water, so it does not necessarily follow that the keeper of the land titles register should be the keeper of the water register.
- Water is fundamentally different from land in terms of the need for adaptive management and the role of the regulator.
- Many transactions that will be entered on the register require the resource manager's approval before registration, and the process will be more streamlined if the two processes are conducted within one department.
- It may reduce delays between consent being granted and registration occurring (delays between consent and registration could affect priorities).
- It is more likely that the register will be kept up-to-date as there is no need for transfer of information between government departments.
- The resource manager is the keeper of resource-management information, which will not be reflected on the register but which persons dealing with the entitlement may wish to access.

Different jurisdictions appear to be adopting different approaches on this matter. For example, both NSW and Queensland have allocated the water-titling function to their land titles offices (or equivalent), while it appears that South Australia and Victoria will keep this function within the agencies responsible for water-resource management.

Whichever body is responsible for the register, it is essential that governments devote appropriate resources to ensure that the register is maintained to a standard that engenders public and lender confidence.

5.8 Facilitate various market transactions

As noted previously, a titling system can be seen as the legal and administrative mechanism to underpin the operation of a property-rights regime.

In addition to promoting market efficiency through providing security of title, the titling system, by being administratively efficient, can play a key role in ensuring transactions are finalised in a timely fashion. In addition, the registration system must be suited to the nature and type of transactions in the market.

In the case of water, trades to date have largely been for 'temporary trades' of seasonal allocations. Increasingly, 'permanent trades' of the underlying entitlement have occurred, and, in some jurisdictions, leasing of entitlements is now permitted. In the future, however, as the market deepens and matures, a wider range of transactions could be envisaged in order to increase the efficiency of the market and to enhance value (eg.

derivatives, options etc).[19] In this regard, the nature and range of transactions in water entitlements is potentially different to those in land titles.

A key issue is how each of these types of transactions is handled by the tilting/registration system. For example, those registers currently maintained by government departments tend to cover both permanent and temporary trades. In Queensland (and as proposed in New South Wales) there has been institutional separation whereby the Queensland Resource Registry deals only with permanent trades and other defined interests, while the Department of Natural Resources and Mines maintains its own register to track temporary trades.

Clearly, while a Torrens-style title system, as described above, may provide the robustness and security necessary for permanent trades in underlying entitlements, the fundamental basis of the Torrens system – of title being effected by registration alone (rather than by execution of the associated contractual document) – may be less well-suited to temporary trades, where time is often of the essence.[20]

In order to track accumulation, trade, and use of water volumes accrued under water entitlements, a separate water-accounting system (distinct from the water-entitlement register) is needed[21]. This would operate in a way similar to a bank account, whereby annual allocations are credited to the entitlement holder (as recorded in the register). Debits to the water account would be made as the water is taken (in conjunction with a use approval). Depending upon the rules applying in each region, carryovers between seasons may or may not be permitted. Monitoring and enforcement would be required to ensure that a user did not use more water than was available in their water account.

Under this system, trades in annual water allocations would be recorded through the water-accounting system, and would not involve the water-entitlement register. There is therefore a clear separation between the titling function and the resource-management function. As discussed above, this function may also be separated institutionally.

[19] For further discussion see ACIL Tasman, *Water Trading in Australia – Current & Prospective Products*, Prepared for the Water Reform Working Group

[20] As noted in Attachment B, however, notwithstanding its fundamental basis of title by registration, the Torrens system does contemplate that interests may exist outside the Register and provides for such interests to be protected by mechanisms such a caveats. As discussed previously, it may be that a similar system is a suitable way to deal with temporary trades.

[21] See also Young and McColl (2002).

5.9 Clear specification of entitlement

It is perhaps self-evident that the titling/registration should provide a clear and unequivocal record of what property rights the underlying entitlements provide (see previous chapter). The new, access licences in New South Wales, for example, will specify:

- the category of licence, date of commencement and date of expiry
- the share of the available water (and the specified water source)
- a reference to the plan under which the Minister may make annual allocations for the entitlement
- the specified times, rates or circumstances, and areas or locations where the licence holder may extract water
- the names of the entitlement holder/s
- details of any encumbrances
- nominated supply works
- conditions attaching to the licence.

Since the full nature of the property right associated with the entitlement may be affected by other related instruments or entitlements, thought also needs to be given to whether any interdependencies should be noted in the register. For example, the rules determined under a water-sharing plan may have a large influence on how much water is allocated to the entitlement holder under different circumstances.

Similarly, if further unbundling of water entitlements occurs, as discussed in section 3.2.3, the scope of the entitlement to water needs to be clearly specified (eg. it may not give the entitlement holder the right to have the water delivered).

5.10 Public accessibility

The basis of a Torrens titling system is to provide a central, complete and publicly available register which, subject to certain well-established exceptions, provides an accurate reflection of the state of the title. Public accessibility of the register is therefore essential if a Torrens-based system of entitlement is adopted.

Public accessibility will contribute to market efficiency by assisting buyers or lenders to verify title relatively rapidly and inexpensively. Under the land registration system, online searching is now available in all jurisdictions. This further increases the speed at which those dealing with the title can obtain title verification, and has the

advantage of allowing remote searching. It is desirable that online searching of water-entitlement registers be available, as is the case with land titles. Online searching could be unrestricted and available to any member of the public via the Internet. This is available on some systems already (eg. the Water Allocation Register operated by the Queensland Resources Registry).

Alternatively, online searching could be provided on a subscriber-basis, which has the potential to provide the relevant government departments with additional revenue. Appropriate search parameters should be available; for example, persons searching the register should be able to search by name as well as the entitlement number/identifier and/or location.

Public access to the register will also help to facilitate trade in water entitlements, as it provides the market with essential information in relation to the water entitlements. This will particularly be the case where information on price and volume are available. With respect to land-titling systems, generally a transfer of the title will not be registered unless the consideration (that is, the price paid for the land) is set out in the transfer. The transfer document is lodged at the titles office and registered on the title.

A search of the register in relation to the land will indicate the dealing number of the transfer document. Persons can then quickly obtain a search of the transfer document itself, if they wish to ascertain the consideration paid under the transfer. It is preferable that a similar system be adopted for water entitlements, to enable persons to obtain access to information about price and volume. Even if not strictly required for registration of the transfer, inclusion of the price in the transfer document may be unavoidable in some cases. For example, where the transfer is subject to stamp duty, the consideration will need to be stated in order to allow the transfer to be assessed.

It is considered important for market efficiency for registers to be readily open to access by interested parties and the general public. This can assist buyers or financiers in verifying title, and can also facilitate trade through provision of market information (eg. the identity of entitlement holders who may be potential sellers, the price at which trades have taken place).

There is therefore a strong case for mandating that these registers be publicly accessible. While most State registers already are publicly accessible, this is currently not necessarily the case with registers held by private irrigation companies.

5.11 National consistency

Each State and Territory currently maintains its own water titling/registration system. Individual irrigation schemes also have registers of their members' shares.

There have been some suggestions that there should be a national approach to registering of water entitlements, in order to facilitate interstate trade. At issue here is how best to make interstate trade as seamless as possible, and what might be the role of the titling system in assisting this.

One option would be to establish a single national tilting/registration system.

Establishing a single national system would be a large undertaking, and, for the following reasons, there is doubt about whether the costs of the changeover would deliver commensurate benefits.

- The lack of a single national titling system is not necessarily the major constraint to more interstate trade in water.[22] It is highly unlikely that there will ever be a national market for water, in the same way as there is, for example, for electricity. Rather, water markets are more likely to be a series of localised markets, given physical constraints on trade between basins.[23]
- The underlying definition of entitlements will and should reflect the particular characteristics of the resource to which it is linked and specific features of the local infrastructure and environment. A uniform national system may be less capable of handling the intricate nature of regional water markets, themselves a function of regional hydrology, regional infrastructure and differences in the nature and intensity of water use in different areas of Australia.
- Attempting to create uniform definition of entitlements within a single register may lead, in fact, to further uncertainty for entitlement holders, as it would entail significant legislative change and may give rise to concerns that, in converting all entitlements to a uniform basis, some of them may be attenuated.

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[22] Other constraints that may substantially impede interstate trade include State government rules on the types of trades that are permitted, restrictions imposed by irrigation schemes on trades out of their areas, and cumbersome and time-consuming approval processes (see ACIL Tasman Pty Ltd (2003)).

[23] It would be a prohibitively expensive exercise to pipe water over the distances required to facilitate a genuine national market. The supply and demand, and therefore the price, of water in northern Queensland, for example, does not influence the markets of the Murray–Darling Basin.

- Seeking to establish a uniform national system now may result in hard-wiring existing instruments (eg. the exchange rate approach to interstate trading) that may be too cumbersome to facilitate seamless trade. An alternative approach would be to first resolve these issues (eg. relative merits of 'exchange rate' versus 'tagging') in a way that would allow a national titling system to emerge if it proves desirable.
- Bringing into State or national registers individual irrigator entitlements held as shares in irrigation schemes would also be a major undertaking and raise some complex issues relating to the legal nature of these entitlements. The costs and benefits and practicalities of doing so would require further analysis.

While we would raise questions about the merits of establishing a single, national water-titling system at this point, bearing in mind that interstate trades are and are likely to remain a relatively low proportion of the total volume and value of water trading, nevertheless there would be, in our view, significant benefits from a more consistent approach across jurisdictions that made for more seamless trading.

In other words, what can and should be nationally consistent are the principles and systems on which the titling systems are based. In this sense, a 'national' system of water rights does not have to imply a single national register. Systems based on similar approaches may reduce transaction costs. As noted by the CEOs' Group on Water (2003, p.4):

> In order to achieve COAG's objectives for water it is not necessary to achieve complete consistency of entitlements to water, and indeed any attempt to achieve this would cause enormous upheaval. However, to address concerns about fairness and to facilitate trade between different supply systems, there would be benefit in establishing some shared, overarching principles.

As discussed in Chapter 3, there appears to be a considerable degree of consensus on the principles that should apply to the specification of water entitlements. This report seeks to supplement those with some principles that could apply to the associated titling/registration systems. The adoption of water-titling systems with these features in common could be expected to substantially reduce the transaction costs of those involved in water trading.

In addition, there are several other options relating to the titling/registration system that could be explored to facilitate interstate trading. These include:

- linkages between individual jurisdictions' registers (eg. via a 'front-end' computer-based search facility)
- area-based registers within regions where significant interstate trade occurs (ie. Murray–Darling Basin, Border Rivers)
- streamlined regulatory approvals processes for interstate trades
- adoption of a 'tagging' rather than 'exchange rate' approach to interstate trades, by permitting entitlement holders in one State to hold water entitlements issued in another.

5.12 Cost-effectiveness and practicality

In practice, the titling/registrations system adopted will need to represent a cost-effective balance between practicality and what may be ideal in principle.

Ultimately, the benefits of a new titling system need to be balanced against the costs of developing and administering it. In this regard, there may be scope for reducing costs by leveraging off existing systems, or by jurisdictions cooperating in the development of new systems. In Queensland, for example, the new titling system for water allocations cost only around $150,000 to establish because it uses the same information technology and administrative systems as those already developed for land titles.

Again, it is stressed that the cost-effectiveness principle is much wider than the costs the agencies see in making the system work. It extends to the administrative costs incurred by parties involved in effecting transfers or loans using water assets as collateral; to implications for efficiency of water resource use; and to costs imposed on lenders and borrowers as a result of residual uncertainty.

5.13 Suitability to a transition/ implementation path

In developing new titling systems, careful consideration will need to be given to practical implementation issues. While the proposed system will be based on sound conceptual principles, it needs to be recognised that we are not starting with a blank page. Indeed, the brief for this project specifically requires the development of policy options that can be integrated into existing regimes as far as possible. Thus, the following must be considered:

- It needs to be recognised that, in some areas, it may take considerable time to convert all existing water entitlements into clearly specified tradeable entitlements (eg. catchment planning processes may take years). This suggests that adoption of robust water-entitlement registration systems is likely to occur gradually, rather than be a one-off initiative.

- Transitional arrangements are needed to ensure that existing titles and registrations of interest on those titles (eg. mortgages previously held over the combined land/water asset) are appropriately carried over into the new framework, where these assets have separate titles.

One approach to the implementation of a new titling system is to provide that all existing entitlements (or, alternatively, entitlements relating to a certain area) be automatically brought within the new titling system on a certain date, or upon a particular occurrence.

For example, in New South Wales, 35 water-sharing plans (accounting for approximately 80% of water extraction) will come into operation on 1 June 2004.[24] On that date, all existing entitlements under the old *Water Act 1912* will be converted to the new system of access licences and approvals under the *Water Management Act 2000*. The access licences and approvals will be created on that date and entered onto the public registers. Before 1 June 2004, the Department of Infrastructure, Planning and Natural Resources will contact licence holders to verify ownership details (Hamstead 2003).

Similarly, in Queensland, existing entitlements are to be converted to new water allocations under the *Water Act 2000*, upon the approval of each Resource Operations Plan (ROP) (made pursuant to Water Resource Plans). The *Water Act 2000* provides that, on the day that an ROP commences, all existing entitlements specified in the ROP will expire and the new entitlements must be created and entered in the register. Accordingly, old entitlements are progressively and automatically converted as more and more ROPs are approved.

Under the transitional approach adopted above, the processes leading up to the date of conversion will be of particular importance if a Torrens system of indefeasibility and title by registration is adopted. Before the date of conversion, the relevant government department will need to conduct checks to verify the ownership of the entitlement and ascertain any other interests in the entitlement (such as security interests).

At a minimum, this process will involve verifying the chain of ownership with the entitlement holder and asking them to provide details about any other interests in the entitlement. Public advertising and procedures allowing interest holders to notify the relevant government department of their interest would help to minimise the risk of existing interests not being identified and entered on the new register. In cases where a person did suffer loss as a result of an entitlement being brought under the new system, this would be covered by the State guarantee. Such cases should, however, be rare if appropriately rigorous procedures are adopted leading up to the conversion date. The advantage of the above outlined approach is that it allows governments to control the speed at which existing entitlements are brought under the new system and minimises the risk of some existing entitlements never being brought under the new system.

An alternative approach to entitlements being automatically converted to the new system on a particular day, is to adopt the approach that was taken when the Torrens system was introduced to cover land. Under such an approach, all entitlements granted after the new registration system began would automatically fall under the operation of the new system.

In relation to existing entitlements, provision could be made for the entitlement holder to make a voluntary application to bring the entitlement under the new registration system. Provision could also be made for certain forms of compulsory conversion. For example, persons wishing to transfer an entitlement could be required to first make an application to bring the entitlement under the new system. In each case, before bringing the entitlement within the new system, the relevant government department would be required to verify the status of the entitlement, as outlined above. The advantage of such an approach is that the department is not required to verify ownership of entitlements *en masse*, but may do so as applications are made to bring entitlements under the new system. The disadvantage of this approach is that it may be a much slower method of bringing entitlements under the new system (it is noted that, in some States, there still exists some land which has not been brought within the Torrens system). To allow for such an eventually, it may therefore be preferable for there to be a sunset clause, whereby the government department responsible is empowered to proceed with the conversion of entitlements that have not been converted as at a particular date.

5.14 Conclusions

A key element of water reforms in Australia over the past decade or so has been the development of water markets, through enabling water to be bought and sold separately from the land, thereby allowing it to move more readily to higher-value uses. All jurisdictions have committed to "separation of water entitlements from land title, clear specification of entitlements in terms of ownership, volume, reliability, transferability and, if appropriate, quality".

[24] Previously 1 January 2004, the date has now been deferred to 1 June 2004.

Considerable progress has been made in the conversion of previously ill-defined licences into more clearly specified, tradeable entitlements. There also appears to be growing consensus that water entitlements should be specified as water-access entitlements, providing rights to a share of the resource deemed available for approved purposes. Processes are also in train for resolving perhaps the most controversial issue of whether future attenuation of the rights provided by these entitlements should be compensated by governments.

The focus of this report is the system of registration of water entitlements, rather than the specification of the entitlements themselves (while recognising the linkages between the two). The legal and financial implications arising from full separation of land title from water entitlements – and the need for appropriate 'quality of title' – have tended to be dealt with only as they emerged during the reform process.

Without title that provides an appropriate degree of certainty of the right, the incentives for efficient trade and investment may be substantially undermined. The ability to use assets as collateral for loans is also affected by the security of title to a property right. The challenge is therefore to ensure that the titling/registration system supports the efficient operation of water markets by reducing transaction costs of trading, and providing appropriate security over title, while at the same time integrating effectively with natural-resource management processes and objectives.

It is proposed that a Torrens-based system be adopted in relation to water rights, as it provides a much higher level of certainty of title to those dealing with the water entitlement and will ultimately be the most appropriate way of facilitating trading and investment.

Existing water-licence registers maintained by responsible authorities originally constituted a record of licences. Such 'Old title' registers provide an appropriate way of recording and administering statutory-based privileges. However, as water entitlements are developing into divisible, tradeable and often highly valuable assets, and are being de-linked from 'Torrens title' land titles, registration systems now have an additional purpose – providing certainty of title and facilitating trading markets.

The analysis in this report leads to the conclusion that water-titling systems based on, but somewhat modified from, 'Torrens titles' for land should be established, in a manner similar to the way that Strata title and Community title was developed as a specific form of title within the broad, Torrens title system. This conclusion rests not so much on the fact that water and land titles were previously linked, but because of the underlying nature of the resource and transactions in it, that distinguish it from other tradeable entitlements such as fishing quotas or rights in the radio spectrum.

In the case of water, the key modification is that the underlying right provided by the entitlement is not the right to manage and use a piece of land defined by boundaries on the cadastre, or by airspace, but rather is the (firm) right to a share of a specified water resource available for approved purposes. Importantly, this is independent of whether the underlying entitlement provides a right to compensation for attenuation via a reduction in the water allocation. The issue of indefeasibility can, with a system of rights based around resource shares rather than volumes, be quite separate from the issue as to whether compensation should be paid for attenuation of entitlements, and if so under what terms.

This position also reflects our on-balance assessment that, in the current setting, adopting a Torrens title system is likely to be a more efficient and effective means of managing the risks and transaction costs in dealing with entitlements than are alternatives such as relying on the advent of private title-insurance as an economic instrument. Considerations here include the existing familiarity and confidence in the Torrens system applying to land in Australia, the fledgling nature of the local private title-insurance market, the fact that many transactions will involve both water and land together where having different underlying titling systems for each may increase costs, and the difficulty in accurately assessing and pricing risks given the current status of State water-entitlement registers.

What is proposed here is not necessarily a radical overhaul of existing systems, but rather adoption of common principles and features of a titling system that are necessary to facilitate investment and water trading, while allowing for adaptive resource management. The following are the key features of the system proposed:

- The register should provide a clear and unequivocal record of what property rights the underlying entitlements provide.
- Title should be 'indefeasible', and dealings in relation to water entitlements should take effect only upon registration of the dealing.
  - In addition to regulation by government, certain exceptions that are applicable to the indefeasibility of land title may also appropriate; for example, where an entitlement or encumbrance has been fraudulently registered. It will be necessary to develop clearly defined exceptions to the concept of 'indefeasibility' which are appropriate to water.

  - Provision could be made for a proportion of registration fees and/or water management charges to be put towards funding a State guarantee.
  - Legislation should specifically provide for the situations in which recourse can be had to the State guarantee. Compensation in this context would be limited to losses arising from the functioning and operation of the register, with compensation for attenuation of entitlements being a separate issue.
- The registration system should be administered pursuant to certain procedures and protocols, similar to the land title office manuals and guidelines that exist in various States.
- There should be provisions to protect third-party interests:
  - By putting in place protocols that require the holder of a registered security interest to be notified of any dealings in relation to the water entitlement and other events affecting the water entitlement.
  - At a minimum, the entitlement itself, permanent transfers of the water entitlement, and encumbrances that affect the water right, such as mortgages and other security interests, must be registered.
  - Interests that can be registered in relation to land should be able to be registered in relation to water entitlements, unless the nature of water as a resource makes that interest inapplicable to water.
  - Lenders should be able to procure the registration of their interest independently of the holder of the water right. Protocols should, however, be developed in relation to this process, so that the holder of the right is sufficiently protected.
  - To ensure public and lender confidence in water entitlements, there must be a system for prioritising competing dealings. An effective means of prioritising interests is to base priority on the order of registration. Registered interests would take priority over unregistered registrable interests. If a person fails to register an interest that is registrable, then that unregistered interest would be defeated by a subsequent registered interest.
  - There should be protocols in place that allow for the discharge of the security interest, in conjunction with the transfer of the entitlement to a new registered holder.
  - There should be mechanisms (such as caveats and settlement notices) to protect the interests of a purchaser between entering into a contract and registration of the transfer, as the lodgement of inconsistent dealings during this period will affect the purchaser's priority.
  - Protocols, such as backdating, need to be developed which deal with delays between date of lodgement for registration and actual registration of dealings.
  - Protocols could also be put in place to assist in the process of identifying unregistered interests.
- Appropriate transitional arrangements to ensure that existing titles and registrations of interest on those titles (eg. mortgages previously held over the combined land/water asset) are appropriately carried over into the new framework, where these assets have separate titles.
- Formal title to environmental water entitlements held, for example, by an environmental agency, could be incorporated into the water-entitlement titling system relatively easily.
- Registers should be made publicly accessible, including information on prices of trades.
- In order to track accumulation, trade, and use of water volumes accrued under water entitlements, a separate water-accounting system (distinct from the water-entitlement register), is needed.

In our view, these features are more important than the issue of who administers the register. They are intended as a checklist of desirable features regardless of whether the register is overseen by a water resource agency, a land titles office, or a private irrigation company.

While there have been some suggestions that there should be a national approach to registering of water entitlements in order to facilitate interstate trade, a uniform national system would be a large undertaking and there are real questions about whether the costs of the changeover to such a system would deliver commensurate benefits.

Nevertheless, there would, in our view, be significant benefits from a more-consistent approach across jurisdictions that made for more seamless trading. In this sense, a 'national' system of water rights does not have to imply a single national register. Rather, what can and should be nationally consistent are the principles and systems on which the titling systems are based. Other options that could be explored to facilitate interstate trading include: linkages between individual jurisdictions' registers (eg. via a 'front-end' computer-based search facility); area-based registers within regions where significant interstate trade occurs (ie. Murray–Darling Basin, Border Rivers); streamlined regulatory approvals processes for interstate trades; and adoption of a 'tagging' rather than an 'exchange rate' approach to interstate trades.

Finally, it needs to be acknowledged that the detailed design and implementation of a titling system for water is, by its very nature, likely to be a continuing exercise. In some areas, it may take considerable time to convert all existing water entitlements into clearly specified tradeable entitlements (eg. catchment planning processes may take years). In addition, there may be merit in a system that guarantees title in accordance with the register, *conditional on the initial registered title being valid*. Provisions could exist for registering these searches as they occur – essentially on a needs basis – and for governments then issuing a guarantee of absolute title. While the proposals in this report are designed to assist in the development of effective water-resource management and titling regimes, it is recognised that adoption of robust water-entitlement registration systems is likely to occur gradually, rather than being a one-off initiative.

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Glossary

Adaptive management

The process of continually reviewing and setting aside water for environmental purposes as conditions change over time, such as in the understanding of environmental needs

Alienate

To transfer property from one person to another

Bulk entitlements

Aggregate entitlements to bulk water held by water authorities out of which they supply their customers (this term used mainly in Victoria)

Cadastre

A public register usually recording the quantity, value and ownership of land parcels in a country or jurisdiction

Caps

Limits on the total amount of water that can be used for extractive purposes

Claw back

Recovery of water for the environment by reducing extractive water entitlements, particularly in catchments that have been over-allocated

COAG

Council of Australian Governments

Derivative products

Products/contracts derived from water entitlements issued by government water agencies that can be traded in secondary markets (eg. futures contracts, call options, put options etc.)

Encumbrance

An interest in land or other asset which interest is held by a person who is not the proprietor of that land or asset. Examples are mortgages, lease agreements, caveats and easements

End user entitlements

Water entitlements held by individual users (as opposed to water authorities that supply them)

Environmental water

Water set aside through formal allocations or through management rules so that the environment and its ecosystems can continue to function

Exchange rate

A mechanism for converting water entitlements in one location into entitlements at another location taking into account differences in reliability between water sources at the original and new locations, and potentially also delivery losses

Externalities

Where private decision-makers impose costs or benefits on others in the community and no compensation or payment is made

Extractive uses

Uses of water that requires its removal from the source

Indefeasibility of title

A term used in the context of the Torrens system of land registration to describe the nature of the registered proprietor's title to the land. Subject to certain exceptions, a registered proprietor's title in land cannot be affected by any existing estates or interests, other than those interests that are noted on the register of titles.

Profit a prendre

The right to take soil, minerals or produce from another's land, or to graze animals on it.

Regulated rivers/streams

Waterways whose flow is controlled through dams or other infrastructure

Reliability of supply

The likelihood of a water entitlement being able to be supplied, given hydrological and other factors (eg. a 90% reliability would indicate that an entitlement can be delivered in 90 years out of every 100).

Requisitions on title

Formal inquiries about matters affecting the quality of title to land, commonly made by a purchaser to a vendor before the settlement of a transaction for the purchase of a piece of land

Return flow

Water returned to its original source after its extraction and use

Riparian rights

Rights to water (for example, for stock or domestic purposes) which flow from ownership of land on the bank of a river or other natural body of water, rather than from a licence

Subsidiary delivery entitlements

Water entitlements held by individual entitlement holders bestowing the right to be supplied with water out of the bulk entitlements held by a supply authority

Tagging

An arrangement for transfer of water between jurisdictions or regions whereby water is linked back to its original source and retains its original reliability (in contrast to converting it via an 'exchange rate' – see above)

Transaction costs

The costs associated with searching, negotiating and finalising a transaction between parties

Unregulated rivers/streams

Waterways whose flows are not controlled through dams or other infrastructure

Attachments

A Project brief – Investigating an effective system of defining water property titles

1 Project context

The historical regime of real property rights in Australia includes the implicit right to water associated with land property. This implicit right is balanced by the state's right to regulate water usage in order to achieve the optimum balance of equity and environmental prudence.

In 1994, the Council of Australian Governments (COAG) adopted a strategic framework for reforms to national water governance. A key part of these reforms has been the development of a system of water property rights based on the separation of water from land. The framework also required that the environment be recognised as a legitimate user of water.

At its meeting of 5 April 2002, COAG noted that substantial progress is being made on the national water reforms and that water management was in a transition phase as jurisdictions implement new water allocation arrangements. COAG reaffirmed the importance of water property rights issues in dealing with the nation's salinity and water quality problems and noted that, during this transitional period, there may be a lack of information in the community about the nature of property rights, including implications of the changes for investment and the impacts of the changes on water users, particularly farmers.

As a first step in clarifying these issues jurisdictions agreed to report to COAG by September 2002 on opportunities and impediments to better define and implement water property rights regimes (including water trading markets) and how they are addressing these uncertainties. Building on this work, the CEOs' Group on Water (2003) developed Common Principles for Water Access Entitlements and Guidelines for Distributing the Costs of Adjustment, which have subsequently been completed for COAG's consideration. However, even if fully implemented, these principles and guidelines will only result in incremental change to property right arrangements in States and Territories.

There is increasing recognition that there remains further work that needs to occur in water reform in order to reach a more effective management regime. This project is designed to assist in future development of more effective water resource management and registration regimes.

2 Objectives and outcomes

The project aims to develop a workable system of water property titles. The outcomes include:

- The definition of water property and its relationship to existing property rights;
- The development of an appropriate titling system that recognises links between water and land property while enabling each to be flexible and independent;
- Identification of issues associated with the development of a set of protocols for the use of water property and the integration of independent water property within the existing regulatory system.

3 Scope of work

The project will focus on developing a manageable system of water property titles. It will include: the definition, ownership and extent of existing water property and the design of a workable system of water property titles that recognises both the needs of water users and environmental priorities.

It is not expected that the project will directly examine the hydrological and ecological aspects of water resources and management, however it is required to make recommendations on how a manageable system of portable water property would relate to these issues. It will also identify issues associated with the design of a management scheme for water that integrates portable water property rights with responsible public water management.

The project is specifically designed to begin from first principles in property, title and regulation for the common good to develop a methodologically sound approach to water as property. Its scope will include a review of current legislation and practice. The project will aim to formulate policy options which can be integrated into established regimes as far as possible.

The project will refer to the material documented in Appendix A.

4 Consultant deliverables

- Draft report (i) reviewing the current state policies regarding the definition, ownership and management of water property and outlining the overall conceptual framework of a new system.
- Draft report (ii) on the design of a titling system suitable for the administration of secure and flexible water property titles.
- Draft final report (iii)
- Final report (iv).

B Overview of titling systems for certain natural resources and other assets

B.1 Land

B.1.1 Nature of property right

Under common law, ownership of land vests in the Crown and the Crown may grant to a person an estate in fee simple over certain land. An estate in fee simple is the closest thing to absolute ownership of land.[25] The holder of an estate in fee simple is commonly being referred to as the owner of the land, is entitled to exclusive possession of the land and may transfer that land. Generally, the owner of land is entitled to transfer the land or otherwise deal with it, without the need to obtain government approval.[26]

B.1.2 Registration of interests in land

In all Australian States and Territories, title to land is governed by a statutory registration system known as the Torrens system. The first Torrens legislation in Australia was introduced in South Australia in 1858.

Before the enactment of the Torrens systems, title to land in Australia was based on what has become known as the "old system". Under the old system, in order to verify a proprietor's title to the land, a person intending to deal with the land (for example a purchaser) had to rely upon written records of previous dealings in relation to the land. It was, therefore, very important that each successive owner of the land retained the original Crown grant and all documents relating to subsequent dealings with the land (such as transfers), in order that a "chain of title" could be established. Over time, documents were lost or removed from the chain of title, with the result that notwithstanding thorough searching, purchasers could not be guaranteed that the vendor had proper title to the land purportedly being sold.

Prior to the introduction of the current Torrens systems, an attempt was made to overcome the problems associated with the 'old title' system by the enactment of registration of deeds legislation in each State. Essentially, this provided for a facility for the registration of deeds and other dealings in relation to land. In comparison to the Torrens system, however, title was not conferred by registration and registration could not cure defects in the chain of title.

The Torrens system was introduced in an attempt to overcome the difficulties in the old system of land titles. The system establishes a centralised public register of titles, which contains records of all dealings with respect to individual parcels of land (Register). The Register is maintained by a public officer, most commonly referred to as the Registrar, and the State guarantees the correctness of the Register. The Torrens system is essentially a system of title by registration, with interests in land passing upon registration rather than upon execution of the dealing document.

The introduction of the Torrens system did not create any new types of proprietary interests in land and generally, the types of interests in land recognised by the common law are recognised by the Torrens system. The Torrens system merely introduced a different system by which title in those interests passes.

In each State, land alienated by the Crown after the introduction of the Torrens system is automatically brought within the Torrens registration system. Land alienated prior to the introduction of the Torrens system will remain under the "old system" unless it is specifically converted to the Torrens system.

The current Torrens legislation in each State is as follows:

- New South Wales – *Real Property Act 1900* (as amended)

[25] The common law also recognises a number of other proprietary interests in land such as leasehold, mortgages, rent charges, profits a prendre, easement and restrictive covenants.

[26] In some circumstances, this general right may be limited by government regulation, for example planning laws or restrictions on foreign investment.

- Victoria – *Transfer of Land Act 1958* (as amended)
- Queensland – *Land Title Act 1994* (as amended)
- South Australia – *Real Property Act 1886*
- Western Australia – *Transfer of Land Act 1893*
- Tasmania – *Land Title Act 1980*
- Northern Territory – *Land Title Act 2000*
- Australian Capital Territory – *Land Titles Act 1925* (as amended)

B.1.3 Outline of the Torrens system

Lack of uniformity across States

As there is different legislation applicable in each State, complete uniformity in relation to land title registration does not exist within Australia. A number of authors have addressed the differences between the various Torrens statute, however, an examination of these differences is beyond the scope of this report.

In the context of this report, it is perhaps more relevant to note the possible effect of these differences. It has been suggested that the lack of uniformity in Torrens statutes across States significantly increases transaction costs, thereby increasing barriers to interstate commerce to some extent.[27]

Notwithstanding the differences that exist across the States, the basic features of the Torrens system are contained within each State's Torrens statute. These features are outlined below.

The Register

Torrens legislation in each State will be administered by the responsible Minister and the particular government department assisting the Minister. In each jurisdiction, a public officer (most commonly referred to as the Registrar) is directed to keep a Register, which contains a record of all parcels of land falling under the Torrens system. In all jurisdictions, the Register is now maintained in a computerised form and online searching of titles information is available.

Within the Register, a folio is created for each individual parcel of land. Each folio contains a description of the particular land to which it relates, as well details of the estate or interest held by the named proprietor of the land. Land is considered to be registered land once a folio has been created.

The Torrens statutes also provide for the issuing of a "certificate of title", which is essentially a copy or extract of the folio relating to the land in question. It becomes apparent that the basic starting point for the Torrens system is to provide a record for individual parcels of land. It follows that each parcel must be able to be accurately defined.

Once a folio has been created in the Register, the person listed as the holder of the estate or interest in the land (the registered proprietor) can then deal with that interest, for example, by transferring the land or granting a mortgage over his/her interest in the land. Each of these dealings must be documented in the approved form and will be recorded in the Register, on the folio pertaining to that land. Only upon registration of the approved instrument of transfer will a person become the registered proprietor of the land.

Any registered interests in the land other than those of the registered proprietor (for example, interests of mortgagees) will be noted on the Register as an encumbrance on the title.

The Register is intended to provide a record of all dealings with respect to particular land. Accordingly, a purchaser should only have to search the Register in order to ascertain the state of the title and should not have to go behind the "curtain" of the Register.

Indefeasibility

A fundamental principle of the Torrens system is that a person who becomes the registered proprietor of land (bona fide and for consideration) will obtain an indefeasible title. Essentially, this means that the registered proprietor's title in that land cannot be affected or defeated by any existing estates or interests, other than registered interests that are noted in the Register.

A registered proprietor will not, however, acquire an indefeasible title where they perpetrated some fraud in the process of becoming registered. In the case of fraud, title will still vest in the registered proprietor, however the title is defeasible in that a previous registered proprietor may bring an action to recover the title.

As discussed, the Torrens system is a system of title by registration. Notwithstanding this, the Torrens statutes contain provisions which contemplate that interests in land may exist outside the Register (for example, certain leases are not required to be registered under the various Torrens statutes). In each jurisdiction, some protection is expressly afforded to such unregistered interests, thus creating an exception to the indefeasibility of the registered proprietor's title.

There are a number of other express exceptions to the concept of indefeasibility provided in the various Torrens statutes, however a complete review of these is beyond the scope of this report.

In addition to the express exceptions to indefeasibility set out in the Torrens statutes themselves, the indefeasibility of a registered proprietors title may be affected by other legislation. Statutes which are passed after the relevant Torrens statute may create interests in land and override the Torrens statute by providing that those interests may

[27] Bradbrook *et al.* (2002), p 111.

be enforced against a registered proprietor, notwithstanding that they are not noted in the Register. For example, in one case, an unregistered interest of a Local government (being a drainage reserve created pursuant to the relevant Local Government legislation) was held to override the rights of the registered proprietor.

Protection of unregistered interests

As discussed above, the various Torrens statutes contain provisions which envisage that interests in land may exist outside the Register.

The various Torrens statutes also provide a mechanism for the protection of unregistered interests by allowing the holder of such interests to lodge a caveat. A caveat essentially gives notice to any person searching the title to the land that an unregistered interest is claimed in relation to the land.

In all jurisdictions, a caveat may be lodged to prevent dealings which may affect the interest protected by the caveat. In some jurisdictions, it is also possible to lodge a conditional or "subject to claim caveat", which prevent dealings with the land unless those dealings are expressed to be subject to the claim of the caveator.

State guarantee of title

It was considered important that the Torrens legislation provide that persons who suffer loss as result of the new system should be compensated. Such compensation was to come from an assurance fund, contributed to by certain users of the system. The right to compensation still exists in all jurisdictions, although in some jurisdictions the separate assurance fund has been abolished and claims are paid out of consolidated revenue.

In all jurisdictions except Victoria, a person who loses their interest because another person takes a registered interest fraudulently is entitled to compensation.

A person who is deprived of their interest in land as a result of it being brought under the Torrens system is entitled to compensation, in all jurisdictions.

Finally, in all jurisdictions, a person who suffers loss as a result of an error, omission or misdescription in the Registrar is entitled to compensation.

Private title insurance

Because of the guarantee provided under the Torrens title system, a private title-insurance market has not developed in Australia in the same way as it has, for example, in the United States. In more recent times, however, it is understood that some insurers have offered insurance in respect of risks arising from 'gaps'" in the Torrens title system (O'Connor 2003).

B.1.4 Strata title

Strata title is designed to facilitate the application of a Torrens title system to individual dwellings in a building consisting of multiple dwellings.[28] Areas that are not designated for individual use, that is common property such as staircases and gardens, is owned by a corporation, known as the strata company. Each individual owner holds a joint interest in the common property and is a member of the strata company. The rights and obligations of the individual owners and the strata company are governed by strata title legislation and the rules made be the strata company.

A strata scheme divides a parcel of land into individual lots and common property under a strata plan. A strata company is created which owns the common property, determines and collects the levies from the strata lot owners, maintains and repairs the common property and keeps proper records.

Lot owners are issued a registered title to that part of the land or building which comprises a lot and hold an equitable interest in the common property for which legal title is vested in the strata company. Each lot owner becomes a member of the strata company. The common property is held on trust by the company for the lot owners in shares proportional to the unit entitlement of their lots and this property cannot be dealt with separately from the lot.

A strata scheme is created as follows:

- Firstly, a strata plan is registered and allocated a dealing number at the Land Titles Office. The plan must show the boundaries of the original parcel of land, divide the land and buildings into separate numbered lots and set out the unit entitlement of each unit (which is the relative value of strata lots on a strata plan between themselves). All other land which is not designated as a lot is considered common property
- On registration of the strata plan, the strata company comes into existence and the land titles office will issue separate strata certificates of title for each lot on the strata plan.
- The title for each individual lot is issued in the name of the registered proprietor of the former undivided land. When a party purchases a strata lot, that lot is transferred to that party. That party becomes the registered proprietor of the strata lot and will be shown as the registered proprietor of that lot. In most jurisdictions, a certificate of title will be issued for the common property, in the name of the strata company.

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[28] Bradbrook *et al.* 2002, p 508

- The strata certificates of title are issued in much the same form as for a fee-simple certificate of title, which includes the Volume and Folio number, a description of the land, the name of the registered proprietor and any encumbrances on the land. The owner of an individual strata lot can deal with the owner's interests in the strata lot, for example, by selling, mortgaging or leasing it.
- No plan of the strata lot is incorporated into the strata certificate of title so it is essential for persons dealing with the strata title to search the strata plan in addition to searching the strata certificate of title. It is the strata plan that defines the actual lot and sets out any encumbrances or interests that affect the whole strata scheme (for example, bylaws which owners must comply with) or the common property (for example easements and restrictive covenants).
- Easements are created by the various strata title legislation between the lots and the common property for support, shelter and access to services.

The strata company and lot owners are bound by bylaws as set out in the relevant strata titles legislation or otherwise registered on the strata plan. These by-laws govern the matters affecting the lots, the management of the strata company and the management and maintenance of the common property.

B.1.5 Restrictions placed on proprietary interests in land

Limitation imposed by nature of the proprietary interest

In some cases, the rights of a registered proprietor may be limited or restricted by the nature of the property interest itself.

For example, as discussed above, the Crown may grant interests in fee simple to any person. The applicable land legislation in all jurisdictions provides that the grant of fee-simple interests by the Crown may be subject to conditions. Generally, where a conditional grant of fee simple is made, the land may not be transferred or otherwise dealt with unless the conditions are met.

Acquisition of land for public purposes

Federal, State and local governments, and various government authorities are empowered by legislation to acquire land for public purposes. Such acquisition can either by way of agreement or, in the absence of an agreement, by the compulsory acquisition process set out in the legislation.

Under the relevant legislation, any person having an interest in the land which is compulsorily acquired has a right to compensation for the interest taken. Compensation is to be paid in accordance with the procedures and principles set out in the relevant legislation. Each of the land acquisition statutes sets out the factors which may be taken into account when assessing compensation. These factors differ across jurisdictions. Broadly speaking, a land owner whose land has been acquired will be compensated for the market value of the land and other losses which arise from the resumption (for example removal expenses and business disruption).

Limitations imposed by the common law

The tort of nuisance restricts those holding interests in land by limiting the way in which the land may be used. Generally, a land owner who uses land in a manner which would cause unreasonable interference with the use and enjoyment of another person's land is liable for an action in nuisance by that other person.

In addition to actions by other private property owners, a land owner who uses land in such a manner may also be liable for an action in public nuisance. Actions in public nuisance are brought by the Attorney General in cases where the use of the land is affecting the public at large.

Actions in nuisance are typically brought in relation to noise, smells and other emissions emanating from land.

Limitation by statute

In addition to the common law, there are numerous statutes and government rules which regulate the rights of land owners and impinge upon the use and enjoyment of privately owned land. Some examples are discussed briefly below.

Planning laws restrict the way in which land may be used and developed by imposing a system of zoning. Further, approvals are generally required to subdivide the land and to develop and/or build certain structures on land.

Environmental laws impose requirements for works approvals and licences before certain activities can be undertaken on land, as well as regulating the discharge of waste and noise from land.

Aboriginal heritage legislation imposes prohibitions on the interference with Aboriginal sites and, in some cases, may require Ministerial consent to be obtained to disturb the site.

A distinction must be made between the "acquisition" of property rights and the mere regulation of them. Generally, the mere regulation of property rights, although it interferes with the owner's enjoyment of the property,

does not necessarily carry with it a right to compensation. In some cases, however, the statute which enables the restriction of the rights may provide a specific entitlement to compensation for loss suffered as a result of that restriction. For example, town planning legislation which provides that a person whose land is injuriously affected by the making of a town planning scheme is entitled to compensation.

B.2 Fisheries

Commercial wild-catch fishing involves commercial fishing operators catching and removing fish from non-private waters, including oceans, estuaries, rivers and lakes. Commercial use of fish stocks is consumptive and rival in supply, in that a fish taken by one user is not available for another. It is a *potentially* renewable resource because there is a natural regeneration of fish stocks that can replace the stocks taken by humans, so long as the level of the catch does not exceed the sustainable extraction limit. Total Allowable Catch is a concept that has been in use since the early history of fisheries management, and is based on the idea of a sustainable yield. It fixes an upper limit for exploitation of a species in a resource pool over a regulation period. Most problematic for fisheries managers is the fact that many fish species are highly migratory; hence they cannot practically be contained within property boundaries. Supply of fish stocks also varies naturally, and human use of the resource is only one of the variables affecting the size of the resource base. Most migratory fish species have the characteristics of common pool resources.

In order to remove the open access characteristic of fisheries and thereby avoid both the ecological depletion of the resource and the economic collapse of the industry, governments around the world have stepped in with a range of policy responses.

The specification of property rights in relation to fisheries and whether they can be specified appropriately is central to the choice between the two broad approaches that can be taken in fisheries management – market-based management or direct intervention. According to Charles (1992) the debate revolves around four main questions:

- Who owns the fishery?
- Who should control access to the fishery?
- What is the most desirable philosophy of fisheries management?
- What role should be played by government in the fishery?

Type	Characteristics
1 **Private ownership**	Ownership rights are held by a private firm or industry.
2 **State ownership**	
Sole ownership	All fishing activities dictated by government as sole owner.
Limited entry schemes	Access and withdrawal rights restricted by the government (may involve non transferable quota).
Quota	Market-based system of management. State confers on fisher an exclusive right to catch a quantity of fish.
Individual transferable quota	Exclusive quota is made transferable via a market to other participants including potential new entrants.
Co-management	Management system based on negotiation. This will involve the participants and the State as the custodian of the fishery.
Concessionaire schemes	Access rights granted by the State to firms who in turn provide access for various groups in return for a fee or a right to recover costs.
3 **Common ownership**	Resource owned and managed jointly by a small group of self-governing fishers. The state would grant this group joint or common ownership. Each participant in the fishery then depends on the arrangements or rules worked out in the ownership group.

Source: Fisheries Western Australia 1998.

Figure 3. Taxonomy of fisheries management systems.

There are many different resource management options for fisheries. Some of these are identified in Figure 1. Some of the responses involve input controls (eg. gear restrictions or limits on the numbers of boats in a given area to limit fishing effort), while others have involved output controls, such as taxes on catches and individual catch quota.

A most commonly approach is a quota system, allowing fishing enterprises to harvest a specified volume of fish over a specified time period, with the collective harvests as set by the quotas no more than the total allowable catch. Some of these fish quotas are non-transferable management instrument, but many fish quota systems now allow for a market of quotas to occur through quota transferability. Where this has occurred, transfers become market-driven, which is to say, quota acquires a price and is traded as a commodity. These are known as Individual Transferable Quotas (ITQs). Information gathered from the licensing is then analysed to gain insight into the current state of the fishery. It is also important to note that quotas do not fully replace the heavily regulated management regimes that generally predated them (Wiber 2000). In most cases, quotas, licensing, gear limitations, and other restrictions on fishing efforts are combined into an extremely complex administrative system.

The state can adjust the overall catch rate by either lowering each quota (making each quota a share of the total resource rather than an absolute amount), or the fishing authorities are an active participant in the market and sell or buy back quotas to ensure the total catch in within sustainable levels. This latter approach in used to control total fishing catches in New Zealand.

Australian jurisdictions used a variety of different approaches. ITQs are the preferred management approach for Commonwealth fisheries resources. According to the Commonwealth Department of Agriculture, Fisheries and Forestry (2003), other approaches are only considered if, after careful evaluation, ITQ arrangements do not address the management challenges within the fishery. Specifically, the *Fisheries Management Act 1991* enables the Australian Fisheries Management Authority to allocate access to new fisheries by auction, tender and ballot. Using auction, tender and ballot ensures that either chance (a ballot) or the market (auction or tender) determines who receives rights of access to a new fishery. AFMA's policy, in formalising access rights, is to allocate a certain proportion of the access rights to those involved in the fishery's development. Its approach recognises the investment risk taken to develop the fishery. Individual States tend to all use different approaches. In Queensland, by comparison, a limited entry policy and other input controls are used to manage the State's fisheries in a sustainable manner, including area/seasonal closures and restrictions on apparatus and fish size and gender. More recently, some output controls have been introduced, such as non tradeable quotas for the trochus fishery and ITQs for the spanner crab fishery.

Licences to fish waters are registered with the relevant authority. In Queensland, for example, this is the Queensland Fisheries Service. An application to search the Register of Authorities must be lodged with the Service, as well as the payment of relevant fees.

B.3 Private forestry on public land

The harvesting of native timber from public forests occurs across many tenure types in Australia, including Crown land and State forests. It occurs through both the logging of old growth and re-growth forests, and is a most important source of hardwood supplies to both domestic and international markets. Timber production is just one of the values of native forests. Forests can also provide for values such as biodiversity and wilderness preservation, clean water, recreation and ecotourism, and carbon sinks. Often timber production occurs at the expense of these other values, particularly where the logging of old growth forests occurs. Although trees are capable of regrowth, the rotation for native tress is many decades, and on a short term time frame a tree from public land is a non-renewable resource. Although trees in forests are a highly divisible resource, economies of scale and government licensing procedures ensure that it is an industry with a small number of large operators. Transactions between the forest owners (the state) and the forest users (the sawmillers or loggers) tend to be few, but large. If managed consistently then supply would be consistent, although the political and physical reality is that available supply of timber resources from public lands tends to quite inconsistent across time as social values change. Issues of compensation are integral to the forestry debate.

Rights to harvest forest resources from public forests have generally been assigned by the States in the forms of licences (a right to harvest) and/or contract (an obligation to harvest on behalf of the State), or through the leasing of the land itself. Each State has its own forestry department. The specific example of Victoria is discussed here.

In Victoria, long term (15 years) timber licences had been adopted with a view to providing the time span needed to make the necessary investment viable. Since September 1989 anyone engaged in commercial timber harvesting in Victorian State forests must hold a Forest Operator's Licence. This includes anyone involved in any part of the commercial harvesting of trees or parts of trees and

includes commercial seed collection. It excludes persons cutting timber (such as firewood) for their own use. No timber can be cut or removed from Victoria's State forests, however, unless a produce licence has first been obtained. The licences tend to be rights to harvest and process the timber for a fee, more so than rights to the trees or the underlying land.

According to the recent Victorian Government policy statement (Department of Natural Resources and Environment 2002), the State is moving away from the system of long-term licensing, instead preferring the retain flexibility to adjust supply commitments either upwards or downwards as further refinement of resource estimates occurs. They are therefore moving to a system of issuing a combination of new short and long-term (up to 10-year) licences, and logging volumes will be regulated by the States on going assessments of the health of the forests.

Long-term licences are, in effect, legally binding contracts. Under the terms of the contracts, the Department is obligated to supply licensees with the specific quantities of timber, except where circumstances outside the control of the Department, such as wildfire or disease, prevent the supply. If a situation arose where the timber committed to a licensee could not be supplied, for example, where the Department deemed it necessary to reduce harvesting to maintain the long-term sustainable supply of timber in a region, the Government could be liable under licence conditions to pay the licensee some form of compensation (Victorian Auditor General's Office 1993). To date, the Department has avoided a situation where payment of compensation of this nature has been required.

Rather than maintain an indefeasible registry of licensing rights, most States maintain electronic systems which generates licence documents for the long-term supply of logs from public land. The licence document is then used as evidence of the agreement. The Victorian Auditor General's Office (1993) explains how licences are transferable and are, at times, traded between timber processors. Although the sale price is not generally disclosed publicly, available information suggests that the market price is significantly higher than the licence fee charged by the State.

B.4 Radio spectrum

The radio spectrum is a scarce resource because signals sent simultaneously over the same or adjacent wavelengths in one geographic area interfere with each other, undermining the quality of the reception for the user and in some cases making intelligible reception impossible. Access to the radio spectrum is almost global, and the physical characteristics of the spectrum make exclusion of users difficult, so that control of use is complicated and relatively expensive. In addition, the various products of spectrum use, such as communications, information, and entertainment, often fall into the category of public goods, which increases the level of social concern over issues related to spectrum property rights.

The radio frequency spectrum is the part of the electromagnetic spectrum that is regarded as useful for radio communications (currently between 3000 Hz and 300 GHz). Each unit of spectrum can be defined according to its frequency, geographic coverage and time of transmission (Productivity Commission 2002).

Spectrum has the following characteristics:

- The boundaries of the resource are clear. The *Radiocommunications Act 1992* (RC Act), radiocommunications is all radio emissions (emissions of electromagnetic energy) of frequencies less than 420 terahertz.
- It is a divisible resource, meaning that it can be broken up into many smaller parts.
- It is a non-depletable resource. While use may be limited at any time, spectrum use in the present is not at the expense of spectrum use in the future.
- It is non-storable, meaning that spectrum not used today is lost forever.
- It is non-homogeneous. Different frequencies have different characteristics that make specific frequencies more suitable for certain uses.

Access to the radiofrequency spectrum in Australia is facilitated by the Australian Communication Authority (ACA) through licensing, managing interference and ensuring industry compliance with mandatory standards and conditions. The ACA also advises on the use of telecommunications and the radiofrequency spectrum and investigates interference complaints.

To make sure that spectrum is used efficiently, and to minimise the risk of interference between services, the ACA has a comprehensive system of licensing of spectrum use. Spectrum licences authorise the use of spectrum space for any device on any site in that space. In addition to radio transmission, common uses of spectrum licences in Australia are for mobile phone, broadband Internet, wireless local loop and pay TV services.

The radio spectrum has historically been viewed around the world as a scarce natural resource to be allocated by national governments and international agencies rather than by markets. That is, government authorities have traditionally has the task of discretionally allocating rights to spectrum use. However, price-based allocation has

recently become an important part of the Australian approach to managing the spectrum. Spectrum auctions are used in areas of spectrum scarcity and high market demand as a means of allocating spectrum fairly and efficiently. Auctions are conducted using an innovative online system known as a simultaneous, multiple round, ascending auction.

Of the alternative spectrum allocation methods – administrative process, lottery, first come first served, and auction – the experiences in different countries as well as economic theory suggest that auctioning works best (McMillan 1995). As well as raising revenue, an auction assigns licenses to the firms best able to use them (the theory is that those who are willing to pay the most for the licence is in the position to it for its most valuable purpose). In addition, the auction can be designed to advance public policy goals, such as avoiding monopoly and directing licenses to minority-owned firms.

The *Australian Radiofrequency Spectrum Plan* allocates all frequency bands to one or more uses under the following arrangements:

- Exclusive use – the band is allocated to a single spectrum use.
- Primary use – the band is allocated to two or more spectrum uses, only one of which is defined as the 'primary' use. Remaining uses are classified as 'secondary', and are unable to claim protection from, or cause interference with, the primary use.
- Co-primary use – the band is allocated to two or more spectrum uses and two (or more) uses are defined as co-primary uses. They share the primary 'rights' to the band.
- Remaining uses are classified as secondary uses. These uses are unable to claim protection from, or cause interference with, the co-primary uses. Secondary uses are not allocated spectrum. They operate on a 'shared basis' in frequencies allocated to primary and co-primary uses.

In Australia, a spectrum licence can be traded in whole or in part, by geography and/or bandwidth, or can be leased in whole or in part to third parties. A licensee can also look to extend the geographic coverage and/or the bandwidth of a licence by acquiring an adjacent spectrum licence from another licensee.

The Register that administers the licences has been prepared in accordance with Part 3.5 of the *Radiocommunications Act 1992*. The contents of the Register are set out in the *Radiocommunications (Register of Radiocommunication Licences) Determination No. 1 of 1997*. The register must contain details about each licensee of a spectrum licence, details about each spectrum licence, as well as details for devices operated under spectrum licences

The ACA maintain an online register of spectrum licenses,[29] intended to be a transparent and accessible source of reference information on radiocommunications services. Information gathered via this interface is on a realtime basis.

Spectrum licences also can be compulsorily resumed to enable spectrum re-assignment, but full economic compensation would be payable to the affected licensees. The *Radiocommunications Act 1992* sets out mechanisms by which compensation may be determined.

A licensee may assign or otherwise deal with the whole or any part of a spectrum licence provided that this is done in accordance with any rules determined by the ACA. Any change to a licence does not take effect until the ACA has been advised of the changes and the Register of Radiocommunications Licences has been altered to take account of the change.

B.5 Shares

A stock or a share represents a proportion of a company or business. The share market is highly dynamic as both the number and value of shares is constantly changing.

Stock in a company is highly divisible, in that the number of units a company can be divided is easily varied, even though the total value and/or size of the company may not change.

An efficient market in shares requires a responsive market where stockholders are able to respond rapidly to changing circumstances. This, in turn, requires transactions can be performed quickly and often. As a result, a share market is highly dynamic, typically involving many transactions across many companies in any one day.

A share in a company is a share of the company ownership, but does not necessarily involve management obligations. Shareholders have both a share of the risk on their capital, as well as a share of the profit if the company does well. Fluctuating value of a share reflects fluctuating value of the company.

The traditional approach to recording a share was through the issue of a share certificate, which is a document with an identifying number that states that the person is a registered holder of a number of securities. In Australia, share certificates were replaced by electronic

[29] See <http://www.aca.gov.au/pls/radcom/register_search.main_page>.

holding statement in January 1999 (Australian Stock Exchange 2003a). Electronic holding statement provides shareholders with an initial statement when the holding is established, and then receive subsequent statements when the holding changes. The statement shows the number of shares owned at the beginning and end of the period by detailing all transactions.

While electronic holding statements provide shareholders with a record of share ownership, a central register is also maintained. In Australia, share ownership is registered through the centralised Clearing House Electronic Subregister System (CHESS). This system is used by the Australian Stock Exchange to record legal ownership of securities listed on the exchange and to transfer this ownership between sellers and buyers. Thus the system has two major functions:

- Provides an electronic subregister of security ownership.
- Operates as a clearing house to facilitate trade in securities.

Ownership on the CHESS subregister is non-certificated, rather legal title is according to electronic records, as in electronic Torrens Title systems. However, a major deviation from the Torrens system is that not all titling needs to be recorded on this central register. Rather, ownership can also be recorded on 'issuer sponsored' subregisters, which are maintained by the company who issued the securities (Australian Stock Exchange 2003b). Whilst the issuer sponsored subregisters operate similarly to the CHESS subregister, with title validated by electronic records rather than by certification, this creates a decentralised registration system where the shareholder is free to choose where their stocks are registered.

The CHESS system's clearing house role encompasses the process of settlement, where money is transferred in exchange for securities. This is done on a delivery versus payment basis, where money and securities are transferred simultaneously and irrevocably. Reflecting the huge volume of trade in this market – relative to property or water markets – the CHESS system is able to clear trades rapidly.

An important feature of the CHESS system's trading function is the requirement for all trades to be directed by the CHESS sponsor – typically the shareholder's stockbroker. The CHESS sponsor's actions are regulated by the Corporations Law and the ASX's Securities Clearing House Business Rules, however in general they are free to access holdings of securities when directed to do so by the shareholder. In certain circumstances, shareholders can be covered for losses arising from unauthorised actions of their stockbroker through the National Guarantee Fund. (Australian Stock Exchange 2003b)

C Water entitlements in Australia

The following discussion identifies and describes the main types of water entitlement currently applying or being introduced in each jurisdiction in Australia.

New South Wales

The *Water Management Act 2000* established a new framework for the integrated and sustainable management in the State and a new water allocation regime that links licences to 10-year water management plans.

A key principle of the new Act is that water for the environment is to be provided as first priority. Water Sharing Plans for each water source are to define water required for fundamental environmental health, supplementary environmental water that may be used for other purposes under nominated circumstances, and adaptive environmental water that is granted under an access licence but committed for specified environmental-health purposes.

Beyond this, the Plans also detail the major rules and parameters to govern the granting and management of access licences in the Plan area, and the allocation of water to these licences.

The Act provides for the progressive transition from previously defined entitlements to a new tradeable form of access entitlement. Water-access entitlements are now fully separated from land. In addition, access entitlements for water are now also clearly separated from works and water-use approvals. They will generally have 15-year terms. If changes are made during the term of a 10-year plan that results in reduce water allocations, compensation may be payable.

At the bulk supply level, access licences will be held directly by supply authorities. All town water entitlements will be converted to a volumetric licence (previously some towns were exempt from licensing, or licences were specified by the size of works ie. the pump). Licences for towns and major utilities will be of 20-years' duration, but are to be reviewed every five years and varied according to population changes.

Private irrigation companies also hold access entitlements directly, so that the licensing relationship with the Department of Land and Water Conservation is with the irrigation company. Individual irrigators hold share rights in the irrigations company's entitlement after allowance for losses, and have contracts for supply of specified volumes. In some cases, carryovers between years are permitted via water accounting.

These access entitlements encompass:

- 'high-security' entitlements, where full volumetric allocations can be expected to be available in all but extreme droughts
- 'general-security' entitlements, of much lower reliability and subject to seasonal allocations depending on the water supply situation at the time.

The level of reliability of general-security entitlements is variable between systems, and has historically been quite low in most systems during drought periods. As noted earlier, the NSW general-security entitlements are of a significantly lower reliability than those of Victoria in areas of potential trade such as the Murray–Darling Basin. The Act provides that, if water allocations have to be reduced, local water utility, major utility and domestic and stock entitlements have higher priority than regulated high-security entitlements, which in turn have priority over general security and supplementary entitlements.

While individual irrigators can generally trade within irrigation districts, trade in or out of the district is governed by the rules of the irrigation company (discussed further shortly).

Private diverters on regulated streams hold their own access entitlements, which again are specified in volumetric terms and again may be either 'high or 'general' security. These entitlements are tradeable, subject to approval.

Access licences are also required for taking water from unregulated streams. Irrigation licences are specified in volumetric terms, while others are being converted to this form.

Access licences are also required to take groundwater via high-yielding bores. Entitlements are specified in volumetric terms, and are tradeable between entitlement holders within a common aquifer.

Landholders have a riparian right for stock and domestic water to be taken from rivers and lakes, which is to be maintained and extended to groundwater sources. They also continue to have a harvestable right to capture 10% of run-off on their land without the need for an access licence. These basic landholder rights remain tied to the land, however, and are not tradeable.

Victoria

The legislative framework governing water allocation and entitlements in Victoria has been in place for somewhat longer than other jurisdictions, and has some important differences.

A hierarchical entitlement structure exists whereby 'bulk entitlements' (usually source entitlements) are defined in precise quantitative form and issued to water authorities, which are obligated to supply the subsidiary delivery entitlements held by their customers, and environmental flows. A notable exception is the Melbourne system, where Melbourne Water still has rights to harvest water under its legislation. Authorities are able to trade 'spare' bulk entitlements, provided that they are able to fulfil their obligations to deliver subsidiary entitlements. Some bulk entitlements are also held by electricity companies for hydro-electric power generation.

Unlike other jurisdictions, Victoria does not have in-built periodic planning review processes to determine high-level allocations between consumptive and environmental uses. The conversion of previous water entitlements into bulk entitlements is generally a one-off process leading to perpetual entitlements, although entitlements are subject to modification by the Minister under certain circumstances.

End user entitlements in irrigation schemes are known as water rights and are of unlimited tenure, specified in volumetric terms, and have very high levels of reliability (around 96–99%).

Private diversion licences entitle holders to take and use water direct from regulated streams. These are generally of around 15 years duration.

Both water rights and diversion licences are able to qualify for 'sales water', which is excess water within a bulk entitlement to that required to meet basic entitlements in the current and following year offered as a proportion of the basic entitlement. It therefore represents an additional low-security entitlement to water right and diversion licence holders.

Water rights and diversion licences are tradeable (subject to approvals), but are still attached to land in the sense that only landholders who are potentially able to use water on their land may hold such entitlements. Restrictions have been imposed on trade of 'sales' water allocations.

Irrigators also have non-tradeable 'as of rights' to take water for domestic and stock purposes.

Diversion licences are also required to take and use water directly from unregulated streams. These licences are usually of one year's duration, but are subject to an expectation of renewal.

Licences are also required to take water from groundwater sources. These are tradeable between users of a common aquifer.

Queensland

The *Water Act 2000* established a new regime for water allocation and management in the State and provides for the progressive transition from previously defined entitlements to a new, tradeable form of entitlement.

Water allocations are now defined and managed within broadly based planning processes designed to ensure the long-term sustainability of the resource. This involves the progressive development of Water Resource Plans (WRPs) that define environmental flow and water allocation security objectives for catchments across the State, followed by Resource Operations Plans (ROPs) that seek to give effect to these objectives through establishing detailed allocations and operating and trading rules. The conversion of previous forms of authorisation to new forms of entitlement is closely linked to this process.

At the bulk level, SunWater now holds Interim Resource Operations Licences (defining relevant infrastructure, operating and water sharing rules, and reporting requirements) and Interim Water Allocations (entitlements to water after allocations to customers and to cover distribution losses) – both of which will no longer be 'interim' after finalisation of ROPs. However, the entitlements of some local government suppliers are still in the form of Order-in-Council regulations.

Individual irrigation licences are to be converted to water allocations when the relevant ROP for the area is completed. Water allocations will be of indefinite tenure, tradeable, volumetric, fully separated from land and from use permits, and liable for compensation if they

are changed during the life of a plan. In the meantime, Interim Water Allocations have been issued, which are also volumetric and, in some schemes, are tradeable,[30] but attach to land (except for those held by a supply authority). In some schemes, SunWater holds Interim Water Allocations that have not yet been allocated, and which are able to be sold to new or existing customers. Significantly, for supplemented users, the relationship between the owner of the water allocation and the headworks or system operator is governed by contracts.

A variety of licences currently exists in relation to unregulated (known in Queensland as 'unsupplemented') rivers and streams. Irrigation licences, which are currently mostly area-based, are to be converted under ROP processes to volumetric water allocations. Water-harvesting licences that currently allow holders to harvest water based on flow conditions are also to be converted to volumetric limits. Licences are also required for stock and domestic use of water that is taken other than by riparian right. Again, for all unsupplemented users, works approvals are separated from entitlement to water.

Various types of groundwater licences (which attach to land and usually specify a volume for high users) are required in respect of sub-artesian and artesian sources that have been 'declared'.

Finally, entitlements to take overland flows will be required in declared areas.

South Australia

In South Australia, water entitlements, licensing and permits are governed by the *Water Resources Act 1997*. This provides for the development of Catchment Water Management Plans by Catchment Boards across the State.

Within this framework, water allocation plans are prepared for each prescribed water resource, incorporating the principle that water for the environment has priority over consumptive use. Licences are required for the taking of water from a prescribed watercourse, lake or well, or taking surface water from a surface-water-prescribed area.

At the bulk level, volumetric water licences are held by supply authorities (eg. SA Water and Irrigation Trusts). These can be traded, subject to agreement of the members of the Trust.

Individual end user irrigation water entitlements may be specified as either a 'taking allocation' approved for use on a specific land title or a 'holding allocation' not attached to a particular land title, but not yet approved for use. Licences are issued in perpetuity, but are subject to conditions of access determined by Water Allocation Plans that may be altered periodically. These licences are tradeable subject to assessments.

These licences represent high-security entitlements, with full allocation being available virtually every year, provided South Australia receives its full entitlement under the Murray–Darling Basin Agreement. There are therefore no 'seasonal allocations' as in other States. Licence volumes may, however, be reduced by the Minister in extreme drought (this may occur in the 2003–04 season) or to comply with the MDBC Cap. Stock and domestic rights are also specified in volumetric terms and are also fully tradeable.

Western Australia

The framework for water allocation and management in Western Australia Rights is provided in the *Water and Irrigation (RIWI) Act 1914*, as amended in 2001. The amendments formalised the key policy principle that environmental-water provisions are determined first, with any allocations for development then made within the associated sustainable yield. Water-allocation plans are developed with scientific, environmental and stakeholder input.

A number of licences are issued under the Act, which define the purpose, location and resource from which the water can be extracted. The two principal types of licences are 'take groundwater' licences and 'take surface water licences'. These are held by both water service providers (ie. supply authorities such as water corporations) and private users (eg. irrigators, mining companies etc.) in proclaimed areas. While generally specified in volumetric terms, these licences have various reliability levels, reflecting their restriction during drought periods.

Subject to water availability and environmental constraints defined in trading rules, the entitlements associated with these licences may be traded, provided they are clearly defined in volumetric terms.

Water can generally be taken from watercourses in unproclaimed areas without a licence. Landholders can generally take water from wetlands wholly on their land, and build a dam or tank on their land provided it is not on a watercourse.

Riparian right allocations, stock and domestic supplies, and environmental water provisions are linked to land and are non-tradeable.

[30] Trade is permitted in certain schemes (Mareeba Dimbulah, Mary River, and Nogoa McKenzie) where a ROP has not yet been completed but there is confidence that trade will not adversely affect environmental values, and there is a perceived need and demand for trading.

Tasmania

The *Water Management Act 1999* provides for the management and allocation of water resources. Access to water is controlled through a new licensing and allocation system in the context of a formal planning process for the sustainable development of the resource.

A water licence is required before water can be taken from a water resource, except for riparian rights, water for firefighting, and other specific uses.

Licences issued under the new Act specify an allocation in volumetric terms and is not attached to land. A water licence is normally issued for 10 years, with provisions for review of conditions after 5 years. Water licences and/the allocations within them may be traded either permanently or temporarily to another person who holds a licence, subject to an approval process. These new licences are gradually replacing the 'water rights' previously issued to irrigators and other commercial water users, but tied to particular parcels of land.

During times of high flows in a watercourse, a temporary water allocation may be issued for up to three months allowing a user to take more water than permitted by a licence.

Separate permits are required for dams on land and for discharge of wastewater.

Special licences apply for the purpose of hydro-electric power generation.

Australian Capital Territory

Access to water is controlled under the *Water Resources Act 1998*. The Act requires that a 'water resource management plan' be developed for each catchment. This identifies how much water is required for the environment and how much is available for consumptive use.

Licences are required to take and use surface water. This applies both to ACTEW (the water supply authority) and to commercial and irrigation users (other than as ACTEW customers). Before a licence can be issued, a person must hold an allocation of a volume of water that can be used under the licence.

Licences are also required to take and use groundwater (except for groundwater under land subject to a lease existing before December 1998).

Water used for stock or domestic purposes does not require a licence.

Permits are required for the construction of bores and water control structures such as farm dams and weirs.

Northern Territory

The Northern Territory *Water Act 1992* covers investigation, use, control, protection, management and administration of water resources throughout the Northern Territory including those on Aboriginal and Commonwealth lands.

The Act also covers general provisions, water resource investigation, use of surface water, use of groundwater, and water quality protection.

Landholders have the right to take groundwater and surface water on their land for domestic purposes, watering stock and for a domestic garden no larger than a half-hectare. Water-extraction licences can be granted to take groundwater and surface water for uses other than stock and domestic purposes. These licences are normally issued for between two and ten years, and are renewable. When the land changes ownership any licence issued is automatically transferred with the title.

Water extraction licences are tradeable within 'water control districts', provided that a water allocation plan to manage water extractions to sustainable levels has been declared.

A permit is required for any interference with a waterway or obstruction of flow. This includes damming creeks or pumping from springs, creeks or rivers. Construction of a rural dam of less than three metres in height and in a catchment of less than five square kilometres does not require a permit.

A permit is required for any bore constructed in a water control district. Bores pumping more than 15 litres water per second anywhere in the Northern Territory require an extraction licence.

An Effective System of Defining Water Property Titles

Land & Water Australia Research Report