Issues in water law reform

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FOREWORD

This publication contains the papers presented at the *Expert Consultation on Issues in Water Law Reform*, convened by FAO in Pretoria, Republic of South Africa, 3 to 5 June 1997. The *Expert Consultation* was the first activity under, and served as a launch for, the FAO-funded and -executed project of technical assistance to the Republic of South Africa, TCP/SAF/6711 "Review of water legislation". It was arranged and timed so as to provide a comparative water law and administration input to the drafting of a National Water Bill, then underway.

At the request of the Government of the Republic of South Africa, the topical programme of the *Expert Consultation* hinged on two key issues of concern to the drafting exercise then underway. These were (a) the transition from an existing landed property-based system of water abstraction rights to a Government-administered system of water allocation and abstraction and (b) the tradability of water rights. The former raises a fundamental issue of taking of constitutionally-protected property rights, with obvious political overtones. The latter raises an equally fundamental issue of balancing the equity goals underlying the conception of water resources as a public good and the Government as guardian and allocator of the resource, with the efficiency goals underlying market-driven allocation decisions and the role of the private sector. These being issues of general significance to the reform of the water legislation of any country, the papers illustrating them have been collected in this publication to be shared with an international readership.

Both fundamental issues have been addressed in the papers prepared by the experts who were invited to the *Expert Consultation*, by reference to the experience of their respective countries. These are Australia, Chile, Mexico, Spain and the United States of America, where significant reforms in the water legislation have taken place or are being contemplated and where the issues illustrated in this publication have been raised and debated, across the spectrum of the world's major legal systems. In addition, the tradability of water rights has been explored from a broader comparative law perspective in a paper contributed by an expert from the United Nations Economic and Social Commission for Latin America and the Caribbean.

It is hoped that this publication will stimulate thinking among policymakers, decisionmakers, legislators, administrators, legal practitioners and academics as countries embark on the path of reforming their legislation on the management and development of

Credit and responsibility for each individual contribution rest with the relevant author, as acknowledged in connection with his paper. Overall supervision and final editing have been the responsibility of Mr. Stefano Burchi, Senior Legal Officer with this Service. The financial support of FAO's Technical Cooperation Programme, through the resources allocated to project TCP/SAF/6711, is gratefully acknowledged.

Lawrence C. Christy
Chief, Development Law Service
Legal Office

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REFORMING SOUTH AFRICAN WATER LEGISLATION: AUSTRALIAN EXAMPLES

by
Sandford D. Clark

Blake Dawson Waldron
Professorial Fellow
Centre for Energy and Resources Law
University of Melbourne
April 1997

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1. SYNOPSIS

The purpose of this paper is to suggest examples from Australian experience which may assist South Africa in revising the Water Act 1956 (the **"Republic of South Africa Act")** and introducing a more comprehensive system of administrative apportionment of rights to water. The following general issues are examined:

- Techniques of qualifying existing rights to water.
- Techniques of managing exposure to compensation.

Most examples have been drawn from the two most recent Australian products of reform. They are the Victorian *Water Act* 1989, which has been in operation since 1990 and the South Australian *Water Resources Act* 1997. The latter Act became law on 10 April 1997 but has yet to come into operation.

2. AUSTRALIAN BACKGROUND

2.1 Initial Legislative Responses

As a common law country, Australia inherited prevailing early 19th century English law about rights to use:

- water flowing in watercourses;
- distributed surface water collecting or falling on private land;
- groundwater percolating through land.

Arid conditions, comparable to South Africa, and the desire to develop rules appropriate, first, for goldmining and then irrigation, led most States wholly or partially to supplant the common law riparian doctrine near the turn of the century.

Legislative intervention to qualify rules about groundwater happened concurrently in New South Wales, where rapid exploitation of the Great Artesian Basin had occurred. Legislative controls have only been introduced in other States during the last 40 years.

Legislative change to rules about the use of distributed surface water has been much more recent. This may partly reflect reluctance to interfere with uses, the immediate effects of which appear to be confined to one land owner, but also reflects uncertainty about what common law principles apply to disputes between land owners over surface drainage. Predictably, legislative rules have only been developed as allocations have increased to levels where all sources potentially contributing to run-off must be accounted for.

2.2 Techniques for Qualifying Riparian Rights

Several techniques were used to limit the impact - if not abolish - common law riparian rights.

2.2.1 Declarations of supervening State interests

The formula most often adopted was that the Crown has "the right to the use, flow and control of all water" in watercourses.

Between 1919 and 1976, South Australia also declared that the Crown had "property" in such water. A similar proposal was rejected in 1886 in Victoria, on the grounds that no one (including the Crown) could have property in such water at common law: compare Republic of South Africa Act, section 6(1).

There has been some judicial debate about whether this formula had the necessary effect of abolishing the rights of riparian land owners. Early cases went both ways.[1] Fullagar J. in the High Court of Australia reviewed earlier authorities in *Grant Pastoral Coy Pty. Ltd.* v. *Thorpes Ltd.*[1] He took the view that the vesting provision:

> "does not directly affect any private rights, but gives to the Crown new rights - not riparian rights - which are superior to, and may be exercised in derogation of, private riparian rights, but that, until those new and superior rights are exercised, private rights can and do coexist with them."

Fullagar J. did not express a concluded view about the correctness of earlier cases, however. His view was later adopted in Western Australia[3] and a Canadian case, interpreting a similar provision, came to the same conclusion.[4] More recently, a single judge in the New South Wales Supreme Court has found that the formula does abolish private riparian rights.[5]

In policy terms, Fullagar J.'s view seems preferable. It might be helpful in the South African context: see item 3.1 below.

A declaration of superior State title is not, however, imperative in all contexts. Thus, such a declaration has been abandoned in the South Australian *Water Resources Act* 1997, which builds on an already entrenched system of administrative allocation.

2.2.2 Reservation of bed and banks

This is by far the most effective technique for denying common law riparian rights, as they can only inhere in land in lateral or vertical contact with the flow of water.[6] In South Australia and Victoria, the practice was earlier adopted of only granting land to the top of the bank on boundary watercourses. In Victoria, later legislative declarations were made of Crown land reserves along many major rivers. Finally, turn-of-the-century Victorian legislation retrospectively deemed the bed and banks of boundary streams to have remained vested in the Crown.

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1 Hanson v The Grassy Gully Gold Mining Co. (1900) 21 NSWR 271; Dougherty v Ah Lee (1902) WN
(NSW) 8.

2 (1954) 92 CLR 317.

3 *Rapoff v Velios* [1975] WAR 27.

4 *Johnson* v *Anderson* [1937] 1 DLR 762.

5 *Van Son* v *Forestry Commission of New South Wales*, Supreme Court of NSW, (1995) Aust Torts R 81-333.

6 John Young & Co. v Bankier Distillery Coy [1893] AC 691.

No issues of compensation arose as a result of such a declaration, for the Australian States (as distinct from the Commonwealth) have no constitutional obligation to make just compensation. Further, retrospectively deeming land to have remained in the Crown did not amount to a "taking" under applicable compulsory acquisition legislation. It is also likely that any relevant compensation would have been small, because of the statutory rights granted to replace those which a common law riparian would normally enjoy: see item 2.2.5 below.

2.2.3 Negation of prescriptive acquisition

At common law, an upstream riparian could acquire the right to use water for "extraordinary" purposes, such as irrigation, if downstream proprietors failed to object.

Conversely, a downstream riparian could sue to prevent an upstream use for irrigation, or any use for other than "ordinary" (i.e. domestic and stock) purposes. This action lay *even in the absence of damage,* simply to prevent prescriptive adverse title being acquired.

In policy terms, the need to encourage irrigation in Australia meant that the barren assertion of a legal right, where no damage was suffered, had to be stopped. By preventing the possibility of acquiring title by prescription, a downstream riparian lost the right to sue an upstream diverter, where no damage had been suffered.

Interestingly, sections 7(4)(b) and 141 of the South Australian *Water Resources Act* 1997 restores the right to restrain an activity which "detrimentally affects the enjoyment of the amenity of water in the watercourse" by an adjoining occupier, even in the absence of actual damage. The rule only applies to those watercourses which are not prescribed in order to make them subject to administrative allocation of rights.

Note that there has never been a possibility of acquiring a right to *receive* water at common law, or to have the flow undiminished from upstream lands, through long use or prescription. A riparian owner always had the right to receive the flow sensibly undiminished in quantity or quality. A provision such as the proviso to section 5 of the Republic of South Africa Act thus does not, and could not, exist in Australia. The "known and defined" channel referred to in that section would be a "waterway" under Victorian legislation and attract the relevant rules for taking water from waterways.

2.2.4 Negation of all water-related incidents of title

Even in Victoria, where each of the techniques set out above were used, there was still a possibility that some riparian rights existed in small streams which flowed through several allotments, but did not form a boundary. Ultimately, these were effectively abolished by the completely revised Water Act passed in 1989. Section 8(7) of the Victorian *Water Act* 1989 provides:

> "The rights to water conferred by or under this Act on a person who has an interest in land replace any rights:
>
> (a) to take or use water; or
>
> (b) to obstruct or deflect the flow of water; or
>
> (c) to affect the quality of any water; or

(d) to receive any particular flow of water; or

(e) to receive a flow of water of any particular quality:

that the person might otherwise have been able to enforce against the Crown or any other person because of, or as an incident to, that interest."

This appears to be a potent provision, sufficient to abolish any incidents of title to land which might otherwise create rights in watercourses, distributed surface water or groundwater. The intention is to ensure that all rights are thereafter derived from the *Water Act* 1989.

A simpler means of achieving a similar, but less comprehensive, result appears in section 7(9) of the South Australian *Water Resources Act* 1997. It provides:

"Rights at common law in relation to the taking of naturally occurring water are abolished."

Although it has the virtue of simplicity, this provision is confined to pre-existing common law rights and would not operate on previous statutory incidents of riparian land ownership or rights awarded by a Water Court to a riparian owner, such as are granted under Republic of South Africa Act, sections 9(1) and 52(1). It is also confined to rights to *take* water and does not deal with rights to *receive* the accustomed flow, undiminished in quantity or quality.

An adoption of the Victorian formula might also be more suitable in South Africa, for other reasons. Note that the Victorian section is cast in *positive,* rather than *negative,* terms. It recites that other rights conferred by the Act replace the rights referred to in the section. The technique of providing statutory substitutes for each of the existing common law rights was a significant technique of winning support for what might otherwise be seen as privative measures. In jurisdictions where compensation might otherwise be payable, it is one way of minimizing potential pay-outs. Coupled with the technique of defining circumstances in which, and means of calculating, compensation, such provisions can significantly reduce exposure to compensation claims: see item 3.1 below.

2.2.5 Re-conferring statutory rights of ordinary use

Where a riparian's right to take water was abolished by either or both of the declaration of superior State title and the reservation of bed and banks (see items 2.2.1, 2.2.2 above) a statutory right to replace the right of "ordinary" use was granted. Each person deprived of riparian title was granted a right to take water for domestic and stock purposes, which included the right to irrigate a household subsistence garden of a defined, limited size. The right is similar in extent to that which any person has with access to a stream, mentioned in Republic of South Africa Act, section 7(a), plus a limited irrigation right.

All other uses - equivalent to those for "extraordinary" purposes at common law - were subjected to licensing requirements.

2.2.6 Re-conferring statutory rights of occupation

Riparian owners deprived of the ownership of the bed and banks of watercourses by their reservation, as described in item 2.2.2 above, were granted permission by the Act to

occupy the bed and banks for grazing purposes. That statutory licence could be enforced against everyone other than the Crown and the occupier was expressly granted the right to bring trespass against third parties.

2.2.7 Introducing licensing requirements

The underlying purpose of most Australian legislation is to provide ready means of introducing administrative controls over both the building of hydraulic structures on waterways and the taking of use of waters for purposes other than stock and domestic (including household garden) purposes.

In States which are sparsely settled and sparsely watered - like Western Australia and South Australia - legislation allows administrative controls to be introduced progressively, as the need arises. In some States, controls are introduced by prescribing *a watercourse;* in others, by prescribing *an area.*

In Victoria licensing requirements both for structures and extractive uses apply throughout the State. Where a licensing obligation is universal, there is no problem of discerning what residual common law or other rules govern the erection of hydraulic structures and the taking of water for other than stock and domestic purposes, in uncontrolled

2.2.8 Re-defining boundaries between watercourses and distributed surface waters

At common law, riparian rights only attach to "watercourses". This word also has a definite common law meaning. It implies notions of permanence or regularity of flow, as well as a defined bed and defined banks.

These criteria are ill-suited to the behaviour of waterways in arid countries like South Africa and Australia. One bizarre consequence in Australia is that there are certain places where it is still impossible to discern the boundary between New South Wales and Victoria. This is because, by statute, the "whole of the watercourse" of the Murray River is in New South Wales, but also constitutes the border. Where there is no defined southern bank - as often happens on the inside of bends - it is impossible to know where the border lies, for the River does not constitute a common law "watercourse" at such places.[7]

In Australian circumstances, discernible drainage courses, which do not comply with the common law characteristics of a watercourse, may nevertheless be significant sources of supply. In intensive farming locations, widespread and uncontrolled interruption of these flows for farm dams have had a significant effect on catchment yield and downstream uses. Accordingly, in Victoria, "waterway" was chosen to escape common law connotations. The *Water Act* 1989 now uses the term "waterway" which is defined as:

"(a) river, creek, stream or water course; or

(b) a natural channel in which water regularly flows, whether or not the flow is

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[7] Ward v R (1980) 142 CLR 308.

(c) a channel formed wholly or partly by the alteration or relocation of a waterway as described in paragraphs (a) or (b); or

(d) a lake, lagoon, swamp or marsh, being:

(i) a natural collection of water (other than water collected and contained in a private dam or a natural depression on private land) into or through or out of which a current that forms the whole or part of the flow of a river, creek, stream or watercourse passes, whether or not the flow is continuous; or

(ii) a collection of water (*other than water collected and contained in a private dam or a natural depression on private land*) *that the Governor in Council declares under section 4*(*1*) *to be a lake, lagoon, swamp or marsh;* or

(e) land on which, as a result of works constructed on a waterway as described in paragraphs (a), (b) or (c), water collects regularly, whether or not the collection is continuous; or

(f) *land which is regularly covered by water from a waterway* as described in paragraphs (a), (b), (c), (d) or (e) but does not include any artificial channel or work which diverts water away from such a waterway; or

(g) if any land described in paragraph (f) forms part of a slope rising from the waterway to a definite lip, the land up to that lip."

The italicised words deserve comment.

Paragraphs (f) and (g) counter the common law requirement that a watercourse must have both defined bed and banks.

Paragraph (d)(ii) is the aftermath of an important policy conflict. As initially proposed, the Bill allowed the Governor in Council to declare intermittent drainage courses on private land to be "waterways". This would have permitted licensing controls to be placed both on hydraulic structures to intercept flows and the taking and use of such water. Although this was seen as an important policy initiative, the proposals were defeated by a number of significant Opposition amendments in the Upper House. Not only was the power confined to existing collections of water, but section 4 provided that the resource could only be subjected to the licensing regime if this is requested by at least one occupier of adjoining land and a widespread opportunity has been given for making public submissions.

The interface between water in waterways, which attracts a legislative regime derived from the riparian doctrine, and distributed surface waters occurring on land, which attract different principles, is a source of unresolved tension in most Australian water legislation. The new South Australian *Water Resources Act* 1997 may be the first to resolve this tension successfully: see item 2.3.1 below.

2.3 Techniques for declaring and qualifying rights in distributed surface waters

Early legislation neglected these waters, partly for the reasons suggested in item 2.1 above, but also because the prevailing use of legislation was to make changes to existing common law principles. Acts were confined to that task and generally did not seek to codify and restate all existing legislative and non-legislative rules. This "if it's not broken, don't fix

it" approach has really only been abandoned in recent years by the Victorian Water Act 1989 and the South Australian Water Resources Act 1997, which go much further in trying to be comprehensive sources of all legal rights to water.

Because of this, in early Acts, distributed surface waters were dealt with only to preserve their common law status as exceptions to new regimes. They were exempted from declarations of superior State title by provisions like:

> "This section shall not operate so as to prevent any person from draining any land or making any dam or tank upon land of which he is the owner".[8]

Although there was often an important proviso that the flow of water in any waterway must not be sensibly diminished by any such action, the proviso was insufficient to deal with the *cumulative* effect of farm dams on catchment yield. In most instances, while the effect of individual dams is insignificant, their cumulative effect can be substantial.

2.3.1 Rights to use

The traditional view has been that the land owner on whose land such water occurs has the absolute right to use it. In recent times, the right has been expressed in legislative terms in some jurisdictions, but not in such absolute terms as section 5 of the Republic of South Africa Act.

The South African section provides that:

> "The sole, exclusive and unlimited use and enjoyment of private water belongs to the owner of the land on which such water is found."

Words like "belong" invite arguments about proprietary interests and attendant problems of compensation. In contrast, the Victorian *Water Act* 1989, section 8 simply provides:

> "(4) A person has the right to use ...
>
> (c) rainwater or other water that occurs or flows (otherwise than in a waterway or bore) on land occupied by that person or, with the permission of the other person, on land occupied by another person.
>
> (5) Water referred to in sub-section (4)(c) may be used for any purpose and on any land."

As noted in item 2.2.4 above, a companion provision states that this right "replaces" any rights which a landowner might otherwise have as an incident of land ownership.

The new South Australian *Water Resources Act* 1997 goes one step further. Section 7(2) starts by declaring that:

> "Subject to this Act and to any other Act or law to the contrary, the occupier of land is entitled to take surface water from the land for any purpose."

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[8] *Water Act* 1958 (Vic), section 4(2).

However, section 8(2) contemplates that an area may be declared "a surface water prescribed area". If so, section 9 does not allow surface water to be taken, or dams constructed to intercept it, without first obtaining a water licence and a construction permit.

These are the first legislative provisions which potentially allow full-scale administrative control, both of the construction of farm dams and of the on-farm use of distributed surface waters.

Nevertheless, there is still the customary limited exemption. Section 7(5)(b) allows an occupier to take and use surface water for domestic and stock purposes - but not stock subject to intensive farming.

2.3.2 Rights of drainage

Part 12 of the Victorian *Water Act* 1989 contains provisions which allow a land owner to obtain, by Court order if necessary, access over neighbouring land for drainage (as well as supply) purposes. These provisions are similar to the servitude provisions in the Republic of South Africa Act, sections 141-151. Such provisions are not generally included in other Australian water legislation.

More difficult problems arise about impeding or concentrating and accelerating the flow of distributed surface water from one parcel of land to another. Australian law vacillated between what were perceived to be common law and civilian law rules. When the High Court finally enunciated rules of general application in 1962% a flurry of Parliamentary Committees in comparatively well-watered Victoria sought to devise a legislative response to the High Court which would impose a "free flow principle", instead of the High Court's rules. A series of Drainage of Land Acts followed, which are now embodied in section 16 of the Victorian *Water Act* 1989. Those rules make liability for damage to others depend on judgments about the reasonableness of flows and whether interference with flows was intentional or negligent. Unfortunately, it does not appear from the section that the rules are primarily intended to deal with flows of distributed surface waters between rural lands. They have, accordingly, been inappropriately invoked to resolve problems between urban land owners or tenants in commercial buildings, over burst pipes, where negligence or nuisance would have been more appropriate remedies.

The problem amply illustrates the difficulty of trying to codify and re-state legislative and non-legislative rules in a comprehensive Act. Section 17 is privative, providing that no civil liability exists for damage caused by water to which section 16 applies, except as provided in that section. Accordingly, it has been argued that the remedies of nuisance or negligence are no longer available to resolve problems to which section 16 provides manifestly inappropriate answers.

Australia can thus offer no reputable examples of legislation to resolve disputes about drainage of distributed surface waters. The Victorian experience does illustrate the legislative problems of:

- trying to codify or re-state comprehensively an area of law; and

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[9] *Gartner v Kidman* (1962) 108 CLR 12.

- privative clauses which endeavour to appoint exclusive statutory remedies for civil wrongs.

2.4 Techniques for qualifying rights in groundwater

At common law, the overlying owner has a right to use subjacent percolating groundwater, but does not own that groundwater.[10] Earlier English authorities suggested that . the right was unlimited in extent and was not constrained by any principles of reasonableness.[11] In both Australia and England, the better view now seems to be that the same principles of reasonableness and forseeability which pervade the laws of negligence and nuisance also place limits on the way an overlying owner may use percolating groundwater.[12]

The earliest legislative qualifications of these rights arose from the uncontrolled waste of artesian water, following discovery of the Great Artesian Basin in 1878. Unconstrained development rapidly led to declining yields and sub-artesian conditions in many areas. Accordingly, early legislation was primarily aimed at controlling the construction, casing and capping both of private and government bores.[13]

The need for more general and intensive controls first emerged in the sub-artesian supplies to more densely settled areas and, in the 10 years following 1959, South Australia, Tasmania and Victoria all passed comprehensive new legislation to control groundwater.

2.4.1 Declarations of supervening State interests

As a general rule, modern groundwater legislation attempts to apply a regime similar to that for surface water. The regime is closer to the treatment of water in waterways than of distributed surface water. This is despite the fact that the common law rights of a landowner to distributed its surface water and groundwater derived from common maxims and were closely analogous.

A declaration that the Crown has the right to the use, flow and control of groundwater was thus a common response: compare item 2.2.1 above.

2.4.2 Conferring limited statutory rights of use

Although common law principles did not limit the purpose or extent for which groundwater could be used by an overlying owner, legislation has generally followed similar principles as those for waterways.

The general principle is that administrative permission is not required to take and use groundwater for stock and domestic (including household garden irrigation) purposes.

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[10] *Ballard v Tomlinson* (1884) 2 ChD 194; (1885) 29 ChD 115.

[11] *Mayor of Bradford* v *Pickles* [1895] AC 587.

[12] *Gartner v Kidman* (1962) 108 CLR 12, 47 per Windeyer J; *Cambridge Water Co. Ltd.* v. *Eastern Counties Leather plc* [1994] 1A11 E.R. 53 (H.L.).

[13] *Artesian Wells Act* 1897 (NSW); *Water and Water Conservation and Utilisation Act* 1910 (Qld).

Sometimes legislation provides the potential obligation to report the amount taken pursuant to these rights.[14]

Apart from these limited rights, all uses of groundwater are subject to administrative permission.

In most instances, the limited right to take groundwater for domestic and stock purposes can also be qualified if a particular area is declared to be a groundwater protection area to which more intensive management controls are applied.

Thus the Victorian *Water Act* 1989, section 8(l)(d) allows a person to take water free of charge from a bore for domestic and stock purposes, if the person "occupies" the bore. Section 8(6) entrenches the right. It can be "limited only to the extent to which an intention to limit it is expressly (and not merely impliedly) provided in an Act or the requirements of an approved groundwater management plan."

2.4.3 Imposing licences regimes

(*a*) *Bore construction*

In most instances, a construction licence must be obtained before a bore can be sunk or enlarged. In some instances, a parallel exemption from this requirement is granted to facilitate domestic and stock uses.

The way in which the exemption is expressed can be significant. Sometimes a depth limit is prescribed by regulation. To grant an exemption in terms of an *intended* use, however, can allow controls to be subverted, as intentions cannot be objectively determined and lend themselves to capricious change.

(*b*) *Extraction licences*

For uses other than domestic and stock purposes, an extraction licence must be obtained. The process for obtaining a licence is usually the same as for a waterway, but the deliberative criteria which must be considered by the relevant administrative authority are usually somewhat different.

(*c*) *Drillers' licensing*

Perhaps the most significant innovation in modern groundwater legislation is the requirement that drillers be licensed. In some States a drillers' licensing board conducts examinations and grants different classes of drillers' licences, depending on the experience of the applicant. In some jurisdictions, political factors have made it more difficult to introduce licensing requirements for drillers than to license construction and extraction.

The Republic of South Africa Act, section 31 presently contains a registration requirement and section 33 creates an offence for failing to register. A licensing system is seen as preferable to registration in some Australian States. Testing qualifications probably

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[14] *Water Act* 1989 (Vic), section 8(2).

helps to protect the resource more securely from the consequences of incompetence. It also probably helps to ensure a more comprehensive flow of bore data, as a driller can lose his or her livelihood if the data obligations attached to a licence are not complied with. The obligations are generally similar to those set out in Republic of South Africa Act, section 32.

2.5 Categories of administrative rights

In most Australian systems, the continued right to take water from waterways, groundwater or surface waters for domestic and stock (including household irrigation) purposes is assured and does not rest on administrative permission.

The type of administrative permits vary considerably between jurisdictions.

2.5.1 Victoria

(*a*) *Licences*

Private diverters apply for a licence which is initially granted for 15 years. In the past, such licences have been automatically renewed. Political pressure and economists' arguments about the certainty of tenure necessary to support trading in water rights led to amendments allowing licences to be renewed either for a further period of up to 15 years or indefinitely.

(*b*) *Water rights and sales water*

Within Government irrigation areas, each holding was initially granted a water right based on what the relevant irrigation authority thought it could supply in bad years. Each authority is obliged to supply farmers with domestic and stock water and water rights in every

Because water rights are fixed as a minimum entitlement, they are insufficient to support irrigation in normal years. Accordingly, authorities are empowered to sell additional water to farmers. This "sales water" is usually fixed as a percentage of water right (for example, 30 percent of water right). Although, as a matter of law, it is a purely discretionary allocation, the annual expectation that sales water will be available is so entrenched that the expectation can now be traded in the same way as a water right!

(*c*) *Bulk allocations*

This innovation has been necessary, both to ensure that all water entitlements are brought to account and to establish certain titles to water in order to support trading.

Before the 1989 Act, the numerous Water authorities throughout Victoria took water to supply to consumers, under cover of statutory powers to supply water. The relevant legislation did not attempt to quantify the entitlements of those numerous authorities.

Their notional entitlements have gradually been converted into bulk allocations which can relate to shares of stored water in reservoirs, of the flow in waterways, or of a particular catchment, or of the flow in channels belonging to water authorities.

Entitlements are calculated at a specified level of security (say 98 percent) which can theoretically be negotiated with the Minister, allowing greater volumes with lower security.

Allocations are often expressed as all of the flow of a specified waterway, up to a maximum annual allocation. Rates of extraction might also be specified. Minimum flow requirements are usually set out, and can vary seasonally, where necessary.

Bulk entitlements can also usually be traded, either temporarily or permanently, in a similar manner to licences and water rights.

(*d*) *In-stream allocations*

Under section 52 of the Water Act 1989, a Minister, or the Minister's nominee, can apply for a licence for an in-stream use of water in a reservoir, waterway or irrigation channel.

In fact, environmental and ecosystem requirements have been mostly met by specifying passing or minimum flow requirements in the bulk allocations of waterway management authorities. No licences have been granted for in-stream purposes and there are unresolved questions about whether water authorities would attach normal irrigation charges to such licences; whether they would be tradeable; and whether they would be granted for periods greater than 15 years.

2.5.2 South Australia

The Victorian Act inherited well-understood community expectations about private diversion licences, irrigation water rights and sales water. Although the Act adopted a facilitative, flexible, non-prescriptive approach in many other ways, it felt obliged to honour and observe categories familiar to rural water users.

The new South Australian Act adopts "water allocation" as a neutral term, avoiding historic connotations and conferring maximum flexibility. Thus, section 33 provides:

> "A water allocation may be fixed by specifying the volume of water that may be taken and used by reference to the purpose for which the water may be taken and used or in any other manner."

In fact, the Act envisages that the nature of relevant transactions will be tailor-made for each catchment by a water allocation plan, developed and promulgated by the relevant catchment water management board. Section 101 provides:

> "(4) A water allocation plan must:
>
> (a) include an assessment of the quantity and quality of water needed by the ecosystems that depend on the water resource and the times at, or the periods during, which those ecosystems will need that water; and
>
> (b) include an assessment as to whether the taking or use of water from the resource will have a detrimental effect on the quantity or quality of water that is available from any other water resource; and
>
> (c) *provide for the allocation* (*including the quantity of water that is to be available for allocation*) *and use of water so that:*

(*i*) *an equitable balance is achieved between social, economic and environmental needs for the water; and* (*ii*) *the rate of use of the water is sustainable; and*

(d) in providing for the allocation of water take into account the present and future needs of the occupiers of land in relation to the existing requirements and future capacity of the land and the likely effect of those provisions on the value of the land; and

(e) assess the capacity of the resource to meet the demands for water on a continuing basis and provide for regular monitoring of the capacity of the resource to meet those demands; and

(f) provide for the transfer of and other dealings with water allocations...

(8) *A water allocation plan may, in order to improve the management of a water resource, change the basis on which water is allocated from the resource* notwithstanding that a consequential variation of a water licence to maintain consistency with the plan results in a reduction or increase in the quantity of water allocated by the licence."

Such provisions, particularly the italicised words, allow great flexibility in fashioning the legal attributes of water entitlements. They would allow, for example, the introduction of a system to allocate each user in the catchment of an unregulated waterway, a proportional share of the run-off of the catchment for consumptive purposes. Under such a scheme, a shareholder might trade in shares within the catchment, or buy shares from other catchments and have them converted into shares in their own catchment. The relevant water allocation plan would be used to define the entitlements and obligations associated with each share. Periodic revision of the plans could refine the definition of those entitlements and obligations.[15]

2.5.3 General observations

The flexibility, particularly of the South Australian scheme, starkly contrasts with the entrenched entitlements spelled out in sections 5, 6, 9 and 10 of the Republic of South Africa Act.

A flexible regulatory system necessarily imposes administrative costs, which probably would exceed the traditional costs of the Water Court in declaring entitlements to public water in South Africa. As a general rule, however, the closer water use is to the maximum capacity of the system, the more sophisticated the management system must be to keep use within that limit. If the limit is set conservatively, it can be run successfully by a relatively simple administrative system. If greater water use is required, however, a highly sophisticated system will usually be necessary, which will cost much more to administer. A well-designed water allocation system should allow a seamless and equitable transition to a more sophisticated system, as pressures on local water resources increase.

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[15] Such a scheme would be broadly based on the innovative principles suggested in M.D. Young, *Sustainable Investment and Resource Use* (Man and the Biosphere Series No. 9) UNESCO 1992.

3. COMPENSATION ISSUES

One of the most significant barriers to a seamless and equitable transition to a system of administrative rights in South Africa is likely to be the problem of compensation. Sections 60, 94 and 112 of Republic of South Africa Act presently set out generally applicable requirements to pay compensation when rights are expropriated by the Minister for a Government water control or catchment control area, or by irrigation and water boards, for the purpose of exercising their functions. There is also apparently concern that any more general restructuring of rights to water could trigger constitutional protections of private property and compensation obligations.

Such risks depend very much on the prevailing interpretation of compensation obligations in each country. The obligation to pay compensation is often an absolute barrier to introducing modern water or catchment management legislation, particularly where radical change is proposed.

Sometimes the political realities of post-revolutionary or post-colonial circumstances can lead courts to turn a blind eye or to find inventive constitutional or interpretative doctrines to avoid the need for compensation. Thus, in India, the validity of vast land reform programs was ultimately challenged on the grounds that they offended constitutional protections of private property. The relevant legislation was said to be unconstitutional, unless full compensation was paid. The Court's inventive solution was a creative misapplication of the doctrine of prospective overruling. It declared that anything done under the land reform Acts after the Court's decision, would be unconstitutional. By then, of course, the land reform program was complete![16]

South Africa may not be able to rely on such a compliant and politically sensitive judiciary. Yet the adoption of new constitutional provisions, including statements in the Bill of Rights provisions about rights to sufficient water for domestic needs and to protect the environment for the benefit of present and future generations, may be important levers to reduce the likelihood or actual cost of compensation.

As noted previously, Australian States have no constitutional obligation to pay compensation for the compulsory acquisition of private property. Although the Federal Government is under a constitutional duty to pay just compensation, water management is a matter for State legislation and executive power.

In practice, of course, political factors generally lead Australian States to make sure that change causes minimum disruption to peoples' perception of their existing rights.

3.1 Some General Principles

Three important general principles seem to emerge from Australian experience.

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[16] *Golak Nath* v *State of Punjab* (1967) 54 AIR 1643.

- If private rights are, in future, to become subject to administrative allocation or control, make sure that existing private rights are replaced by substantially equivalent entitlements, at least for an interim period.
- Before making changes, ensure that the reasons for, and nature of, the proposed changes are well understood by the public.
- If the re-stated administrative entitlement must subsequently be qualified or altered, make sure that both the circumstances in which compensation will be paid, if at all, and the means of assessing it, are closely defined in legislation.

In item 2.2.1 above, the effect of a declaration of supervening State rights to the use, flow and control of water was discussed. If the correct analysis of that provision is that private rights are not abolished, but simply abate to the extent that they are inconsistent with the exercise of superior State rights, it may be that neither the enactment of a declaration of State rights, in stronger terms than the Ministerial powers enunciated in section 2 of the Republic of South Africa Act, nor the exercise of consequential powers, would necessarily be characterized as expropriation.

It will probably be necessary to go further, however, and enunciate equivalent entitlements under a new administrative system, if risks of compensation are to be reduced.

3.2 Calculating administrative rights

Under the South Australian Act, when a source or area is prescribed in order to introduce administrative controls, an "establishment period" will be fixed, during which existing uses will be assessed and a proposed regulation prepared for future use of the resource. The establishment period will end when the proposed regulation is published, inviting public submissions. A "prescribed period" then begins, during which water allocations are made, based on both the amount used during the establishment period and any development commitments entered into before the prescribed period begins.

If, when all allocations have been made, their total exceeds the capacity of the resource, the Minister may either reduce allocations proportionately, or pursuant to some other scheme set out in the regulation.

These arrangements have four distinct merits:

- They provide a means of verifying the extent of existing uses, which is likely to be more accurate than simply inviting users to register their existing uses.
- They take into account future development commitments, which have already been made.
- They relate the reduction of allocations to the scarcity of the resource.
- They provide for entitlements to be reduced *pro rata.*

In such circumstances, it is more difficult to characterize the restriction on entitlements as expropriation, as the claimed entitlements exceed the known capacity of the resource.

The Act also foresees that there may be a need to reduce entitlements after initial controls have been introduced. Again, reductions must either be *pro rata* or pursuant to a

scheme set out in the relevant regulation. Section 37 provides the following grounds for reduction.

> "The Minister may reduce the water allocations of the licences that have been granted to take water from a particular water resource if in his or her opinion it is necessary or desirable to do so:
>
> (a) to prevent a reduction, or further reduction, in the quality of the water in the resource or in a water resource that is affected by the taking of water from the first mentioned resource; or
>
> (b) to prevent damage, or further damage, to an ecosystem that depends on that water or on the water from a resource that is affected by the taking of water from the first mentioned resource; or
>
> (c) because there is insufficient water to meet the existing demand or expected future demand for water from that resource or from a water resource that is affected by the taking of water from the first mentioned resource."

The Victorian *Water Act* 1989 similarly gives the Minister power to suspend, reduce or alter all but the right to use surface water for domestic and stock purposes on one's land. The provisions only take account of water availability, however, and do not consider water quality or environmental concerns. Section 13 states:

> "(3) A qualification may only be made if the Minister has under this section declared that a water shortage exists in the area or supply system concerned.
>
> (4) The Minister may declare that a water shortage exists in an area or supply system if he or she is of the opinion that the volume or quality of water available in the area or system to satisfy the rights is or will shortly be inadequate for any

Neither the South Australian nor Victorian Act provides for compensation to be paid in such circumstances.

3.3 Other powers to adjust entitlements

South Australia also has a provision which allows for the *temporary* reduction of entitlements for up to two years. The Minister can exercise this power, whether or not the resource has been proclaimed and is subject to other administrative controls. Again, no compensation is payable. Section 16 provides:

> " (1) Where, in the opinion of the Minister:
>
> (a) the rate at which water is taken from a watercourse, lake or well (whether prescribed or not):
>
> (i) is such that the quantity of water available can no longer meet the demand or there is a risk that the available water will not be sufficient to meet future demand; or
>
> (ii) is affecting, or is likely to affect, the quality of the water in the watercourse, lake or underground aquifer; or

(iii) in the case of water taken from a watercourse or lake - is having a serious effect on another watercourse or lake, or the level of water in an underground aquifer, that depends on water from the watercourse or lake for replenishment; or

(b) the rate at which water is taken from a well (whether prescribed or not) is such that the underground aquifer is likely to collapse or suffer any other damage; or

(c) the rate at which surface water is taken (whether from a surface water prescribed area or not):

(i) is such that the surface water available can no longer meet the demand; or

(ii) is having a serious effect on a watercourse or lake, or the level of water in an underground aquifer, that depends on surface water for replenishment,

the Minister may, by notice published in the Gazette and in a newspaper circulating in that part of the State in which the watercourse, lake or well or the surface water is situated:

(d) prohibit or restrict the taking of water from the watercourse, lake or well or the taking of surface water; or

(e) direct that dams, reservoirs, embankments, walls or other structures be modified to allow water to pass over, under or through them.

(2) When determining the demands on available water under sub-section (1), the need for water of the ecosystems that depend on water from the water resource concerned must be taken into account."

3.4 Defining the circumstances in which compensation will be paid

Section 16(l)(c) and (e) of the South Australian *Water Resources Act* 1997 thus allow the Minister to make a *temporary* order to alter dams in order to ensure that surface water is not retained in ways which detrimentally affect other resources. No compensation is payable in such cases.

On the other hand, section 16 allows the Minister to order the *permanent* removal or modification of a dam or other structure "that collects water, or diverts or impedes the flow of water, in a watercourse or flowing over any other land and that was lawfully placed in or near the watercourse or on the land before the commencement of this Division."

In such cases, compensation is payable, but only for the "value of the dam" and the costs of removal. Section 146 provides:

"(4) For the purposes of sub-section (3), the value of a dam, embankment, wall or other construction or object will be taken to be:

(a) the amount by which the dam, embankment, wall or other obstruction or object increased the value of the land; or

(b) the cost, at the time of removal, of replacing the dam, embankment, wall or other obstruction or object,

whichever is the lesser.

(5) The Minister is liable to pay compensation to the occupier of land for the loss of water (if any) held by a dam, embankment, wall or other obstruction or object when it is removed in compliance with a notice under section 15(1)."

While calculating the amount by which a dam increases the value of land will necessarily require consideration at the putative value of future water supplies to the land, sub-section (5) carefully limits the obligation to pay compensation to the cost of water actually contained in the dam at the time.

Specifying what damage is compensable can meet the constitutional obligation to pay compensation while, at the same time, placing realistic limits on the losses which must be met from the public purse.

REFORMING SOUTH AFRICAN WATER LEGISLATION:

TRADEABLE WATER ENTITLEMENTS

IN AUSTRALIA

by

Sandford D. Clark

Blake Dawson Waldron
Professorial Fellow
Centre for Energy and Resources Law
University of Melbourne
May 1997

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1. SYNOPSIS

The purposes of this paper are to explain in general terms:

- the system of transferable water entitlements in one Australian jurisdiction; and
- leading-edge ecological economic thinking, which is transforming the way in which property rights in natural resources are being re-structured in Australia.

The State of Victoria applies distinct rules to each type of water entitlement. The relevant rules are set out in the *Water Act* 1989, the Water (Permanent Transfer of Water Rights) Regulations 1991, amended in 1994 and by-laws about the temporary transfer of irrigation water rights, made by the Goulburn-Murray Rural Water Authority in 1995 and the Gippsland and Southern Rural Water Authority in 1996.

The system of tradeable salinity credits available to the State Governments of New South Wales, Victoria and South Australia under the Murray Darling Basin Agreement is also explained.

Finally, important work done by the Division of Wildlife and Ecology of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) on the structuring of natural resource property rights is introduced. This work has already led to fundamental reforms in legislative regimes for managing pastoral lands in South Australia, abalone fisheries off-shore from Victoria and New South Wales, kangaroo culling and commercial fisheries in New South Wales. The principles have also been closely examined for structuring access to trade waste disposal and are being seriously considered by at least one Australian jurisdiction to re-structure water rights.

2. TYPES OF WATER ENTITLEMENTS

Victoria has numerous categories of water entitlements, each with different attributes. In brief, they comprise the following.

2.1 Domestic and stock water

Landowners have the right to take and use the water from adjacent waterways, subjacent groundwater and distributed surface water on the land, for domestic and stock purposes, including irrigation of a domestic garden. A similar right - without the irrigation component, is granted by statute to anyone who has lawful access to a waterway, by a road or public

These are the only types of entitlement which are not potentially tradeable.

2.2 Distributed surface water

Water, such as rainwater falling on, or flowing across, land can be used by a landowner on that land. It can also be used:

- by the landowner on other land, belonging to the landowner or someone else, if that person agrees; and
- by someone on other land, if an agreement to transfer the water is made between them.

No administrative constraints are placed on such transfers. The terms are wholly determined by agreement between the relevant landowners.

2.3 Licences

Landowners may apply for, and obtain, a licence for up to 15 years in the first instance, to take either:

- water from an adjacent waterway; or
- groundwater.

Temporary and permanent transfers of some or all of the entitlement in the licence can be traded on the terms set out in section 62 of the *Water Act* 1989.

2.4 Irrigation water rights

Each holding within an irrigation district initially was granted water rights which, for many years, were regarded as fixed to, and inalienable from, the land.

These rights may now be traded temporarily, for the current irrigation season, even inter-State. They may also be permanently transferred, though not yet to inter-State destinations: see *Water Act* 1989, sections 224-226.

2.5 Sales water

In addition to water rights, landowners in an irrigation area have come to rely upon a volume of sales water which is customarily made available in each year, at the discretion of the relevant water authority. As befits a discretionary annual allocation, sales water can only be traded temporarily by a landowner. Nevertheless, trading in the expected allocation for the current irrigation season is allowed.

2.6 Bulk entitlements

Bulk entitlements are granted to water authorities to quantify their historic uses under statutory powers. These may be traded, to the extent provided in the relevant bulk entitlement, either temporarily or permanently.

2.7 In-stream allocations

A licence can be granted to a Minister, or a nominee of a Minister, for in-stream use of water in a reservoir, waterway or irrigation channel. In theory, such licences would be tradeable in the same way as other licences, although it is inherently unlikely that such rights, once acquired, will be traded.

3. HISTORY

Before the late 1970s, the common law would probably have supported only the limited transferability of distributed surface waters between landowners: see item 2.2 above. Limited instances also existed where groundwater was piped from wells to remote locations, very often for mining purposes.

The early Australian responses to notions of transferability, advocated in the various studies undertaken for the US President's Water Policy Commission in 1969, were that:

- water rights in irrigation areas were integral to the survival of closer settlement schemes and were inalienable and inseparable incidents of title to that land; and
- the engineering constraints of irrigation channel design and the complexities of ordering and delivering water prevented trade in irrigation water.

Discussion was mainly confined to the possibility of trading in irrigation water rights, rather than entitlements secured by licences. There was no notion of possible trading between water authorities, probably because their respective entitlements had not been quantified or bestowed with proprietary characteristics.

In the mid-1970s, a succession of dry years resulted in less than usual sales water being available to supplement irrigation water rights. Farmers with more than one holding in the same district sought to amalgamate their water rights for use on one holding, in order to ensure that at least some of their irrigated pasture survived. Experiments with such limited and temporary forms of transferability and more sophisticated systems for ordering water deliveries within irrigation areas, overcame many arguments about engineering constraints and opened the way for more extensive trading. Comprehensive legislative reforms in the Victorian *Water Act* 1989 facilitated trading in most types of entitlement.

Following an independent inquiry to propose a National Competition Policy, in February 1994 the Council of Australian Governments adopted a national agenda for micro-economic reform. Comprehensive requirements were proposed to reform the water sector.

In relation to water allocations or entitlements, the Council resolved:

"(a) the State Government members of the Council would implement comprehensive systems of water allocations or entitlements backed by separation of water property rights from land title and clear specification of entitlements in terms of ownership, volume, reliability, transferability and, if appropriate, quality,

(b) where they have not already done so, States would give priority to formally determining allocations or entitlements to water, including allocations for the environment as a legitimate user of water...

(c) that the environmental requirements, wherever possible, will be determined on the best scientific information available and have regard to the intertemporal and inter-spatial water needs required to maintain the health and viability of river systems and groundwater basins. In cases where river systems have been over allocated, or are deemed to be stressed, arrangements will be instituted and.substantial progress made by 1988 to provide a better balance in water resource use including appropriate allocations to the environment in order to enhance/restore the health of river systems,

(d) in undertaking this work, jurisdictions would consider establishing environmental contingency allocations which provide for a review of the allocations five years after they have been determined, and

(e) where significant future irrigation activity or dam construction is contemplated, appropriate assessments would be undertaken to, *inter alia*, allow natural resource managers to satisfy themselves that the environmental requirements of the river systems would be adequately met before any harvesting of the water resource occurs."

In relation to trading in water allocations or entitlements, the Council resolved:

"(a) that water be used to maximize its contribution to national income and welfare, within the social, physical and ecological constraints of catchments,

(b) where it is not already the case, that trading arrangements in water allocations or entitlements be instituted once the entitlement arrangements have been settled. This should occur no later than 1998,

(c) where cross-border trading is possible, that the trading arrangements be consistent and facilitate cross-border sales where this is socially, physically and ecologically sustainable, and

(d) that individual jurisdictions would develop, where they do not already exist, the necessary institutional arrangements, from a natural resource management perspective, to facilitate trade in water, with the proviso that in the Murray-Darling Basin the Murray-Darling Basin Commission be satisfied as to the sustainability of proposed trading transactions."

States are proceeding to implement these reforms at different paces, but substantial compliance will be required by 1998 if they are to receive the benefit of substantial compensatory payments from the Commonwealth Government for the cost of implementing the National Competition Policy.

Victoria is further advanced than other jurisdictions in introducing full cost recovery for rural water supplies. Its arrangements for water transfers, though simple in institutional terms, are also more universal and further advanced than those of other jurisdictions.

4. TRADING RULES

4.1 Licences

4.1.1 Administrative requirements

Transfers may be either temporary or permanent. Applications must be made in the required form, accompanied by a prescribed fee. The authority with power to decide such matters is the Minister, although, in practice, the Minister delegates this power to the relevant water authority responsible for the area in which the licence is granted.

4.1.2 Modes of disposition

The holder of the licence has a choice as to the way in which the licence is disposed of. It may either be sold at auction, or by inviting tenders, or in any other manner that the holder thinks fit.

4.1.3 Deliberative criteria

The Minister, or the Minister's delegate, may have regard to:

- the report of any panel which may have been convened to consider public submissions when the licence was granted in the first place;
- any water resource management plan which has been adopted for the area;
- any restrictive order specifying an annual groundwater reserve or a groundwater conservation area;
- the existing and projected availability of water in the area;
- the existing and projected quality of water in the area;
- any adverse effect that the allocation or use of water under the entitlement is likely to have on:
  - (a) existing authorized uses of water; or
  - (b) a waterway or an aquifer; or
  - (c) the drainage regime; or
  - (d) the environment, including the riverine and riparian environment;
  - (e) any water to which the applicant is already entitled;
  - (f) any volume of water that is allocated as sales water to the applicant;
  - (g) the need to protect the environment, including the riverine and riparian environment;
  - (h) any approved management plan for any relevant groundwater supply protection area;
  - (i) the conservation policy of the Government;
  - (j) Government policies concerning the preferred allocation or use of water resources

(k) whether the proposed source of water is within a heritage river area or natural catchment area subject to any restrictions on use;

(l) if appropriate, the proper management of the waterway and its surrounds or of the aquifer;

(m) the purposes for which the water is to be used;

(n) the needs of other potential applicants.

The Minister also has a general discretion to consider "any other matter that the Minister thinks fit to have regard to."

These deliberative criteria are, for the most part, identical with those for the initial decision whether to grant a licence. In such a case, the criteria are mandatory and must each be considered by the Minister, or the Minister's delegate. In the case of transfers, however, the criteria are only discretionary.

If the application is to transfer a licence entitlement *temporarily* to the owner or occupier of land outside Victoria, the Minister or the Minister's delegate may also have regard to the effect of that transfer on "usage of water, the impact of subsidies and any other matter that the Minister considers relevant." In the case of permanent transfers out of the State, general conditions may be established by a Ministerial Order which is published in the Government Gazette.

4.1.4 Administrative powers

The Minister, or the Minister's delegate may refuse to approve an application to make a transfer. If the application is approved, conditions attached to the transferred licence can also be amended, deleted or added to.

4.1.5 Cross-border trading

While different States maintain different pricing policies for water and supply entitlements with different levels of certainty, cross-border trading will continue to present

In practice, however, cross-border trading is really only practicable between States which are parties to the Murray-Darling Basin Agreement. It is anticipated that, in the timeframes envisaged by the Council of Australian Government's resolutions on reforming the water sector, the Murray Darling Basin Commission may assume a co-ordinating role for inter-State trading in water, which must, of course, eventually be reflected in the entitlements of each State to water under the Murray-Darling Basin Agreement.

One important barrier to sensible regulation of such trading may arise from the constitutional requirement in section 92 of the Australian Constitution that all trade and commerce between the States must be free.

4.1.6 Appeals

An appeal lies to the Administrative Appeals Tribunal against a decision not to approve, or to attach conditions to, a transfer.

4.2 Bulk entitlements

4.2.1 Administrative requirements

Bulk entitlements can be granted in relation to water in a waterway or groundwater, but can also be granted in relation to water held in the works of a water authority. Most often, they are granted to water authorities, by either the Minister or, if the Minister chooses to refer the matter, by the Governor-in-Council.

Applications to transfer bulk entitlements must be made to the Minister. Because of the potential political complexity and consequences of a water authority disposing of part of its entitlement, .the Minister has power to advertise any application for the temporary or permanent transfer of a bulk entitlement and to invite public submissions. The Minister may also require the applicant to provide further information or to participate in an investigation to assess the likely effects of granting the application and to bear the costs of that investigation.

4.2.2 Modes of disposition

An Authority has power to sell a bulk entitlement, or part of its bulk entitlement at auction, or by inviting tenders, or in any other manner that it thinks fit. However, if it does decide to sell the whole or part of its bulk entitlement and the proposed transfer is to be permanent, the Authority must publish notices in the Government Gazette and newspapers declaring that it is available for purchase and giving details of the manner in which it is to be sold.

4.2.3 Deliberative criteria

In making a decision, the Minister has the discretion to have regard to the same criteria set out in item 4.1.3 above.

There is an express provision that "without limiting the discretion of the Minister", the Minister may refuse to approve a transfer if it is likely to have

"an adverse effect on:

(i) existing authorised uses of water; or

(ii) a waterway or an aquifer; or

(iii) the drainage regime; or

(iv) the environment, including the riverine and riparian environment."

These are not the only grounds on which the Minister can refuse a transfer. The provision operates simply as a suggestion to the Minister that special attention should be given to these matters before a transfer is approved.

If an application is made permanently to transfer part of a bulk entitlement to irrigators or licence holders, the Minister can only approve the transfer if the Minister is satisfied that the portion to be transferred is surplus to the water authority's obligations to supply water to others.

4.2.4 Administrative powers

The Minister may refuse an application or grant it, subject to any conditions which could have been attached to the original grant of a bulk entitlement.

4.2.5 Cross-border trading

The implication from section 46B of the *Water Act* 1989 is that a bulk entitlement may only be temporarily traded inter-State, for a period of up to 12 months. Such a transfer may be made to a "person outside Victoria". This phrase includes a water authority in another State. In contrast, water licences can only be traded to the owners or occupiers of land in another State.

4.2.6 Appeals

No appeal is available against a decision not to approve or to attach conditions to a transfer of a bulk entitlement. Once a transfer is approved, the holder of the bulk entitlement is obliged to apply for a revision of the pre-existing entitlement.

4.3 Irrigation water rights

4.3.1 Administrative requirements

Irrigation water rights are registered in relation to land within an irrigation district, which is usually supplied from irrigation channels operated by the local water authority. Transfers of such interests thus attract certain safeguards, intended to protect the legitimate interests of:

- all of the registered proprietors of land to which the water right is attached;
- the water authority which supplies the transferor;
- the water authority which will be obliged to supply the transferee, if water rights are transferred.

In general terms, an application for either the permanent or temporary transfer of water rights must be made to the transferor's water authority. That water authority has express power to make by-laws for administrative matters which:

(a) prescribe procedures for applications;

(b) fix any fees for processing and approving applications;

(c) fix fees for the use of the authority's works to make a temporary transfer;

(d) set the minimum amount of water rights that must be retained by the owner of any holding;

(e) set the maximum amount of water rights that may be held by the owner or occupier of any holding;

(f) set limits on the transfer of water rights or water offered for sale into and out of any part of an irrigation district, having regard to:

(i) drainage and salinity criteria; and

(ii) the need to protect the water rights attached to other holdings within the irrigation district; and

(iii) the possible environmental impact of transfers; and

(iv) prescribe any other terms and conditions in relation to a transfer; and

(v) prescribe irrigation districts within and out of which water rights and sales water may be temporarily transferred.

In addition, the Minister has power to establish guidelines about whether temporary inter-State transfers can take place, and the terms and conditions to be attached to such transfers.

In the case of permanent transfers of water rights, the Governor-in-Council can make regulations which:

(a) prescribe irrigation districts within and out of which water rights may be transferred;

(b) prescribe the types of interests in land, the holders of which must give approval for a transfer;

(c) prescribe procedures for applications;

(d) fixing fees payable to the Authority for processing and approving applications;

(e) setting the minimum amount of water rights that must be retained by the owner of a holding, except where the water rights are transferred to a water authority, having regard to:

(i) drainage and salinity criteria; and

(ii) the need to protect the water rights attached to other holdings within the irrigation district;

(f) setting the maximum amount of water rights that may be held by the owner or occupier of any holding, having regard to the same criteria mentioned in item (e);

(g) setting the limits on the transfer of water rights into and out of any part of an irrigation district (except in the case of a transfer to an authority), having regard to the criteria mentioned in item (e) as well as the possible environmental impact of transfers;

(h) prescribing any other terms and conditions in relation to a transfer;

(i) prescribing forms;

(j) fixing the fees payable to an authority for the issue of a water rights certificate.

4.3.2 Methods of disposition

There are no prescriptions about the way in which water rights may be transferred. Notice of an application permanently to transfer water rights must, however, be published in a local newspaper, at least 28 days before the application is made. Such an application must also be accompanied by the written consent of all persons who have an interest in the transferor's land.

4.3.3 Deliberative criteria

The *Water Act* 1969 does not set out a list of deliberative criteria to be applied by the water authority in deciding whether or not to approve a transfer of water rights, comparable to the criteria mentioned in items 4.1.3 and 4.2.3 above. The transferor's authority has a general discretion as to the criteria it considers, although:

- an authority must have regard to any guidelines promulgated by the Minister when deciding whether to grant an application for a temporary transfer of water rights inter-State; and
- the authority's discretion will also be constrained by its own by-laws about temporary transfers and regulations made by the Governor-in-Council about permanent transfers of water rights.

An authority's discretion may be limited in several further ways. First, if there is no bulk entitlement providing sales water in the relevant area and the Minister believes that the transfer may result in a serious increase in water use, the Minister may prohibit or limit temporary transfers of water rights for a specified period.

Secondly, unless the Minister determines otherwise, a landowner cannot make a temporary inter-State transfer of water rights, if he or she has also accepted an offer to take sales water in that year, or has already transferred the sales entitlement for that year.

Finally, permanent transfers of water rights can only be made if the seller's authority is satisfied that all persons which it knows, or ought to know, have an interest in the land, have consented to the transfer.

4.3.4 Administrative powers

A transfer, whether temporary or permanent, takes effect subject to any terms or conditions prescribed in the by-laws or regulations, as well as to any other conditions notified to the parties by the transferor's water authority at the time the transfer is approved.

Water rights, unlike licences and bulk entitlements, are created by an entry in a register, rather than by an instrument setting out terms and conditions. Unlike those entitlements, the power to attach conditions is thus not subject in any way to pre-existing conditions which were fixed by an initial grant.

4.3.5 Cross-border trading

Only temporary inter-State transfers of water rights are possible. Unlike temporary transfers of licences or bulk entitlements, a transfer cannot be made for a full 12 months. Depending when the temporary transfer is made, it can only be for the balance of the current irrigation period (approximately October to April) or the current non-irrigation period (approximately May to September).

A temporary inter-State transfer can also only be made with consent of the relevant water authority in whose area the water will be used.

4.3.6 Appeals

No appeal lies from a decision not to approve a temporary transfer, or to attach conditions to a transfer. An appeal does lie to the Administrative Appeals Tribunal against a decision not to approve a permanent transfer of water rights, but not against the conditions attached to a transfer.

5. SALINITY CREDITS

In 1993, the Murray Darling Basin Commission adopted a strategy to reduce average annual river-borne salinity in the Murray Darling system to a designated target level at Mannum in South Australia. This was to be done through jointly funded salt interception works, mainly on tributary rivers in Victoria and New South Wales. The estimated benefits of those works were substantially greater than the target for permanent reduction at Mannum. Accordingly, each of New South Wales and Victoria were allocated "salinity credits" equivalent to 15 E.C.U., measured at Mannum, which each can draw on to improve and increase drainage of saline run-off to the river.

Further, the relevant Appendix to the Murray Darling Basin Agreement envisages that a State may elect to fund further salt-interception works, either in its own territory or in the territory of another State. If it does, it will earn additional salinity credits which, in all probability, it will use to increase drainage to the river but which, in theory, it could also market to either of the other two States.

Apart from this limited example, Australia has not generally developed markets in the absorptive capacity of environmental resources.

6. EMERGING PRINCIPLES OF RESOURCE ALLOCATION

As noted in item 1 above, propositions and recommendations developed by ecological economists, as distinct from conventional economists, are now having significant impact upon natural resource management regimes in Australia and upon the nature and attributes of proprietary access rights.

As noted in item 2 above, the Council of Australian Governments also recommended that, by 1988, all Australian States should:

- implement comprehensive systems of water allocations or entitlements, backed by separation of water property rights from land title and clear specifications of entitlements in terms of ownership, volume, reliability, transferability and, if appropriate, quality;
- give priority to formally determining allocations or entitlements, including allocations for the environment;
- institute trading arrangements in water allocations or entitlements, once they have been settled.

The Council's agenda has thus presented an opportunity to re-examine existing mechanisms for allocating, and the attributes of, entitlements. The quest is to find techniques which meet traditional criteria of efficiency, as well as satisfying principles of sustainability, the integrity of ecosystems and intergenerational equity. In the words of one practitioner:

> "Ecological economics seeks to understand the underlying and fundamental causes of environmental degradation and the means to redress them. Efficiency is not seen as a sacrosanct objective but maintenance of the integrity of our global ecosystem is. The market is important but not the source of all information. Recognition of uncertainty, a willingness to consult with and use social welfare functions set by the communities and attention to institutional issues are part of the core agenda."[17]

From the point of view of legislative models and traditional notions of property, the most challenging issue is the recognition of uncertainty.

For many lawyers and traditional economists, "property" is seen in terms of absolute, certain and incontestable rights to a specified share of resources. It is difficult to devise sophisticated proprietary regimes which acknowledge both uncertainty and variation in the availability of water resources within a catchment, as well as the need for flexible responses to dynamic ecological systems.

The Appendix to this paper sets out one description of how such principles can be embedded in a property rights regime for transferable water entitlements, using comfortable analogies with corporate shareholding, banking and renewable leasehold regimes.

I would do a disservice to its author, Mike Young, of the CSIRO Division of Wildlife and Ecology, if I attempted to summarize his paper. With his consent, I have thus reproduced a significant proportion of it in the Appendix.

As a property and water resources lawyer and legislative draftsman, I am particularly interested in the exciting possibilities it raises of:

- separating the entitlement to tradeable shares of an available resource from the annual allocation of a proportion of available water to each share;
- a Torrens-style system of title by registration of trading instruments, rather than registration of titles;

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[17] Young, M., "Water Rights: An Ecological Economics Perspective", Working Paper Series 1997/7, Resource Futures Program, CSIRO Wildlife and Ecology (1977), p4.

- the role of variable exchange rates to allow for evaporation, percolation to groundwater and the effects of trade on environmental flow;
- the proposed precautionary approach to determining environmental allocations;
- the role of a management plan and periodic reviews in adjusting entitlements to achieve sustainability and ecological objectives;
- the optional roll-over consequences of the management plan review, which will allow new information to be incorporated, while maintaining resource security.

My own view is that these principles offer opportunities for developing allocation and trading systems which are much better adapted to the known challenges of sustainability than the traditional - and somewhat pedestrian - allocation and trading mechanisms I have earlier described.

I also suspect that replacing existing statutory rights under the South African *Water Act* 1956 with such a system of adaptive, share-based, tradeable rights may be an excellent way of minimizing possible compensation claims.

APPENDIX

The following pages are extracted from Mike Young, "Water rights: An Ecological economics perspective", Working Paper Series 97/7, Resource Futures Program, CSIRO Wildlife and Ecology, PO Box 84, Lyneham ACT Australia 2602.

The paper explains something of the discipline of ecological economics as well as introducing the International Society for Ecological Economics, established in 1988.

Box 1 neatly summarizes the evaluation criteria used by ecological economists. The remaining material applies those principles to water allocation. I have also reproduced the References provided in the original paper.

Box 1

Evaluation criteria used by ecological economists

Economic efficiency - Having regard to implied and actual values, the chosen trade-off between production and conservation is achieved at least cost (productive efficiency) and so that no reassignment of property rights would improve production or biodiversity objectives without making some-one worse off (allocative efficiency);[18]

Dynamic and continuing incentive - the mechanism used continues to encourage technical innovation, improvement of biodiversity beyond the official policy target; and automatically adapts to changing technology, prices and climatic conditions;

Equity - no group of people, including future generations, is unfairly disadvantaged or favoured by the instrument's operation;

Dependability or certainty - the instrument will deliver the desired biodiversity target, even when knowledge about likely responses is uncertain;

Precaution - the instrument avoids the chance of serious or irreversible consequences especially when there is scientific uncertainty about outcome;

Administrative feasibility and cost - monitoring and information costs are minimal (low information cost)," government enforcement is cost effective, can be financed from available revenue and self enforcement is encouraged (low administrative cost), the instrument's requirements are simply explained (communicative simplicity),[20] and the decision-making processes associated with the instrument can be understood by all parties (transparency); and Community and political acceptability - the policy instruments motivate the community to ensure that biodiversity conservation objectives are achieved, are perceived as being legitimately formulated and delivered, adds to social harmony, are consistent with government commitments and attracts bipartisan support.

Source Young et al (1996).

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[18] This is a Pareto definition of allocative efficiency. The alternative, less restrictive definition of allocative efficiency is the Kaldor-Hicks version - Hypothetically, if those who gain from a proposal could fully compensate those who lose and still be better off, then the proposed change is efficient. In this framework we regard this less restrictive definition as a trade-off between equity and efficiency.

[19] Complex highly technical schemes that require large amounts of information, complex monitoring or many minor decisions are to be avoided.

[20] Stakeholders can obtain information about the instrument easily and find the instruments effects easy to explain to others.

Application to Water Allocation

In 1994, CO AG committed itself to the "Implementation of a Strategic Framework for the Efficient and Sustainable Reform of the Australian Water Industry." Under the agreement, states have agreed to try to "implement comprehensive systems of water allocations or entitlements backed by separation of water property rights from land title and clear specification of entitlements in terms of ownership, volume, reliability, transferability, and if appropriate, quality." The $2.4 billion of financial assistance offered to states is conditional on satisfactory progress being made. Properly designed, and in concert with contestable markets and astute institutional arrangements, these reforms have the potential to make water use consistent with community values (Young 1996, Young & McCay 1995).

As indicated above, **ecological economists are particularly interested in the specification of property rights. In contrast, conventional environmental economists tend to focus on prices and market valuation and leave discussions about property rights to institutional economists.** Ecological economists see markets as excellent servants but poor masters. Institutional and macro-economic policy reforms are seen as a means to achieve sustainability. Property-right systems are preferred to pricing systems because property-right systems define the ecological limits and then leave the market to work out what prices and charges are necessary to keep use within those limits across space and through time. Property-right systems tend to be ecologically more dependable than pricing systems. While neo-classical economic theory would suggest that there is no difference between price-based and right-based approaches, this is true only if charges are varies to account for differences across space and through time. In practice, governments routinely fail to vary prices in response to changing economic conditions and opportunities (Young 1992). When a property-right is used to define the limit, however, market processes take over. Value is determined by market opportunity within ecological limits.

Specifying and allocating water rights

The current system of water allocation varies from district to district and state to state. There are no fully specified perpetual rights. Essentially, an entitlement to a fixed quantity of water, say 10 ML, is allocated with an implicit degree of reliability attached to it. Access to 10 ML might be expected 7 years in 10 but that situation might change. Apart from the political process, there is little to protect each user from the issue of further licences or the cancellation of current licences. Entry by application to the Minister is still possible. Often, groundwater rights and rights to harvest water from unregulated streams are vague. The question of how to specify and allocate water rights is one of the most difficult issues raised by the COAG reform agenda. Responding to COAG, ARMCANZ (1995) proposes that "where practical, individual water users - not institutions - should hold the property rights to shares in natural water resources." This is not unlike the share system gradually being introduced for New South Wales fisheries (Young 1996). Under this system a fishery, or in this paper's case, a sub-catchment is defined and each water user is issued shares in proportion to their current entitlement to use water. Thereafter, a water user can change their entitlement to receive allocations. The right is clearly specified and unambiguous. Permanent changes in allocation are possible only through the acquisition or sale of shares.

ARMCANZ has gone on to say "ownership tenure should be perpetual but with conditions of access associated with entitlements that are subject to reviewability within an open planning system." Essentially, the question is one of what to share and how to work out the details necessary to make sharing possible.

Essentially, the challenge is to find a system that will enable rights to an uncertain volume of water to be traded. Many years ago the corporate world faced up to this very problem in relation to uncertainty in revenue streams. Companies form and shareholders, in proportion to the number of shares they hold, receive profits as and when they are made. Entry and exit from the system is possible only by trading shares. This same system is easily adapted to water by giving each water user within a sub-catchment shares in the total amount of water available for consumptive use. In this paper I recommend that shares be used as the mechanism to facilitate trade and prevent new entrants diluting the value of the opportunities available to existing users. Within this framework, I suggest that a document- called a catchment management plan - be used to define the rights and obligations that attach to each share. If this recommendation is accepted then an important institutional innovation occurs. The status of a management plan changes from that of an indicative document to a formal legal instrument with status similar to that of regulations under an act of Parliament. Shareholders would have rights and obligations defined by sentences and statements made in the plan.

Taking a trans-disciplinary approach and well advised by communicators, an ecological economist might also recommend that discussion in the management plan about the relationship between shares and expected allocations be expressed in terms of expected median flows - not mean flows. In one South Australian river system that I have looked at in the Clare Valley, the median flow is 60 percent of the mean flow. Operationally, this means that either 31 percent of the mean flow has been allocated for consumptive purposes or, alternatively, 51 percent of the median flow has been allocated to consumptive purposes. The statement that 49 percent of the median flow has been set aside for environmental purposes conveys a very different message to a statement that 69 percent of the mean flow has been allocated to environmental flows. **Generally, ecological economists tend to take a much more pro-active approach to informing people about ecological principles than is common among conventional economists.**

A dual-right system

Drawing upon some of my earlier work, I would also recommend a "dual-rights" system that formally separates entitlements to receive water allocations on a regular basis from volumes of water that have been assigned to people. This mechanism enables a significant reduction in transaction costs and opens the way to make water rights more valuable than they otherwise would be.

Under a dual-rights system, allocations of water in November, for example, are registered separately from the entitlement that produces that allocation. A formal share registration system is established for the long-term entitlement to receive allocations. A central share register would be established for each sub-catchment and shares would be mortgageable. As with land, share trades would be possible only with the consent of mortgagees. Using a separate registration system, regular allocations would be made in

proportion to shares held. The system used would be similar to that used by banks to track money in cheque accounts. New allocations would be credited as and when they become available. Water use would be debited in a similar way. Keeping transaction costs to a minimum, trades could be implemented by writing "cheques". Use would be debited when water is "ordered" and adjusted when meters are read. Some borrowing against expected future allocation would be permitted.

Facilitating trade

Taking the banking analogy a bit further, periodic allocations would be tradeable within a sub-catchment on a one for one basis. Allocation trades between sub-catchments would be managed via a series of exchange rates set to allow for evaporation, loss to groundwater, effects of the trade on environmental flows, etc. As with money, these exchange rates would vary periodically. As a general rule, the rate for downstream trades would be different to that operating for up-stream trades. Shares would be tradeable in a similar manner.

Environmental flows

At present, COAG statements made about the preferred position for allocations to the environment is unclear. Some statements indicate a preference for environmental shares, others indicate a preference for a separate process to ensure that environmental flows and quality are maintained. COAG's initial document was virtually silent on this issue and it is only recently that the Standing Committee on Land and Water Resources Management (SLWRMC 1996) has issued a document setting out the principles to be followed.

Generally, ecological economists prefer to work with other scientists from a range of disciplines and build models which link that knowledge together. Asked to develop recommendations about the most appropriate way to allocate rights to the environment, **a conventional environmental economist might conduct a contingent valuation or conjoint analysis. Like COAG, however, an ecological economist would argue that environmental water requirements should be determined on the best scientific information available** (ARMCANZ 1996).

Ecological economists also tend to deal with uncertainty in a manner that is quite different from environmental economists. In the face of scientific uncertainty, an ecological economist is likely to advocate a precautionary approach. In contrast, conventional environmental economics texts make virtually no mention of the precautionary principle.

Addressing the question of whether or not to allocate a fixed proportional share to the environment, an ecological economist might recommend a precautionary approach that grants the environment a prior right similar to that given to stock and domestic water users. This would make it possible to change allocations without having to acquire them from consumptive water users. In essence, the community undertakes to always meet environmental flow objectives and is never subject to the political failures common to budget processes. Given the expectation of widespread trade in water rights and the paucity of

knowledge about water ecosystems, links from groundwater to surface water systems etc, this approach is more dependable than a system that allocates a fixed share to the environment.[21] It ensures that sufficient water can always be allocated for maintenance of water riverine and wetland ecosystem functions, and biodiversity values associated with these systems.

In summary, the precautionary approach to the question of how to ensure adequate environmental allocations is to set up an institutional process to determine the guidelines necessary to determine how much water should be allocated to the environment at any point in time and then allocate the remainder for consumptive purposes in proportion to pre-defined rights. One consequence of this recommendation, and drawing on the banking model used earlier, is that a complex set of exchange rates will need to be set up for between catchment trades: 1,000 shares at Griffith may deliver a very different volume of water to 1,000 shares at Albury.

The management plan review

The COAG framework identifies the need for reviews to account for changes in climate, land-use practice, technology etc. An ecological economist, like an institutional economist would see the institutional mechanism for review as a critical part of any resource management strategy. **One of the principles that ecological economists have drawn from the ecological profession is the importance of building-in active adaptive management processes that recognize the presence of uncertainty, ignorance and indeterminacy (see Box 3). In contrast, much environmental economics is conducted in a manner that assumes that information about the environment is constant.** Active adaptive management processes seek to learn from experiments, like the trade of water from one catchment to another. Surprising outcomes are expected and, hence, initial trades should be conducted at a scale and in a precautionary way to minimize the chance of irreversible, adverse outcomes.

Box 3

Different kinds of knowledge

RISK - System behaviour is well known. Range of outcomes and probabilities associated with them can be predicted.

UNCERTAINTY - System parameters are known but don't know the odds.

IGNORANCE - Scientists will be surprised by the outcome. They don't know but in retrospect can usually explain it.

INDETERMINACY - Scientific knowledge is inadequate. Causal chains and networks are open and not understood.

Source: After Wynne (1992).

From a conventional economic viewpoint review is the question of how best to distribute risks of economic loss and gain. The framework proposed in this paper distributes

[21] An alternative approach is to give the environment a very large share so that in most years the "environment sector" sells water for consumptive use. To do this without compromising existing standards, all existing use rights would have to be reduced substantially in most catchments. Moreover, some trade between sub-catchments would need to be taxed so that passive environmental values, like the provision of a medium for fish to swim in could be maintained. This would be particularly important for up-stream trades.

all the benefits from improvements in consumptive opportunities to shareholders but gives the environment a prior right similar to that presently provided for stock and domestic purposes.

Essentially, the task of each management plan review would be to ask if and how water use rights and obligations should be changed. In order to achieve sustainability objectives, considerable change to permitted forms of water use may be necessary. As a means to reduce dryland salinity problems, for example, a review may propose that all irrigators in a groundwater recharge area must replace spray irrigation equipment with drip irrigation equipment.

From an operational perspective, attention needs to be given to the frequency of review and the processes by which that review is undertaken. Recognizing the benefits of collective decision making, an ecological economist is likely to recommend strong community and resource-user participation in this process. Drawing on fisheries co-management literature, I would recommend that the plan be revised by a committee comprising shareholders, community representatives, environmental representatives and government water-supply managers.[22] **Recommendations for institutional change are common among institutional economists but rarely part of conventional economic analysis - even though policy reforms like the introduction of tradeable water rights requires many institutional reforms.**

Another consideration is the frequency of management plan review and the effect of down-side risks that discourage investment. In Figure 1, a five-year review period is proposed[23] and shares are issued for a 10 year period with a guaranteed right of renewal. No matter how imminent the next state or Federal election and how courageous the Minister, this institutional mechanism forces regular review.

To minimize the downside risk problem, upon completion of the review and release of the new management plan, shareholders are given a choice between remaining under the rights and conditions that attach to the old plan or dropping through to the new one. If they choose to delay accepting the rights and obligations in the new plan, then they lose 15 percent[24] of their shares (see Figure 1). This choice bounds the down-side economic risk associated with changes embedded in a management plan. In practice, and faced by such a mechanism, no review committee is likely to force immediate transition to a new set of conditions if that mechanism requires considerable investment or diminishes economic opportunity. The mechanism is designed to force Review Committees to phase-in expensive changes to water rights and obligations. If a Review Committee perceives a need to force all people to move to drip irrigation, for example, this mechanism would give the Committee a strong incentive to give irrigators - at least - 5 years to comply with this requirement. In effect, the right system recommended is one that gives water users a fully tradeable right to use water resources perpetually in a sustainable manner. Elsewhere, I have called this a sustainability guarantee without penalty.

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[22] Arrangements for interaction among sub-catchments and catchment could be organised and managed according to similar principles.

[23] The five-year frequency of review is arbitrary and is a recommendation that would benefit from empirical modelling. My intuitive judgement is that the optimal period is somewhere between 5 and 7 years. The precautionary approach is to start with a short period and extend once experience has been obtained.

[24] Other penalties for failure to adopt a new management plan immediately are possible.

Economic uncertainty associated with the review process can be reduced further by rotating catchment reviews so that a few catchments are reviewed each year. This has the added advantage of increasing administrative experience in the review process and reducing monitoring and evaluation costs.

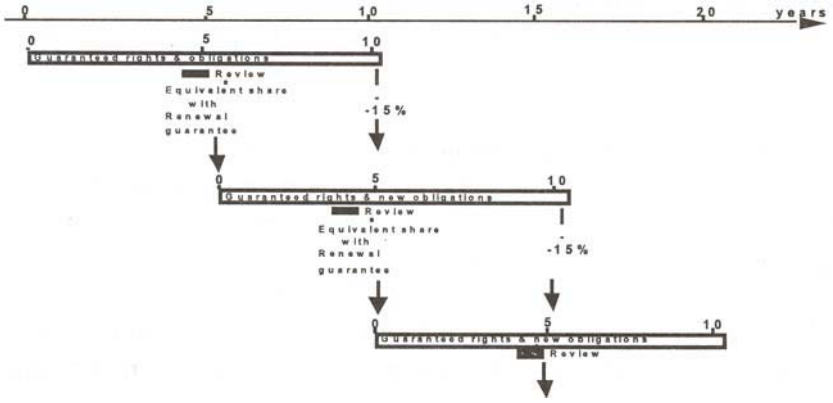

Figure 1 An adaptive share based tradeable rights system that uses periodic reviews to facilitate incorporation of new information while maintaining resource security (after Young 1996).

Stewardship

Stewardship refers to the intentions and behaviour of resource users with respect to maintaining the productivity and ecological characteristics of a resource or ecosystem. Essentially, it is a measure of the degree to which resource users prefer potential long-term benefits to short term, opportunistic gains. It pertains to the willingness of individuals to undertake activities that maintain long-term benefits even when the short term opportunity cost of doing this is high (Young and McCay 1995).

In conventional economic theory, which assumes markets reflect social aspirations for a resource, the simplest way to achieve perfect stewardship is to give resource users exclusive rights to use a resource as private property (Andersen and Leal 1991). "Resource security" as Australian industry likes to call it, increases the weight that self interested individuals give to the future relative to the present. **Most ecological economists would agree with this simple theoretical proposition that resource security encourages stewardship but then immediately seek to understand the exceptions to this rule and search for ways to over**

Considerable resource security is a necessary condition for sustainable resource use and investment but is not a guarantee that this objective will be obtained. As Colin Clark (1973) long ago showed, where the natural rate of productivity is less than the real discount rate, the optimal strategy is to slowly run down the resource. Unfettered privatization is not a sufficient condition to ensure stewardship in dynamic living systems. Kirby and Blyth (1987), in a

highly regarded Australian paper, make a similar point with regard to land degradation. **Conventional economists define soil as just another form of capital, which as it only renews itself slowly, should be eroded at an "optimal" rate. In contrast, ecological economists will argue to the maintenance of natural capital and the introduction of programs to ensure that across the board no net loss occurs** (Janssson 1994; Pearce and Turner 1990). Most consider it necessary to address such issues from an inter-generational equity view point and not just argue that some soil erosion must be good because this is "economically efficient."

Under present arrangements, water users rely on political processes to ensure that rights are renewed. Most licences give irrigators little guarantee that they will personally benefit from changes in management arrangements and that a Minister will not dilute the value of their licence by issuing additional ones. The framework outlined above introduces resource security by giving water users a perpetual share of the consumptive potential of a resource and membership of the Committee responsible for revising management plans. Consistent with conventional economics, entry and expansion is only possible through the acquisition of shares or allocations from an existing user.

Apart from increasing resource security, stewardship can be enhanced further by building institutional mechanisms that:

- keep the size of areas over which shares are allocated relatively small so that each shareholder's sense of ownership and control over the system is strong;
- make resource security conditional upon compliance with catchment management plans and, in particular, by making loss of shares the main penalty used to enforce compliance. (In practice this means that mortgagees must be informed of all breaches and have an interest in ensuring compliance); and
- increase the value of each share by making them mortgageable, by minimizing trading costs, and sharing information.

One of the more interesting issues being explored by ecological economists is the relationship between "sense of ownership" and stewardship. Amongst other things this is leading some of them to oppose the globalization of the world's economy and, at least for natural resources, recommend ownership restrictions. It is arguable that there is a nexus between proximity to a resource and interest in resource stewardship. Applied to water resources, this may mean that stewardship may be greater if ownership is restricted to catchment landholders and independent speculators are allowed to broker but not hold water shares. **A conventional economist might argue that these issues should be left to the Foreign Investment Review Board. An ecological economist would probably not deny a catchment committee the right to restrict share ownership to registered local land holders.** This could be achieved by allowing catchment committees who want to restrict ownership to local people to do so by including such a provision in a catchment management plan.

Equity Issues

Another issue that differentiates ecological economics from conventional economics is a much greater concern and interest in equity issues. **In particular, ecological economists are**

less inclined than conventional economists to assume either that the benefits from structural adjustment will trickle down or that it is most efficient to deal with equity issues via independent policy processes.

Ecological economists might be expected to argue that compensation must always be *paid.* They recognize that one of the major criticisms of tradeable property-right systems is that they appear to involve privatization of economic opportunities previously distributed throughout a community. From an equity position, it can be argued that at least some of the economic rent embodied in water rights should return to the community that created it (Young and McCay 1995; Young 1996).

In the case of water allocation, the issues that require careful consideration are:

- the interests of third parties like those who own businesses that supply irrigators; and
- the allocation of water to people who hold partly or totally unused licences (sleepers and dozers).

Mechanisms likely to be considered by an ecological economist would be based on ideas and propositions arising from the post-normal science doctrine. These are likely to include recommendations for:

- allocation of 80 percent of rights in proportion to the highest three of the last 5 years consumption; and allocation of the other 20 percent in proportion to official entitlement;
- a maximum limit on the ratio of shares to land owned in a sub-catchment;
- a "return to the community" achieved by the periodic surrender of part, say 2.5 percent, of each share holding to a tender pool with the revenue realized being returned to the local community; and
- hypothecation of revenue to a local council or catchment management committee.

An interesting feature of the 'return to the community' option mentioned above is that this mechanism is particularly effective in deepening shallow markets and breaking up monopoly positions. In the United States a variant of this mechanism - known as a zero-revenue auction - is used to deepen air pollution markets. Under this mechanism, every year, each right holder sets a reserve price for a proportion of their share holding and submits that portion to a tender pool. If the price realized is higher than the reserve, then a owner of the shares receives a cheque. It is called a zero-revenue auction because the process yields no money to the government (Young and McCay 1995). Both zero-revenue auctions and community return mechanisms have the additional advantage that they quickly establish a mature market where all people are accustomed to trading water rights on a regular basis.

Concluding comments

This paper is different to most because it uses the issue of water allocation as a backdrop to illustrate differences between propositions arising from conventional environmental economists and ecological economists. As I have defined ecological economics, the main differences that emerge are that ecological economics tends to take a much more trans-

disciplinary approach and uses a much wider set of evaluation criteria. Much of what is recommended by conventional economists is advocated by many other ecological economists. The qualifications, however, tend to be different and give much greater weight to the importance of encouraging the maintenance of environmental integrity and institutional processes.

Finally, I think it important to emphasize that I see merit in dialogue and debate about the assumptions and doctrines that surround conventional economics. In an ideal world there would just be economics. That economics would know no boundaries to analysis; would only make assumptions that respect the laws of nature; would see efficiency as one means to achieving superior social objectives such as the benefits of living in a society that emphasizes happiness and security through time, values, unexploited options, and which, does not push everything to the limit. I urge conventional economists to think openly about the advantages of trans-disciplinary approaches that recognize that virtually all economic activity depends upon the maintenance of ecosystems processes.

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TRANSFERABILITY OF WATER USE RIGHTS AND THE CASE OF TRANSITIONAL LEGISLATION IN CHILE*

by
Gustavo Manriquez Lobos

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CHAPTER I - HISTORICAL BACKGROUND

1.1 Prehistoric customs and rules

Although Chile is officially classified as a semi-arid country, with an annual average rainfall of 450mm limited to only four months of the year between May and August, it is actually a desertic or arid country, in which the people have had to survive on very scarce water resources since they made their first appearance in the territory.

It was this lack of water that made it necessary to establish a proper water management system, without which social peace would have been impossible. Water-use and water management rules and regulations therefore existed in Chile even before its history as a country began.

When the Spanish *conquistadores* arrived there they found a system of alternating or revolving water-use already in existence, known in the aboriginal language as "mita".

This system, with which all the aboriginal farmers complied to the letter, was later taken back by the Spanish to the Iberian Peninsula for implementation there.

They also discovered that the indigenous peasants followed the practice of collecting water in small ponds, known as "cochas", which in the Quechua language of these original inhabitants meant lagoon, and all the water from the cocha, known as "cochada", was delivered to a given cropland entitled to use the water on a rotating basis.

Under this system, which is still used today in small areas in the north of the country, efficient use was made of the little runoff water that exists there instead of being completely lost by seepage and evaporation before reaching the irrigated lands.

In addition to being efficient water-use systems, they were regarded as binding , because they could only be enforced to the extent that they were accepted and applied by the whole community.

1.2 The colonial period

Throughout this phase in Chile's history, running from 1541 to 1818, the colonial power imposed its own legislation, namely Spanish legislation in force in mainland Spain and other legal rules enacted specifically for enforcement in America, known at that time as The Indies.

These latter laws were found in the *Recopilacion de Leyes de Indias* (the Code of The Indies) which took precedence for enforcement in the American colonies.

No provisions existed for the sale of water rights in any of this legislation, but from historical documents we know that farms were bought and sold, including their water-use rights.

However, as we shall be seeing shortly, at the beginning of the Republic a law was enacted governing the sale of water-use rights, which only set the selling price, suggesting that the transfer of water rights had become a legally recognized transaction by that time.

From the point of view of the legal nature or status of water it should be recalled that in the Spanish legislation of the day, all water was the property of the Crown, or, in modern legal parlance, it was considered to be a public asset.

Rights to water use were granted by the Governors, and recorded in the municipal records. Originally, licences were granted for two categories of water use: urban licences for domestic uses or for society as a whole, and rural licences, for farm irrigation purposes.

This was the system as it stood when the country gained independence and the Republic was established.

CHAPTER II - THE REPUBLIC

Part One - The Pre-Codification Period

2.1 The 1819 Act

The country finally acquired independence in 1818, and the following year, 1819, a law was enacted on the assessment, distribution, delivery and development of water.

This was done by the Senate on 18 November 1819, by specific reference to three issues:

(a) the establishment of a 'water unit' (known as a *Aregador*) as the standard unit measurement of water applied to every river in the country, and the standard unit size of water extraction systems, applicable throughout the country;

(b) the selling price of each 'water unit', which was set at 750 pesos;

(c) it created a statutory easement of aqueduct for water conveyancing purposes, without compensation for the landowner.

We may conclude from the notions underlying this Law and the earlier Spanish legal system, that Chile's legal tradition has made provision for the possibility to sell water use rights throughout its history, and that this forms part of Chile's water users' mentality, particularly among the farming community.

2.2 The Civil Code

The Civil Code was enacted into law in 1865 and came into force on 1 January 1867, revealing in particular the strong influence of French legislation, particularly the French Civil Code or the Napoleonic Code. Through this instrument, Roman law was thoroughly applied; and still is to this day.

2.2.1 The Civil Code system governing water

Under article 595 of the Civil Code, which has since been repealed, the water in rivers and any other natural watercourses was a national asset for public use, or public property, that is to say, held in public ownership or domain.

Article 598 stated that private individuals could be granted 'use and enjoyment rights' over public water for irrigation, navigation and other purposes, subject to the provisions of the Code and any other orders and regulations on the same subject matter to be laid down in future.

Examining these articles separately and independently of the rest of the provisions of that Code, one can infer from the wording that water was a non-marketable commodity, since public property cannot be sold under Chilean law and if any item of public property were to be sold by mistake or in bad faith the transaction would be absolutely null and *void.*

However, as we shall be seeing, this is not necessarily the case because the Civil Code contained a contradiction, in that while water was declared to be public property, the private ownership of water was also recognized in certain instances.

2.2.2 The riparian system

Article 834 of Chile's 1865 Civil Code laid down the general legal framework for water use including the "riparian system" under which all riparian landowners were guaranteed the right to use the water taken from any natural watercourses running through or bordering on their farms.

2.2.3 Private water

Article 595 of the Civil Code, analyzed earlier, stated that even though water was generally considered to be in the public domain, private water could also exist. This included water in lakes and small lagoons, as well as water in mountain streams and small natural waterways originating in, running through and remaining within the same property.

In these cases, the law gave the landowner private ownership rights over the water.

Article 837 of the Civil Code established that "water running through an artificial watercourse built at someone else's expense belongs solely to the party which built the waterway with all the statutory authority to do so".

Recognizing the private ownership of water, this provision produced a legal effect which in Chilean administrative law is known as the *desafectacion* of an item of public property, meaning the transfer of such item from the public domain into private ownership, which always requires official authorization. By so doing, the Civil Code gave all water in use the status of private property, at least so long as those provisions remained in force.

2.2.4 Conclusions regarding the Civil Code system

As we have seen, the private use of water according to the Chilean Civil Code is normally granted under the "riparian system" under a general provision of the law, based solely on the physical location of the farms. However it does leave open the possibility for the authorities to grant concessions for the private use of public property.

On the subject of water ownership, the general statement that water is public property only applied so long as the water remained in or ran through natural watercourses, because in addition to declaring a number of cases with special geographical situations to be private water, the general statement that water running through private channels was the property of the channel-owners meant that any water extracted from these watercourses was private.

The basic principles underlying this water legislation were:

- So long as the water remained in natural watercourses it was public property.
- The "riparian system" was the way of obtaining the private use of public water.
- Once extracted and routed into a channel or artificial waterway, public water became private water.
- Groundwater was private, and belonged to the owner of the land above it.
- The Civil Code also provided the possibility of obtaining the grant of water-use rights under concession from the authorities.

It should be noted that during the period in which the Civil Code provisions governing water were in force, the country had a very small population of less than four million, and food and labour requirements were therefore really very small.

Part Two - The Codification Period

2.3 The 1951 Water Code

During the 19th century, after the enactment of the Civil Code, Chile suffered from a series of severe droughts and natural disasters for which amendments had to be made to the legislation which was no longer adequate to deal with the problems to which these events had given rise. New regulations and ordinances had to be issued to deal with the newly-arisen situations, and principles were developed that still apply to this day because they were subsequently incorporated in national legislation.

In the first half of the 20th century various unsuccessful attempts were made to change the legal system governing water, and after a few years during which they were neither accepted nor enforced, they were eventually repealed.

Chile's legislators then studied and prepared a new comprehensive water Act, which was over 20 years in the making, which was to be called the Water Code, becoming effective in 1951.

2.3.1 The new general system

This Water Code was enacted almost 100 years after the Civil Code, but contained no major innovations to the current legal system apart from abolishing the "riparian system" as a statutory source of original water-use rights, replaced by the system of government concessions.

2.3.2 Water ownership

The new Code maintains the general principle that water is a national asset for public use, but in some cases it retains recognition of the legal status of water as private property.

Even though the Water Code make no express provision for water running through private watercourses or channels to belong to the owners of such facilities, as the earlier Civil Code had done, it defined water rights in practically the same terms as the Civil Code used to define *"dominio"* or "ownership", which are identical concepts in Chilean law.[25]

It stated, in effect, that the right of water-use granted the right-holder title to use, enjoy and dispose of the water exactly as if he were the owner, with the sole proviso that the authorities could terminate this right or forfeit it as a penalty for certain statutory offences.

In practical terms, the water-use right was a right of ownership (*dominio*) of the water, because no provision was ever subsequently made for that right to be forfeited.

With regard to the transfer of water-use rights, article 21(2) of the same Code stated that "the purchase of water-use rights includes the acquisition of a proportional share of its channel, save where otherwise expressly agreed". This means that the 1951 Water Code expressly accepted that water-use rights could lawfully be transferred.

This legislation recognized water from mountain streams or small natural watercourses originating in, running through and terminating in one and the same estate, as well as water in lakes or small lagoons as private water, together with groundwater which is the property of the land-owner.

Consequently riparian owners, in the case of surface water, and landowners, in the case of ground water, became the statutory owners of their respective water.

2.3.3 Constitutional guarantees

The 1951 Water Code was in force under the 1925 Chilean Constitution which provided powerful guarantees for private property.

For example, Article 10(10) of the 1925 Constitution provided that all the inhabitants of the Republic were guaranteed "the inviolability of all private property, without any distinction whatsoever".

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[25] The Civil Code article 582. *Dominio* (which is also called ownership) is the real right over a tangible thing, which may be enjoyed and disposed of at the owner's discretion, provided that it is not unlawful or that is does not infringe on third party rights.

> "No one may be deprived of his or her property, or part of it, or rights over it except by the courts of law or by expropriation on the grounds of public utility, so declared by Statute. In this latter case, the proprietor shall be indemnified in advance, in the amount eventually established by the courts of law."
>
> "The right to private property is subject to the constraints or rules required by the maintenance and progress of the social order. In this regard, the law may impose obligations and servitudes in the general interest of the State and public health and hygiene".

This constitutional provision clearly shows that water-use rights, which were held as items of private property, had a solid and safe legal basis, since any change to those rights was subject to this constitutional provision.

2.4 The Alliance for Progress and its influence on Chilean legislation

During the Sixties, John F. Kennedy, the President of the United States of America, under a special programme for Latin America called Alliance for Progress, fostered a large number of improvements in Latin American society known as structural changes' in those days, relating in particular to working conditions, trade, education and agriculture.

Under the measures for agriculture, Latin America's farmers were the target of particular attention.

Agriculture thus became one of the most important components of this programme, and agricultural land tenure, with all its unfairness and lack of equity, was one of the central objectives of the efforts deployed by the governments of both the United States and the countries of Latin America, to redress the shortcomings.

In Chile, the Alliance for Progress focused its efforts on this particular objective -agricultural land tenure - in order to have special legislation enacted to change the old agricultural structures characterized by the existence of huge, partially exploited estates, accounting for 80 percent of the total arable land in the country, and the smallholdings owned by 80 percent of the peasant population accounting for 15 percent of the total arable land area.

The law was supposed to make it possible to expropriate agricultural lands that were not being properly exploited, subject to certain conditions, for redistribution among the poor farmers who were normally farm labourers, sharecroppers, and smallholders.

The political and social slogan accompanying the preparatory work and subsequent implementation of the Act was "The land to those who work it".

However, land was not the only subject of debate accompanying the gestation of this Law, because a substantial part of the debate concerned changes to the legal system governing water. And when the Agrarian Reform Act was eventually passed, it comprised 336 sections of which 85 were devoted to modifying the existing legislation on water.

In order to achieve the purposes of the Act, the Constitution had first to be amended, in order to enable the government to carry the plans through, for the Constitution was highly protective of pre-existing property rights which it was impossible to change.

What is interesting about the statutory amendments under review is that as far as water was concerned, they proposed a number of legal instruments designed to achieve several objectives simultaneously.

Firstly, it was planned to move away from a statutory system in which private water and public water coexisted towards a system which accepted only publicly-owned water, with only one type of water rights.

Secondly, vested rights were not to be infringed on, in order to avoid having to pay out compensation in the event of expropriation.

Thirdly, standardizing the legal status of water was coupled with a change in the legal nature of water rights, considerably reducing the powers of the right-holders over water.

Lastly, all these amendments had to be introduced within the framework of the current legal system and in accordance with the rule of law, without interfering with the legal system as a whole or infringing on the Constitution.

As we shall be seeing shortly, the legal objectives were achieved, but in our opinion the legislation failed to attain the economic and social objectives originally set for this process. However, a long time afterwards, for other political and economic reasons, all these reforms eventually produced very positive results.

2.5 The 1967 Water Code amended by Act No. 16,640

The 1951 Water Code was substantially amended by Act No. 16,640 which may be considered a completely new Code altogether, totally different from the one it replaced.

As far as the subject-matter of this paper is concerned, namely, the transitional regime and the granting and marketability of water-use rights, we must make it clear that the new statutory system is based on the paramount authority of the government in these matters, effectively pre-empting the decisionmaking authority individuals used to enjoy.

2.5.1 The transitional regime

As stated above, and as we shall be seeing in greater detail below, the 1967 Act was certainly wisely'thought out to the extent that it created a transitional regime making it possible to transform private water into public water, followed by the replacement of the civil real right of water-use by an administrative right, abolishing existing guarantees, such as mortgages, over the right of water-use, and then all the other radical changes needed to bring water wholly under the management of the State, without infringing on the Constitution, and without giving rise to compensation claims against the State on grounds of taking or on other grounds

2.5.2 The allocation and re-allocation of water

A centralized system of the kind created in 1967 could not permit private individuals to take decisions regarding water, except over the way it was actually used.

It therefore stated quite categorically that the power of original grant of water-use rights was vested in the State and that even the use of the water remained subject to severe restrictions. Failure to comply with virtually any of them could lead to the forfeiture - that is to say, the loss - of those rights.

The law went so far as to state that the only case in which the sale of farmland with all the water rights did not require government authorization was when the transaction stipulated that the right to inherit the land was vested in a single universal heir.

To break up an estate, authorization was required to divide the water rights, leading to the grant of a new right that involved endless bureaucratic red tape, and in practice caused the law to be ignored.

The transfer of water-use rights with or without valuable consideration was absolutely prohibited, leaving the government empowered to reallocate water rights.

For this purpose a "rational and beneficial water-use rate" was introduced, to be set for each river basin for each use, and in the case of agriculture, for each crop. All new water-use rights were granted subject to this rate.

In addition to introducing the rate, the "water-use rationalization area" was also created, enabling the administrative authorities to terminate all existing water rights in a particular area, which could be a river basin , by Executive Decree, and redistribute the rights in accordance with the "rational and beneficial water-use rate".

As can easily be imagined, this system made water-use rights extremely precarious.

2.5.3 The marketability of water-use rights

As we have seen and repeatedly stated, it was absolutely prohibited to tranfer water-use rights. This prohibition was so strict that in a list of offences against water legislation for which the penalty was the forfeiture of the rights, namely the loss of water-use rights, the authorities were placed under a statutory obligation to cause the water-use rights to be forfeited in the event that they had been transferred.

2.6 The 1981 Water Code

In Chile, since 1964 various governments of different political ideological backgrounds came to power: centrist governments like the one headed by Eduardo Frei Montalva, the father of the present President of Chile, the left-wing government of Salvador Allende, and subsequently right-wing ideological governments under the military rule of Augusto Pinochet, between 1973 and 1990.

Matching these political changes were the economic ideas according to the prevailing ideology of the day, and this constant change in economic philosophy required corresponding changes to be made to legislation to reflect them. It would therefore be useful, at this point, to briefly examine the political and economic ideas underlying the 1981 Water Code, which is still in force today.

2.6.1 The political-economic context of the 1981 Code

At the end of the 1970s, the military government began to apply free-market economy ideas, particularly those of the so-called "Chicago School", which led to a far-reaching transformation of Chilean society, which was not exempt from serious social upheavals.

These free-market ideas began to be applied to every area of Chile's social life, including water and water administration.

However, partly due to the country's general sensitivity to the water issue in view of the acute shortage of water in Chile, the changeover from the system established in 1967 to a new free-market system was neither painless nor easy, despite the fact that it was carried out under a dictatorship with no parliamentary scrutiny.

Different stances obviously existed even within the government itself, making it possible to moderate the changes that certain leaders, particularly farmers, wanted. There were naturally some who wanted water to be made private property as a general principle, but after debate and even arbitration, this idea was discarded.

2.6.2 The principles underlying the 1981 Water Code

Following a four-year process, the Water Code was eventually issued in 1981, based on a number of basic principles which are examined below.

2.6.2.1 Water is a national asset for public use, in all its forms and wherever it is found.

2.6.2.2 Private individuals may obtain an exclusive right to use water upon request from the government. This water right is granted in the form of a water-use right, which authorizes the use and enjoyment of the water.

2.6.2.3 The right to use water is vested in the right-holder, who may use, enjoy and freely dispose of it.

2.6.2.4 The water authority must encourage the regularization and registration of current usage rights which have not been formalized, for which the law provides a number of fairly simple procedures.

2.6.2.5 The water administration is left in the hands of the users themselves through the organizations established by law, and the government must encourage the establishment of these organizations, *inter alia* through programmes financed by the government (Today, 15 years after the law was enacted, about 60,000 water rights have been officially regularized).

2.6.2.6 Any conflicts and disputes that arise with regard to water must firstly be submitted to the users' organizations for arbitration. If no agreement is reached, the matter is placed before the Courts of law.

2.6.2.7 The original allocation of water-use rights is effected by regulated, published, procedures giving the possibility to any third parties to apply for the rights over the same water resources; in the event that the applications exceed water availability, the requested rights may be put up to auction or tender so that they can be allocated on the basis of economic considerations and not by an arbitrary decision taken by the government.

2.6.2.8 The reallocation of the water resources is left to the market, namely, the unfettered buying and selling of water-use rights. (It should be noted that after 15 years of operating this system, only about 2 percent of the water-use rights have actually been sold separately from the use for which they were intended. Furthermore, according to recent surveys, the users have indicated that if they could improve their efficiency and increase available water, they would not sell it but would prefer to extend their land under cultivation).

2.6.2.9 Water-use rights also confer the right to statutory easements, but compensation is always payable to the adversely affected party.

2.6.3 The resilience of the 1981 Water Code

The 1981 Water Code was accepted with several reservations by the democratic governments that followed the military regime, and only a few amendments have actually been tabled before the Congress in a draft Bill currently under debate.

These amendments do not affect the substance of the system, and their only purpose is to correct certain shortcomings and flaws in the present system, such as the possibility to hoard water rights without actually exercising them, in order to financially exploit the unavailability of water.

The principles mentioned in the previous section remain unchanged, and only a few new ideas have been added to them such as integrated river basin management, the establishment of ecological minimum flow requirements, and the perfecting of water-users' organizations.

CHAPTER III - A TRANSITIONAL MODEL IN THE CHILEAN SYSTEM

3.1 The legal changes of 1967 and manner of implementation

As previously explained, in 1967 there occurred the most drastic changes in Chile's water legislation.

When it was decided to change the legal status of water there were many powerful restrictions on changing the features of a right, and on the expropriating rights of private individuals, for the main reason that until December 1966 the Chilean Constitution recognized and vigorously protected private property rights.

We have seen in the historical overview that at the time the Agrarian Reform Act was passed, private water existed, and that the system of water rights was similar to that of ownership as defined in the Civil Code.

The major problem to be solved was therefore how to move from one type of legislation to another which was radically different, which changed the nature of the rights to be granted, without causing constitutional problems or having to pay excessive compensation.

Two legal approaches were used: constitutional reform, and amendment to the water legislation.

3.2 The 1967 constitutional reform

3.2.1 The previous situation

Chile's Constitution, which had been drawn up in 1925 and was still fully effective in 1967, provided a very powerful guarantee to private property rights and as we have already seen, Article 10(10) guaranteed "the inviolability of all property without distinction".

The taking of private property was only permitted in two instances, the first of which was by court judgement, and the second was by expropriation, which required the courts to rule that it was in the interest of the public and subject to prior payment of compensation.

The requirements of the Constitution would have made it impossible to implement the Agrarian Reform Act because the Chilean government did not have sufficient resources to pay compensation in advance, in cash, to all those affected by expropriation orders.

On the other hand, the advocates of agrarian reform felt that there was no justification to pay landowners in cash and in advance when they had never farmed their lands, and believed that these expropriated individuals did not possess the moral or ethical rights to demand full and immediate payment.

At that time, Chile's government favoured agrarian reform, and the majority in the Congress supported reforming the Constitution, with the result that the government set about changing the constitutional private property guarantees.

3.2.2 New constitutional rules governing property

Under Law No. 16,615 of 20 January 1967, article 10(10) of Chile's Constitution was reformed on the basis of the following parameters.

The amendments diluted the right to private property, as evidenced from the wording of the constitutional guarantee which no longer referred to the "inviolability" of property in the broad sense of the term, but to the "right to property in its various forms".

From now on, the scope of and the restrictions on private property and its social function was to be determined by Statute. It was also left to Statute law to give the State

exclusive ownership of natural resources, production assets and any other goods declared to be of importance to the country's economic, social or cultural life.

The law only mentions expropriation as the means of depriving anyone of ownership or property rights, and provides that this can only be carried out "for reasons of public utility or in the social interest", which must be qualified in a special or general Statute.

The Constitution enshrines the right to compensation in the event of expropriation, but this requirement need not be complied with prior to taking possession of the expropriated asset.

The new Article 10 of the Constitution deferred to a statute for the laying down of the rules to calculate the amount of compensation payable and to decide when physical possession of the expropriated asset could take place.

In the matter of agricultural estates, the Constitution provided that the amount of compensation was the current value used as the basis for calculating the land tax, which was and still is much lower than the real value of land. It expressly declared that part of the indemnity could be paid in cash, with the balance payable within a period of anything up to thirty years.

The reformed Constitution also expressly stated that "by Statute, all the water in the national territory may be set aside in the public domain for public use, and privately-owned water may also, by Statute, be expropriated and brought within the public domain. In the latter case, the proprietors of the expropriated water shall continue to' use the water as holders of water-use rights under concession, and shall only have title to compensation if, as a result of the total or partial extinction of their water-use rights, they are effectively deprived of access to sufficient water to meet the needs they were wont to meet through the rational and beneficial use of the same water, before losing the water-use rights".

These constitutional provisions put an end to the earlier legal system governing water, under which publicly-owned and privately-owned water existed side by side. From now on, all water was considered to be a public asset.

Underlying this constitutional provision was the scientific concept of the water cycle, which implies that water is always one and the same and passes through a sequence of phases

According to this scientific concept, if water is the same there can be no legal justification for treating it differently merely on the grounds of its geographical location, and one and the same legal regime should apply to all waters, without exception.

The reform of the Constitution paved the way for the modification of the previous legal system, but it did not trigger off any immediate conflict in terms of pre-existing rights because such conflicts could only arise when the constitutional precepts were implemented, namely, when Chile's water legislation was reformed.

3.3 The Agrarian Reform Act and the Water Code

After the reform of the Constitution in January 1967, the Agrarian Reform Bill was tabled before Congress and approved as Act No. 16,640 on 28 July 1967.

This Statute not only dealt with the issue of land tenure but also with the legal regime of water, radically changing its legal bases.

We have already seen that the basic principles of the 1951 Water Code rested on the public ownership of water and of natural watercourses, on the acceptance of the private ownership of groundwater and of certain types of surface water through a water-use right which was tantamount to actual ownership, giving the right-holder total freedom to transfer his water rights.

The Agrarian Reform Act introduced radically different concepts of water and water-use rights, and changed the legal regime governing the original allocation of water and its subsequent reallocation.

3.3.1 The new legal principles governing water

Generally speaking, according to the new provisions that were then laid down, the legal situation was henceforth to be as follows:

3.3.1.1 All water in the national territory was transferred to the public domain, wherever it was available, and to whomsoever it belonged, without any exception.

3.3.1.2 The right to use water was henceforth to become an administrative right, which was weaker than a right of ownership (*dominio*), with a large number of grounds on which a concession could be terminated by the government, in most cases without compensation.

3.3.1.3 The holder of a water-use right concesssion could only use the water. Furthermore, the right had to be exercised strictly in accordance with the stringent rules set out in the Water Code, and any breach entailed forfeiture of the right, without compensation.

3.3.1.4 The right could only be obtained, without prejudice to the recognition of vested rights, under a concession issued by the water authority, i.e., the General Water Directorate.

3.3.1.5 The reallocation of water remained wholly under the responsibility of the government, through the General Water Directorate as the only body empowered to authorize changes in water-use holders' rights.

3.3.1.6 The transfer of water-use rights was prohibited, and any unauthorized transfer entailed forfeiture of the rights.

3.3.2 The underpinnings of the 1967 water legislation

All these new legal rules governing water set out in the Agrarian Reform Act were clearly technical in nature, and were obviously influenced by economists, agronomists and engineers who had studied and familiarized themselves with experiences abroad.

In his address to the National Congress when tabling the Bill for enactment, in which he summed up the purposes and principles of the new Law, the President of the Republic declared that this was based on the water legislation enacted in Israel in 1959, in West Germany in 1957, in the United Kingdom in 1963 and in Austria in 1959.

3.4 The amended Water Code

Perhaps the best way of showing how the new constitutional provisions were implemented in relation to water is by referring explicitly to the articles in the Water Code, explaining the implications of the reform.

> "Article 10. For the sole purpose of incorporating it into the public domain, all water in private ownership on the date of entry into force of Law No. 16,640 is hereby declared to be of public utility and is hereby expropriated.
>
> The owners of expropriated water shall retain the right to use that water as water-use right-holders in accordance with the provisions of this Code, without requiring a specific grant of rights.
>
> Any indemnities due shall be governed by the provisions of Article 32 of this Code".

3.4.1 Explanations of the 1967 Amendment

Chilean law, which is based on Roman law, recognizes that virtually everything that exists in the country, whether tangible or intangible (rights) may be owned, either in the public domain or by private persons.

Under the previous legislation, namely the unmodified 1951 Water Code, water could be public or private depending upon the circumstances of its geographic situation. Under the new legislation, however, water was brought fully into the public domain without creating any constitutional or legal problems, and as far as possible avoiding the need to pay compensation or damages for expropriation.

This was achieved in four different ways through the Act:

Firstly, by declaring private water to be public property and expropriating it.

Secondly, by immediately recognizing the right of the former owners of private water to continue using that water, under the same conditions as in the past, but this time with a right defined by the new Act which only recognized the right to use the water.

hirdly, by introducing a new type of water right, not a real right similar to the right of ownership (*dominio*) but an administrative right, granted in the form of a concession, and therefore subject to conditions for its termination, revocation and lapse.

Fourthly, by limiting the right of use to water-use alone, abolishing all rights in respect of the enjoyment and freedom to dispose of water.

It should be borne in mind that the change in the characteristics of the right of water-use, without being tantamount to expropriation, was made in accordance with the provisions of an earlier law governing the retroactive effects of Statute law, drawing a distinction between acquired rights/vested interests and mere expectations.

Section 12 of that earlier law, which was enacted in 1861, and which is still in effect today, provides that "all real rights acquired under a Statute and in accordance with that Statute will continue to exist under a new Statute; but as far as the enjoyment of that right, the obligations under it and matters relating to its extinction are concerned, the provisions of the new Statute shall prevail".

Under the 1861 Statute - the Retroactive Effect of Legislation Act - enjoyment and obligations, and the manner of extinguishing a real right, do not count as "acquired rights" or "vested interests" but "mere expectations", and are therefore susceptible to modification without the need for expropriation and compensation.

In this regard, it is useful to bear in mind that following the Roman law tradition, Chile's Courts are obliged by the Constitution to settle all disputes submitted to them for a ruling by applying the literal wording of the legislation, and may not create law by way of interpretation. The interpretation of laws is subject to very strict rules, which demand compliance with the literal wording of the law, and only in highly exceptional cases - and then only where there are no major practical implications - can a liberal interpretation be sustained.

3.4.2 The issue of compensation for damages

Chilean law, following French practice, usually draws a distinction between different types of loss or damage to the property of an individual caused by unjust or unlawful acts or events in order to decide whether or not the alleged offending party is required to pay compensation.

Firstly, there is direct and indirect loss and damage. Direct loss or damage is caused immediately by the act or deed itself. Indirect loss or damage is caused by an act or deed which is only the remote cause underlying the prejudicial effects at issue.

In Chile's legislation, only direct loss or damage triggers compensation, because liability can only subsist for indirect loss or damage where an express covenant or agreement exists between the parties.

Furthermore, damages for direct loss or damage may be classified either as *damnum emergens*, and are sought to make good the actual loss occasioned to the aggrieved party, or as *lucrum cessans*, which make good the loss of earnings or compensate for the cessation of earnings as a consequence of the loss.

The Courts usually consider direct loss or damage as giving rise to payment of compensation, including both *damnum emergens* and *lucrum cessans.*

3.4.3 Limitations on compensation for damages in the new legislation

Under general legislation, the State would have been liable to payment of compensation for the expropriation of private water, and even for the transformation of water-use rights from real rights into administrative rights. Law No. 16,640 therefore amended the Water Code in order to obviate this juridical effect.

The amendment required the addition of a new article, Article 32, which is cited in Article 10 transcribed above, as being applicable to cases of expropriation.

Article 32 states as follows:

> "the holder of a right of use that has been wholly or partially extinguished under Article 28 shall be entitled to compensation in respect of the *damnum emergens"*.

Furthermore, in the case of water to be used for irrigation purposes, this same article added

> "in the case of irrigation water, compensation shall only be due in respect of the loss or damage occasioned by the reduced value of the farm as a result of the allocation to the right-holder of a smaller annual maximum volume of water than the right-holder would have received based on rational and beneficial usage criteria in relation to the number of hectares under irrigation prior to the total or partial extinction of the right of use".

These provisions established the limitation that compensation for transforming private water into publicly-owned water could only be claimed in respect of *damnum emergens* (consequential damage). In the case of water, this meant that the quantity of water delivered to the damaged party would have to be less than the quantity required to be able to continue farming in the same way as before.

However compensation, in this case, would not be due because, with the transformation of water from private to public ownership, the affected parties were simultaneously vested with the administrative right under the law to use the same water. This made it impossible for the loss or damage discussed here to occur as there would be no reduction in the quantity of water available under the new rights.

In addition, article 34 of the Water Code confirmed the system underlying the amendment to the Constitution and added that compensation could be paid in instalments.

In order to make this system foul-proof, article 32 of the Water Code required an initial appraisal to be made by the General Water Directorate, as the administrative authority responsible for carrying out the expropriation or termination of the right.

3.5 Practical effects of the system

While this Statute remained in force, namely from July 1967 to 29 October 1981, and even after that date, not once has compensation been claimed in or out of the courts of law, for

having changed the legal status of waters from private to public, and for the changes introduced in the existing water-use rights.

CHAPTER IV - ALLOCATION AND REALLOCATION OF WATER RIGHTS

4.1 The general issue

The legal status of water and water-use has to do with the very future of the human race on this earth, its growth in terms of the population, and its social and economic development.

Prior appropriation and riparianism were the first legal doctrines developed in the juridical field to establish legal ways of justifying the originally exclusive private use of water, since water was quite plentiful at that time and adequate to meet society's needs.

So long as water is in plentiful supply to meet needs, there is no need for major restrictions to be imposed on the transferability of statutory rights or rights granted by the authorities, leaving right-holders free to transfer their water.

But as the population grows, the cities expand and economic development begins to gain pace, pressure on water increases at the same rate and the systems for the original allocation of water based upon natural facts or the mere will of man are no longer suitable for the original allocation of the resource.

Practically all of today's legal systems have ended up giving central government the responsibility for the original allocation of water, while establishing priorities of water use which limit the discretionary authority of the government.

4.2 The Chilean system, a different model

Chile's water legislation was completely overhauled in 1981 when a new Water Code was issued, creating a new legal system for the original allocation and for the reallocation of water rights. This took account of the acknowledged scarcity of the resource, the need to avoid arbitrary decisions by the allocating authority, and recognition of the fact that water is both a resource and a commodity with an economic value.

4.2.1 The original allocation of water

Based upon these concepts, a framework for establishing original water-use rights was drawn up based on economic concepts, with the ultimate aim of using a scarce resource like water in a manner that offers the maximum return on it, and ultimately the maximum profitability to the country.

For surface water, the Code provided that anyone requesting a water-use right was required to do so in respect of available water resources following a procedure in which publicity was essential to ensure that the largest number of interested parties are informed about these applications.

By a fairly short deadline of a mere thirty days, anyone interested in the same water can submit an application which is then published, declaring their interest and requesting the right to receive a smaller quantity, the same quantity or a larger quantity, depending upon their needs.

One or more interested parties may make the same application, and once the deadline period has passed, the granting authority is required to examine the availability of water and the applications in order to decide whether or not the applications can be met out of the water resources available.

If it is possible, the rights requested are granted.

If there is not sufficient water to meet all the requests, an invitation to competitive bidding is then advertised, and the highest bidder is granted the water-use rights.

There is an economic rationale behind this system because it presupposes that the bidder with the best project, which will obtain the highest rate of return on the use of the water, will offer the highest price, which means that greater investment will be made in terms of present value to obtain the expected profits.

When no other parties are bidding for the same water, the right of use is issued, free of charge, to the applicant, because in this case it is supposed that the requested resource has a cost or value to society equal to zero, demonstrated by the lack of interest in it.

In the case of groundwater, competitive auction is not applicable. However, sinking a well to extract groundwater is extremely expensive in Chile, suggesting that anyone applying for the water use right has a profitable investment project ensuring that the use of this scarce resource will be the most adequate in economic terms.

However, this system is not absolute because it leaves open the possibility for the President of the Republic, acting on public interest grounds and as the supreme authority in the country, to directly allocate the resource to an interested party, even if there are several other applicants for the same water. No appeal lies against the President's decision.

4.2.1.1 *The results of the implementation of the system*

Since 1981, this legal/economic model has been applied with some positive and some negative results, making it necessary at this point to provide a few other explanations regarding the Chilean system.

In the Eighties it had become clear that economic and social development could only come about as a result of investment, for which the State did not have sufficient capacity alone, thus making it necessary to create an attractive legal and economic environment for private investors to choose Chile as the most suitable place in which to invest.

A number of economic, legal and social reforms were therefore carried out, creating the free-market-oriented Chilean model with little government intervention in the economy, while providing security and guarantees for potential investors.

One of the aspects that were innovated related to water management, for which most of the responsibility - following a very ancient Chilean tradition - was vested in the users themselves. Accordingly, a complex and tight system of rights was created under which once the State and its agencies had granted a water-use right they had no powers to introduce any major changes to water use, and any disputes that arose had to be settled by the courts.

With regard to the allocation of water-use rights, as we have seen, major innovations were introduced into the existing systems and the results vary according to the nature of the rights which are granted.

To begin with, it is essential to bear in mind that the Chilean system recognizes consumptive rights and non-consumptive rights, both of which may co-exist on water coming from the same natural watercourse.

4.2.1.2 *Consumptive rights*

As far as consumptive rights were concerned, namely, rights which permit the right-holder to use the water without any obligation to restore the water used, when the legal system was reformed in 1981, rights had already been established over most of the water in the country, or they were *de facto* being exploited without any formal authority

This means that it is very difficult to find any water available for new and original consumptive rights.

There have been very few cases in which a procedure for the issue of a concession reaches the point of a public auction, and these cases - only three in all - have all ended with a decision adopted by the President of the Republic granting the water-use right for major socially important uses, such as drinking water and for the ecological preservation of natural water courses.

4.2.1.3 *Non-consumptive rights*

The effects have differed from the case of consumptive rights, because once the 1981 Act had been adopted there were many applications for non-consumptive water-use rights, which entail the obligation to return the water used in the same quantities, of the same quality, substance, fitness for use and all the other features. In other words, it is a right which only permits the applicant to use the water without making any changes to the physical or chemical properties, mainly used for generating electric power, while leaving the way open to other possible uses.

Water use rights were granted without any obligation to use the water for any one particular purpose, or within any particular timeframe.

However, since water-use rights are not charged for, their accumulation led to speculation, which has begun to create costs to the country by holding up the construction of the hydro-electric power stations that,are needed to generate power, as the main energy source in Chile.

Furthermore, in the Chilean economic system, electricity prices are set by the market. Because of this, the authorities are reluctant to see the country's largest generating company holding most of the non-consumptive water-use rights of greatest significance in the country.

The situation could arise under which, without building any more power stations, a company in this position could earn greater profits from a shortage of energy against a growing national demand, because having the monopoly over all the water-use rights needed to build the required number of power stations, its decisions regarding the use of a particular resource and energy production would only be made in terms of its own economic interests, thereby breaking the laws of the free market.

In order to solve this problem, a Bill to reform the Water Code has been submitted to the National Congress to levy a charge on any water-use rights which have not been put to use since they were granted.

This charge would apply after a grace period has elapsed during which the right-holder has had an opportunity to use his or her rights. Every five years the charge would be increased until the right-holder is forced to exercise the rights for their intended purpose, or otherwise return the right to the government to be subsequently granted to another applicant under the

The idea of setting up a charging system rather than a system under which the rights are forfeited is based on the need to maintain legal stability and security of use rights, as mentioned earlier.

These have proven of fundamental importance in encouraging major foreign and domestic investment in the country in activities based on the use of water, such as hydroelectric power generation, mining, manufacturing and the supply of drinking water.

4.2.1.4 *A critical assessment of the system*

The present writer was responsible for working on the Water Code during the period of preparation, and at that time he pointed to all the dangers inherent in excessive free market thinking when granting original water-use rights, precisely because of the possibility that those rights could be hoarded and accumulated for speculative purposes regardless of water being a scarce resource of vital importance to national development.

Fear of the excesses of free-market economic doctrines was probably the reason why these warnings were heeded, and subsequently shown to be well-founded.

It was also found that in the Chilean situation the increased scarcity of the resource has enhanced its value, and this has encouraged people to prospect for ground water, sinking deep wells, with all the related costs. These have not prevented speculators from hoarding substantial resources for their own use in the hope of subsequently increasing their profits from selling them.

In view of this it seems reasonable to accept that water-use rights should be issued free of charge in order not to hamper the necessary speed with which major investments have to be made. But at the same time it is essential to provide the necessary legal guarantees to prevent

the formation of a monopoly of rights at the hands of speculators, which could cause the whole system to collapse.

In our view, these guarantees require speculators to pay for the externalities caused to society by leaving scarce and strongly needed water resources unused, for purely speculative purposes.

Imposing heavy charges on non-use of water by right-holders seems to be one viable way of remedying these evils, provided that it is an objective procedure which does not weaken the right in general, because this would eventually punish the vast majority of users, who use the water lawfully and appropriately.

4.2.2 Allocation of water

In light of the explanations given above, it is clear that in Chile it has always been part. of the water-use system to provide the possibility for water use rights to be transferred, with or without valuable consideration, to third parties other than the original right-holder, without any major restrictions. It was only with the statutory amendments introduced in 1967 by the Agrarian Reform Act No. 16,640, that this freedom to market water-use rights was temporarily suspended.

4.2.2.1 *The philosophical underpinnings involved*

It is interesting to note that on this subject, namely the system for allocating water-use rights, not only technical concepts but also philosophical ideas are involved, because it is not only a matter of establishing the most appropriate legal and technical procedure for the reallocation of water rights in a country, particularly when water is scarce or depleted, but also of making a choice of a higher order relating to a country's political and economic management and administration.

For as far as water management is concerned, one position is water that being a natural resource which is indispensable to a country's life and also because it is irreplaceable in driving national economic and social development, the State must be given the authority to regulate it, including reallocating it, through the agencies of the State; these have the prime duty to pursue the common good, a function which cannot be delegated to anyone else.

The opposite argument is that whereas the State has proven to be an ineffective manager, decisions regarding the reallocation of scarce resources and commodities must be left to the law of supply and demand, in an open, unfettered and competitive market, in which decisions are always taken intelligently because the risks will always be borne by the parties concerned who are also equipped to decide whatever is most consonant with their own

The sum total of these individual decisions will bring the greatest benefit to the economy of the country, and hence to its future development.

4.2.2.2 *The Chilean experience*

Chile has acted according to both of these concepts in subsequent periods of its history, and it is therefore possible to draw on this experience in order to judge the two positions that have been briefly sketched out above.

It is, however, necessary to note that the possibility of the unfettered transferability of water use rights has been so entrenched in the mentality of the Chilean water-users, that even during the period in which it was prohibited to transfer water rights, namely between 1967 and 1981, they were in fact actually transferred without any major consequences for those responsible.

(a) The first stage

The first period in the history of the unfettered transferability of water-use rights began in practice with the Spanish conquest and the settlement of Chile, because according to the law governing the country at the time, water rights (water concessions) could be transferred

Under the Republic this same situation remained unchanged under the riparian system first, then under the concessions system introduced by the first Water Code of 1951 .

Sometimes, before this legislation was changed, some water users - particularly the poor users — complained of abuses committed against them by the water right-holders with greater economic muscle. This had nothing to do, in our opinion, with the unfettered marketability of water, but was due to shortcomings in the system of justice, because it was very costly to go to litigation. We have never met any users who were obliged or forced to sell any of their rights of use, except to the same degree in which one finds malicious or fraudulent acts being committed elsewhere in the world.

(b) The second stage

This occurred in the historical period during which water-use rights could not be transferred, and the water reallocation process was given over entirely to the authorities of the State.

The change introduced by the Agrarian Reform Act, as we have seen already, was not a reaction to any real abuses or to any socially undesirable situation, but rather to the configuration of a global system in which the allocation and reallocation of water were the responsibility of a central government authority which was supposed to act according to technical criteria.

The whole system that was set up is extremely interesting because it gave the central government technical control over deciding what maximum amount of water could be held by each user, based on a rational and beneficial usage rate, which was used to effect the original grant of the rights requested. Subsequently, as the new law was implemented, the reallocation of water was effected through the establishment of so-called "water-use rationalization areas". In these areas the central government could, through an Executive Decree, redistribute water, and even grant new rights . As a result, all previous water rights would become ineffective.

In Chile's practical experience, and during the fifteen years in which this system was applied, only two rationalization programmes have been carried through in two small watersheds in the city of Santiago: the First Section of the Mapocho River, and the Zanjon de la Aguada basin.

The total sum of these rationalization areas was less than 6,000 hectares, which, when compared to the total area of Chile under irrigation on a guaranteed basis, namely 1,200,000 hectares, shows that the central government did virtually nothing to reallocate water

These rationalization programmes began and were implemented between 1974 and 1979 under the military regime, and the results were mediocre and mistakes were made. In the case of the Zanjon de la Aguada, the rationalization programme was not only incomplete by the year 1981 but it is still incomplete to this very day.

This writer was a member of the General Water Directorate, the State agency responsible for those programmes, and is a first-hand eye-witness of them, and even a participant in the case of the Mapocho River, as one of the officials involved. The author can therefore pass judgement on the results fairly objectively and his conclusion is that these did not encourage pursuing this approach elsewhere in the country.

(c) The third stage

The third stage in water reallocation came about with the changes in the legislation introduced in 1981, when the new Water Code was issued.

This Code again took up the free marketability of water-use rights and to facilitate the trade in water use rights it introduced a number of innovations regarding the configuration of these rights.

Firstly, a right of use is defined as "a right over the water, consisting in the use and enjoyment thereof, without making the use of water conditional on any one particular use, which subsequently made it unnecessary to request a change of use in the event of a transfer.

It also recognized the existence of consumptive rights and non-consumptive rights, so that a new category of rights could be created in natural watercourses, making it possible to use the water and to subsequently return it in full, in such important uses as electricity generation, fish culture, recreation and leisure, use as a source of power and others.

With the same intent of facilitating the transfer of water, massive programmes of regularization of the water-use rights were implemented in the different river basins in the country. For no one would be willing to purchase a right unless this was legally formalized, as otherwise one would only buy trouble.

4.2.2.3 *A critical assessment at the system*

Despite the fact that this system, in our view, works better than the previous one under which the State was responsible for reallocating water-use rights, there are still many flaws in it which need to be ironed out.

(a) The purchase of a water-use right implies that water must be subsequently transferred from one canal in which it was formerly used to another one, in which it will be put to a new use. This transfer has created a serious difficulty, partly because the government is required to authorize it, and at the present rate an authorization takes approximately two years. This discourages any interested party from embarking in new projects.

(b) Secondly, many of the canals in the country have antiquated infrastructure and anyone wishing to use them to transport their water rights not only have to pay an indemnity for the use of assets belonging to a third party, but also have to make enormous investments in order to modify the water intakes, the water conveyancing and the water separation structures.

Apart from these criticisms, which the author of this paper believes apply to the present Water Code, there are a number of other criticisms by others who are opposed to its philosophy.

It is claimed that this system for the unfettered marketing of water rights enables wealthy people to purchase with comparative ease the rights of the poorer people, both because the latter are unable to offer sufficient money, but also because the needs of the sellers force them to agree to sell, and also because they can be tricked into giving away their water.

On this subject the author has recently reviewed the Water Property Registers for about ten of the country's most important basins out of a total of 25, and the result is that less than 2 percent of all water rights have been sold separately from their uses. The vast majority of the cases involved transfers to drinking water companies, and the prices paid according to the public records are extremely high, and probably exceeded the normal value of the land plus

A second criticism is that the water rights have been hoarded, and monopolized by a few electricity generating companies.

This is a fact, but it only affects the non-consumptive rights which, while important from an economic point of view because they make it possible to generate electricity, are not relevant from the point of view of the social utilization of water, which is exercised through consumptive uses, for drinking, irrigation, manufacturing and mining, mainly. As far as consumptive rights are concerned, hoarding does not apply because these rights are only sold in very special cases, as has been explained above.

The third criticism refers to the lack of an effective water market in the country, which is also a fact, but the answer to this criticism is that the law does provide the possibility for the market to reallocate the water resources, without making this mandatory.

What investigations and research in this area, namely, water marketing in the country, have shown is that where the scarcity of water has reached a critical level, because of a lack of both surface water and groundwater, the water market has appeared, with people willing to pay sufficient money to persuade the water-use right-holders to enter into commercial transactions over their rights.

4.3 Conclusions regarding the system of water allocation and reallocation in Chile

Drawing on the experiences discussed above, and with a view to simply illustrating a legislative system which has produced quite positive results over fifteen years of implementation, even though there have been shortcomings, here are a few conclusions based essentially on the author's own experience, which may not necessarily be shared by other Chilean experts.

4.3.1 The Chilean system for reallocating water-use rights is based fundamentally on the personal decision or will of the users themselves, who are entirely free to transfer their water-use rights and also to purchase them whenever they feel that they need more water for their productive activities.

4.3.2 This system is not without its difficulties, which certainly exist, and vary in magnitude. In some cases, legal changes have had to be made in order to perfect the system, such as in situations relating to the hoarding of rights or of authorizations taking too long to be obtained without rational justification.

4.3.3 In comparison with systems in which the reallocation of water rights remains in the hands of the government, whether centralized or decentralized, it would appear that the system under which transactions may be freely made is beneficial both in terms of encouraging decision- making by the users themselves over the use of water resources, and in terms of discouraging interference by, and outright corruption of, government agencies.

4.3.4 Allowing decisions affecting industry, irrigation, mining projects and others to be adopted by third parties, however reasonable they may appear to be, might discourage potential investors, who would probably refrain from embarking on projects which could be rapidly and diligently implemented if left to their decision alone.

4.3.5 The Chilean system has been viewed with great attention by scholars and also by the authorities in other countries, and it is likely to influence Latin American legislation, particularly in the near future.

As a system that is specific to one particular country, the ideas and concepts must be analyzed and carefully understood in order to extract from them all the positive aspects that might be adopted by other legislations.

MODERNIZATION OF WATER LEGISLATION: THE MEXICAN EXPERIENCE

by

Hector Garduno Velasco

Advisor to the Director General of the National Water Commission
Mexico City
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WATER AVAILABILITY AND USES

The 777 mm. mean annual precipitation which fall over two million sq. km. of the country's territory produce 450 cu km of renewable surface and groundwater, which should be enough to satisfy the needs of 93 million Mexicans. The equivalent *per capita* mean annual available water of 5,000 cu m is well above international scarcity standards. However, its uneven space and time distribution, along with waste and pollution, is making water with suitable quality for specific uses an increasingly scarce resource[26]. This scarcity explains the multiple conflicts which occur all over the country, specially in dry regions, among uses, users, states and regions.

Almost 300 thousand users withdraw an estimated annual volume of 209 cu km of national waters in the country. Examples of users of national waters are:

- Irrigation modules which have been transferred to users organizations[27] Each one covers on average 5,000 ha (individual users are clients of the module's users organization).
- Public or private water utilities (domestic, industrial or other individual users connected to the municipal distribution network are clients of the utility).
- Individual self-supplied agriculture or livestock users, industries, services, hydro and thermal power plants, aquaculture, recreational users, or others who have their own intake or well.
- Users who utilize national rivers, reservoirs groundwater aquifers, soil, lakes or oceans to dispose wastewater.

	Volume (cu km/yr)		Estimated Number of user
	Withdrawal	Waster water	
Hydropower	122.00	na*	75
Agriculture & livestock	62.50	12.00	122,000
Urban & Domestic	15.00	7.30	163,000
Industry &services	7.50	2.05	13,000
Aquaculturer	1.30	1.30	1,000
Thermopower	0.94	3.98	47

*na = non applicable

Table 1. Water uses

By 1992, most users didn't have a legal concession to abstract national waters or to dispose wastewater. Given the conflicts caused by water scarcity in most of the country's territory, it is mandatory to regularize users in order to provide them with legal certainty and to have a reliable data base for water resources planning and management.

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[26] Jimenez B.E., Garduno H. and Dominguez R., "Water Availability in Mexico Considering Quantity, Quality and Uses", paper approved to be published in the Journal of Water Resources Planning and Management by the American Society of Civil Engineers.

[27] Up-to-date, almost 90 percent of the 3 million ha in irrigation districts has been successfully transferred to users organizations.

INTERNATIONAL RECOMMENDATIONS

During the last twenty years, the participants in several international meetings[28] on water and environment have reached consensus on the fact that water scarcity is aggravated by waste and pollution. Every day less water with the required quality is available for its different uses. This threatens severely four vital aspects of human survival:

- Food production.
- Human health.
- Ecosystem equilibrium.
- Social, economic and political stability.

The main recommendations from those meetings can be grouped as five principles:

1. Fresh water is a finite and vulnerable resource, essential to sustain human life, ecosystems and socioeconomic development.
2. A participative approach, involving users, authorities and all stakeholders, is required to achieve a sustainable water resources development.
3. Water has an economic value for all its competing uses and must be recognized as an economic good. However, water for human consumption must be delivered at affordable prices.
4. It is required to improve the integrated management of water demand, through economic and regulatory instruments.
5. Capacity building is mandatory to make operational the above principles.

CONSTITUTIONAL AND CONCEPTUAL FRAMEWORK

During millennia, before the Spanish Conquest, the relationship with water of the various indigenous cultures was both religious and practical. The fact that there were several water deities leads to believe that maybe since then water was regarded as a public resource, not as a commodity which could be owned privately. At the same time, the pragmatic realities made it necessary to establish norms in order to define who could use water, how to resolve conflicts among water users and how to cope with floods.

During the 300 years of the Spanish Colonial Period (1521-1821), water belonged to the Crown and a royal grant (*pierced*) was needed to use it. When the Mexican Nation was created, the Act of Independence of 1817 stated that all the belongings of the Spanish State and the Kings passed to be property of the Mexican State. After the Independence and until the Revolution in 1910, several constitutions were issued, but it is the Constitution of 1917 the one which, modified through several amendments during the last 80 years, is now in force. Also, during that period, several laws related to water were issued. The one presently in force was approved by Congress in December 1992. It is important to keep in mind the

For instance: Mar Del Plata (1977), Dublin (1992), San Jose de Costa Rica (1996), Marrakech (1997).

Constitutional framework both to understand the nature of the present law and to evaluate the feasibility and convenience of amending it.

Table 2 shows the main constitutional articles which make up the framework of the Mexican water (*i.e.* continental waters) legislation.

Table 2. Constitutional Framework

CHAPTER	**ARTICLE**[29]
1. On Civil Rights	**25.** The Mexican State will support the activity of enterprises, subordinated to the public interest and provided productive resources and the environment are conserved. **26.** Within the system of democratic planning, the law will set up the basis for the Federal Executive to coordinate actions with the states and to come to agreements with private citizens **27.** The Nation is the original owner of land and water within the Mexican territory.[30] The Nation has had and has the right to transfer the domain of land and water in order to constitute the private property. All surface and groundwater, except that which flows through a single property or lies only beneath it, belongs to the Nation. All groundwater whose use has not been prohibited, ruled or reserved by the Federal Executive, can be used without a concession. The domain of the Nation upon water is inalienable and imprescriptible. The only legal way to use national waters is through a concession granted by the Federal Executive. The Federal Executive has the power to establish and suppress prohibitions to use national waters. All water concessions granted from 1876 to 1917 which violated the rights of communities, are null. All contracts celebrated from 1876 to 1917, which monopolized water are subject to revision. **28.** The nation may concede the rendering of public services.
2. On Mexicans	31. One of the duties of Mexicans is to contribute to public expenditures, in the proportional and equitable way established by the laws.
3. On Foreigners	
4. On Mexican Citizens	
5. On National Sovereignty and Form of Government	41. The state constitutions cannot contravene the Federal Pact.
6. On the Parts of the Federation and National Territory	43 and 44.The Federation is formed by 31 states and one Federal District, which is the capital of the Republic.

[29] A paraphrase of those aspects directly related to water is included, not the complete text of each article.

[30] The National Waters Law is a "first rank law", since it is considered to be the by laws of Article 27 of the Constitution.

7. On the Legislative Power	**73.** The Congress has the power to Impose contributions to finance the national budget, as well as contributions related to the use of water and to public services conceded or directly managed by the Federation. Issue laws to coordinate actions of the Federal Government, the states and the municipalities, regarding environmental Issue all the needed laws to bring into effect all the powers given by this Constitution to the Executive, Legislative and Judicial Powers of the Union.
8. On the Executive Power	**80.** The President of the United States of Mexico is invested with the Supreme Executive Power of the Union. **89.** The President has the power to proclaim and to carry out the laws issued by Congress, providing the administrative means to ensure they are obeyed precisely.
9. On the Judicial Power	**103.** The courts of the Federation will resolve all controversies due to authority violations of civil rights. **107.** When the complain referred to in Art. 103 could jeopardize a community right to use water, every effort must be made to benefit the community and to specify its agrarian rights.
10. On the Responsibilities of Public Servants	**109.** Any citizen may report illegal acts of public servants to the House of Representatives of the Congress.
11. On the States of the Federation and the Federal District	**115.** The municipalities, with participation of the states when the laws consider it, will provide public services of water supply and sewerage. **120.** The state Governors must publish and enforce the Federal laws
12. On Labor and Social Security	
13. General Considerations	**133.** This Constitution, the Congress laws which emanate from it and all the agreements in accordance with it, will be the Supreme Law of all the Union. The judges in each state will act accordingly, regardless of any opposing disposition in a state constitution.
14. On Amendments to the Constitution	**134.** Any amendment requires the vote of two thirds of the Congress, as well as the approval of the majority of the states
15. On the inviolability of the Constitution	

Following international principles 2 and 3, water use management should be based on a well tuned combination of regulatory, economic and participation instruments. The main laws that constitute our water legislation, within this three-instrument conceptual framework, are the National Waters Law (NWL) and the Federal Tax Law (FTL).

The National Waters Law and its By Laws

The objective of the NWL is to contribute to the sustainable development of water resources. It defines the National Water Commission as the sole federal water authority in the country. The Law calls for an integral approach of both quality and quantity of surface and

groundwater, within watersheds which are considered to be the ideal geographical units for planning, development and management of water resources.

Some of its main regulatory features are:

- Enforcement of water resources planning as the basis for management within watersheds.
- Reiteration of the Constitutional principle that water can be used by individuals or legal associations only by means of a concession granted by the Federal Executive through the National Water Commission (NWC), for a period from 5 to 50 years.
    * Definition of specific regulations for the principal uses (irrigation; water supply, sewerage and wastewater treatment; power generation; and other productive uses).
    * Criteria to extend abstraction concessions in time and to declare their expiration if a user does not use the volume conceded during three consecutive years. The second rule is included, in order to avoid speculation and monopoly.
    * Enforcement of efficient water use, with due sanctions to users who ostensibly waste water.
- Power of the Federal Executive to limit users rights through regulation of water use, prohibition to use water or establishment of water reserves, for the following reasons of public interest:
    * Prevent or remediate groundwater overdraft.
    * Protect or restore an ecosystem.
    * Preserve sources for water supply or protect them from pollution.
    * Preserve and control water quality.
    * Severe water scarcity or drought.
- Water pollution prevention and control, through the following obligations of users who dispose wastewater:
    * Obtain a discharge permit and comply with the specified discharge standards.
    * Inform the NWC how they comply with standards.
- Regulations to manage the use of federal zones[31], and of sand and gravel from river beds.
- Users who do not pay the contributions specified in the Federal Tax Law (FTL) for water abstraction or wastewater disposal are subject to cancellation of their concessions and permits.
- Flood control regulations:
    * Coordination with state and municipal governments to build infrastructure and establish non-structural control measures.
    * Preventive measures, such as forecast and warning systems, as well as dam operation rules.
- All abstraction concessions, federal zones occupation, discharge permits and water rights trades must be recorded in the Water Right Public Register (WRPR), in order to provide users with legal certainty.

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[31] Federal zones along rivers and contours of lakes and reservoirs are defined as the strip of land formed by 10 m measured from the level of the maximum normal flood.

- Role of the NWC as mediator or arbiter in resolving users conflict.
- Sanctions to users for not complying with the NWL or its by-laws. Users have the right to claim disagreement against NWC resolutions and use administrative resources, before resorting to the judicial power.
- Transition measures so that users who have documents other than concessions and permits or are *de facto* users, can regularize their legal situation.

The economic instruments provided in the NWL are:

- User obligation to pay the contributions established by the FTL, regarding water abstraction, wastewater disposal, use of federal zones and use of national sand and gravel as building materials. Also, concessionaires of hydraulic infrastructure or delivery of water services, must pay certain contribution.
- Tradability of water rights (including abstraction concessions and discharge permits), to promote an economically more efficient water allocation.

The participation instruments considered by the NWL are:

- Establishment of watershed councils, as coordination and agreement units of federal, state and municipal authorities, as well as water users and all stakeholders. Their main tasks are to participate in planning and development of water resources, as well as in management particularly to cope with scarcity and pollution problems.
- Enforcement of users organizations, mainly through decentralization of irrigation districts and strengthening of water supply utilities.
- Enforcement of social participation in design, construction, financing and O&M of hydraulic infrastructure and water services.

Federal Tax Law

This Law which is updated yearly establishes all contributions which Mexicans must pay. Regarding water, it defines the tariffs for using public goods or for services provides by the State, such as bulk water provided by the NWC to Mexico City.

The FTL complements the definition of the economic instruments by making operational the "user pays" and "polluter pays" principles. That is, the tariff for abstraction water levies depends on the specific use and the relative scarcity of the water source; and the tariffs for wastewater disposal levies depend on the pollutants load and on the use and vulnerability of the receiving body.

Other Components of the Mexican Water Legislation and Related Laws

Besides the Constitution, the NWL and the FTL, the following legal components must be considering in water resources management:

- International treaties (The most important one is the international waters treaty signed in 1944 between Mexico and the USA).
- Jurisprudence.
- Custom.

The following are the most important related laws:

- National Goods Law.
- Environmental Law.
- Water supply and environmental laws issued by the legislature of each state in the Federation.

INSTITUTIONAL ARRANGEMENTS

Water management in Mexico did not start with NWC, which was created in 1989, but goes back more than a millennium to prehispanic times. Its modern institutional tradition started in 1926 with the National Irrigation Commission, which was succeeded by several institutions, even by a Ministry of Water Resources from 1946 to 1976. Their main objective was to build and operate irrigation and water supply infrastructure. The NWC is the first national institution which was designed to cope with water use management along with water resources development. However, the Law was designed with an advanced approach including most of the water management paradigms which have gained consensus in international meetings and now the Commission organization has to come up to those standards[32]. In fact, it is now recognized that water use management will be probably its more important task in the near future. The following activities are carried on by the NWC in order to fulfill this task:

- Grant, modify or cancel concessions of national waters, federal zones, and utilization of gravel and sand from river beds.
- Grant, modify or cancel wastewater disposal permits.
- Operate the Water Rights Public Register (WRPR).
- Monitor water abstractions, quality of wastewater disposals, as well as users compliance with their legal obligations.
- Define sanctions when users violate applicable regulations.
- Monitor water levies payment and send reports to fiscal authorities.
- Reconciliation or arbitration in water users disputes.

In order to carry on these activities, along with its other tasks, the Commission has six sub-directorates and several central units, as well as six regional agencies which group several states each, and 33 state agencies. A further step that is now being taken is the substitution of those regional and state agencies with 13 watershed agencies whose boundaries area municipal limits which are established as close as possible to water divides instead of the present state boundaries.

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[32] Important steps in this direction are being taken by the present administration.

IMPLEMENTATION EXPERIENCES

Water Abstraction Concessions and Wastewater Disposals Permits Prior to the 1992 Law

Issuance of water abstraction concessions has of course been influenced by politics and social pressures all along Mexico's history, as well as limited by lack of information and human, economic and technical resources. Figure 1 shows the main features of such evolution.

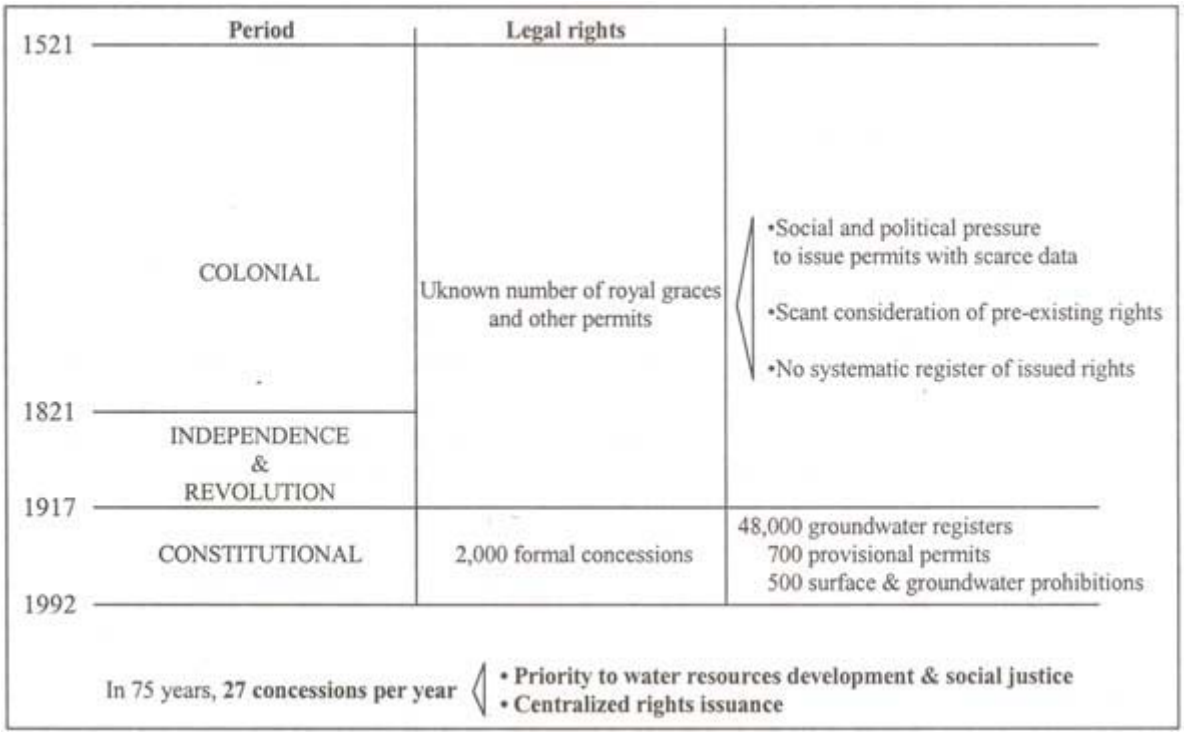

Figure. 1 Water Rights Prior to the 1992 NWL

During the colonial period, water rights were issued according to different legal frameworks which were shaped both by indigenous tradition and by Spanish regulations. Later, water rights responded to Mexico's first efforts of developing as an independent Nation and to the needs of social justice and construction of incipient irrigation works and water supply infrastructure.

Mexico's water legislation after 1917 and until 1992, was influenced also by the need to develop the main irrigation districts, as well as to supply fast growing cities and industries with water. As a result, insufficient attention was paid to water use management and the Federal Executive was the only person in the country with authority to issue concessions. In recent years this authority was also invested in the Water Resources Minister and afterwards in the Agriculture and Water Resources Minister and one of their Sub Ministers. In any case, this excessive centralization and other priorities related to infrastructure and social justice, lead to a very limited number of formal concession titles: only 2,000 in 75 years!.

During this period, several thousands of registers and provisional permits without the complete legal, technical and administrative supports of a concession title were issued. On the

other hand, during this period, some 500 prohibitions in watersheds and groundwater aquifers were issued in order to control water withdrawals.

The efforts to balance the permanent conflict between development and sustainability has been hindered also from a similar lack of resources to control water pollution. As a result (Figure 2), it was not until 1971 that formal wastewater disposal control started to be enforced and only 2,800 formal permits were issued in 20 years.

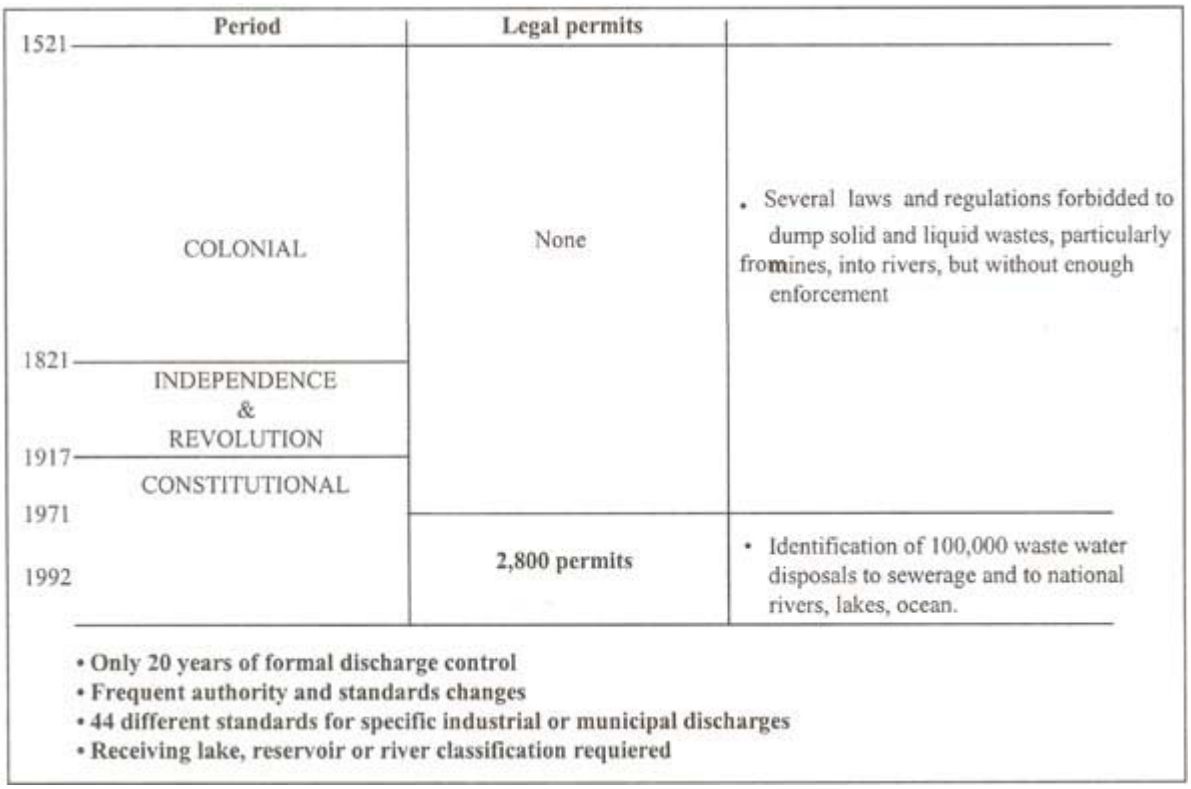

Figure 2. Discharge Permits Prior to the 1992 NWL

Moreover, influenced by foreign practices, 44 different discharge standards were issued for specific industrial and municipal disposals and legislation required to classify receiving bodies according to their assimilative capacity. This latter requirement placed a technical burden impossible to be managed because of lack of reliable data and water quality models which could be suitably calibrated. A further limitation was that the standards were not realistic because they did not allow for gradual compliance according with the real economic and technical possibilities of users. Also, the institutional capacity to enforce those standards was not taken into account.

Abstractions and Disposals Regularization from 1993 to 1996

The NWL was passed by Congress in December 1992 and its by-laws were issued by the Federal Executive in January 1994. The National Water Commission was thus only three years old when the law was approved and five when the by-laws were issued. The first implementation step regarding water use management, was to decentralize water abstraction concessions and wastewater disposal permits to the Sub-director General for Water Use Management, the six regional managers and the 32 state managers. Also, they were all

invested with full authority to look after the rest of the water use management functions in their geographic jurisdiction. They were given powers according to water scarcity, volume of the abstraction or of disposal volumes requested by users and third party effects. That is, state managers deal with requests of minor volumes in zones with relatively abundant water, which do not affect other states. Regional managers have authority in dryer zones and on issues that affect more than one state and involve greater volumes; and the Sub-director General deals with even larger volumes in the driest zones, issues which affect more than one region, and with international waters.

By June 1994 it was necessary to design simpler procedures and to exempt users from the payment of titling and registering services, as well as to forgive sanctions to water supply utilities for using water without concession titles (Figure 3). As a result, by March 31, 1997 46,625 concession titles were registered in the WRPR.

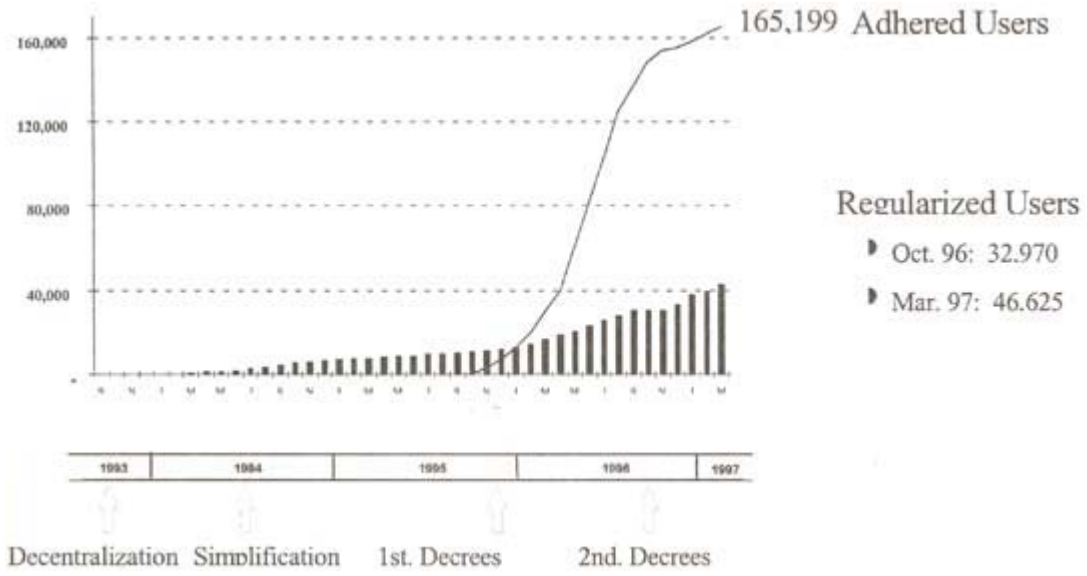

Figure 3. Concession Titles for National Waters Abstraction Registered in WRPR

The present administration recognized the priority of regularizing all water abstractions and wastewater disposals by issuing concessions and permits, so the Federal Executive issued three decrees (for agriculture and livestock, industries and services, and water supply utilities) on October 1995, which further simplified procedures; partially or totally condoned levies debts; didn't apply sanctions for abstracting water without concession title and disposing wastewater without permits[33]; and exempted certain service payments. More benefits were given to agriculture, livestock, aquaculture, water supply users, and micro enterprises than to large enterprises. Moreover, the latter received more benefits if they adhered promptly to the presidential decrees. The result was that after the one year period during which the decrees were in effect, 175,902 of the estimated universe of 300,000, had adhered to them. The capacity of the NWC was not enough to evaluate all those requests and only 20,328 titles were issued. Nevertheless, considering the titles issued prior to the decrees, the WRPR has now 75,596 concession titles. This means 10,000 titles per year as compared with 27 per year during the period from 1917 to 1992, and it also means that with 13 percent of the estimated users being registered, 71 percent of the total estimated withdrawal is now controlled.

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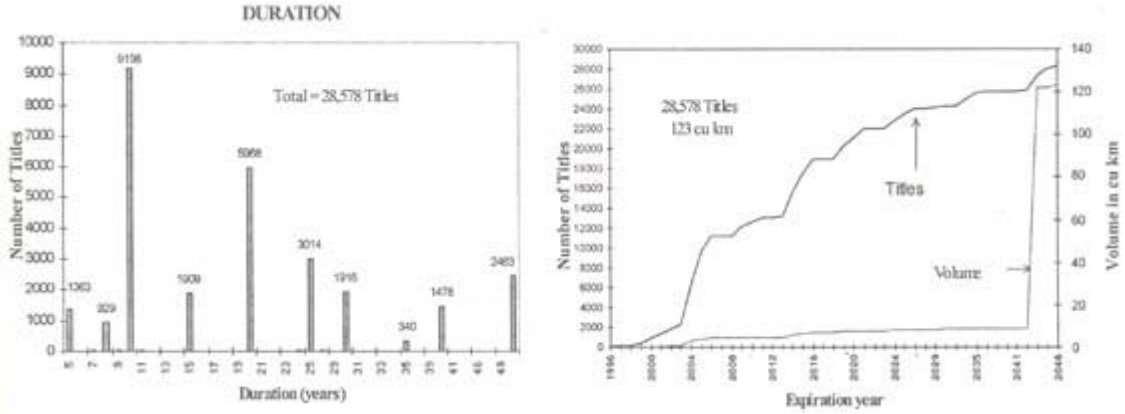
[33] However, damage to the environment or human health by toxic wastewater disposals continue to be sanctioned.

It is interesting to observe the duration composition of the titles which have been issued. According to the NWL, they can be issued for periods from 5 to 50 years and users may ask for renewal five years before their titles expire. Regional and state managers were instructed to issue shorter periods when in doubt of water availability or where there was evidence of a negative hydrological balance. Figure 4 shows that 32 percent were issued for 10 years and only 9 percent for 50 years. Most of the titles with 50 years duration correspond to non-consumptive use in hydroelectric plants and to water supply utilities. This analysis will help in designing communication programs for users to be aware of their expiration dates, and in monitoring programs to cancel those titles which are not renewed on time.



Taking into account the relative success of the first decrees, the Federal Executive issued three new ones, based on even simpler procedures and, more important, on a different approach which relies on trusting the user and limiting the discretionality of the water authority. Table 3 compares both sets of decrees. In the two cases only users who used water or disposed wastewater prior to October 15, 1995 may adhere to the decrees. Users who, prior to that date, were legally using water, either because they had their formal concessions and permits or some other authorization recognized by the Commission, will be given preference in federal programs. For instance, financial support to make more efficient use of water or when the times comes to reduce abstraction volumes in a watershed in order to balance withdrawals with availability.

Table 3. Presidential Decrees

	Oct 12,1995-Oct 11,1996	Oct 12,1996-Dec31,1998
Users with concession	Preference in support and water use management programs	
Administrative regularization	Obtain concession	Comply with requirements
Fiscal regularization	Pay water abstraction and levies since Jan 1,1995 -	
Volume	• According to availability and external effects • Users must demonstrate effective use	• Declared to be using or needed for installed capacity • NWC can verify
Duration	5 to 50 years	10 years
Waste water quality improvement	• Treatment plant • NWC approves program	• Treatment plant or process improvement • NWC receives and monitors program
Fiscal benefits	Condoning of partial or total debt according to use: • agriculture and livestock • municipal • industry and services and to promptness in adhering to decrees	

In the first set of decrees, a user was considered to be regularized only after obtaining his title from the Commission. Now it is enough to comply with the NWC requirements for a user to be considered to be administratively regularized and hence to benefit from the decrees. Fiscal regularization means that a user must pay the debts which are not condoned and start paying water levies since January 1995. According to the first decrees, users had to demonstrate they were effectively using the volumes they claimed, and it was up to NWC discretion, taking into account water availability and possible negative third party or environmental effects, to define the granted volume and the duration of the concession.

The new decrees state that in all cases NWC must issue concessions for 10 years and for the volume which a user claims, under oath of telling the truth, either to be using or to need for his installed capacity. This means that instead of having to evaluate each single request, NWC will have to implement the capacity to verify the truthfulness of users claims only in a statistically representative sample. Of course, users who do not declare truthfully may be imposed penal sanctions and their abstractions could be canceled.

With respect to waste water disposal under the first decrees, users had to obtain approval from the Commission for their treatment plants construction programs. Now, it is enough for them to present their programs which are not limited to "end of the pipe" solutions, but they can also propose to improve their production process in order to reduce pollution. Similarly to the case of water abstraction, NWC will monitor the progress in wastewater quality improvements programs and users will not get the benefits of the decrees if they do not progress according to their programs.

It is expected that the implementation of the decrees will result, by the end of 1998, in the regularization of most of water abstractions and wastewater disposals. The price that will be paid is that by then many watersheds in dry regions will probably be over-concessioned. But one has to recognize that nowadays those watersheds are in fact overexploited in the case of groundwater, and that most surface water users suffer from lack of reliability because of variability of runoff. The ten year period for the concessions will allow for councils, with due representation of water users, to be operational in watersheds all over the country. It will then be feasible to establish water use regulations and programs to reduce water abstractions with the consensus of users, within the participation framework that will be provided by watershed councils.

With regards to wastewater disposals, since the approval of the NWL and also with help of the decrees, almost 3,000 new permits have been issued under the standards in force. But the most important recent achievement is the approval of a single new standard for all industrial and municipal wastewater disposals, which substitutes the former 44 standards. Moreover, Congress has approved reforms to the FTL regarding wastewater disposal permits consistent with the new standard. ,

Parameters:

- **Basic:** Temperature, pH, oil and grease, floating solids, settleable solids, TSS, BOD, Total P, Total N
- **Heavy metals: (As, Cd, Cu, Cr, Hg, Ni, Pb, Zn)** and **Cyanids**
- **Pathogenes:** Bacteria, viruses, fecal coliforms and helmynth egss

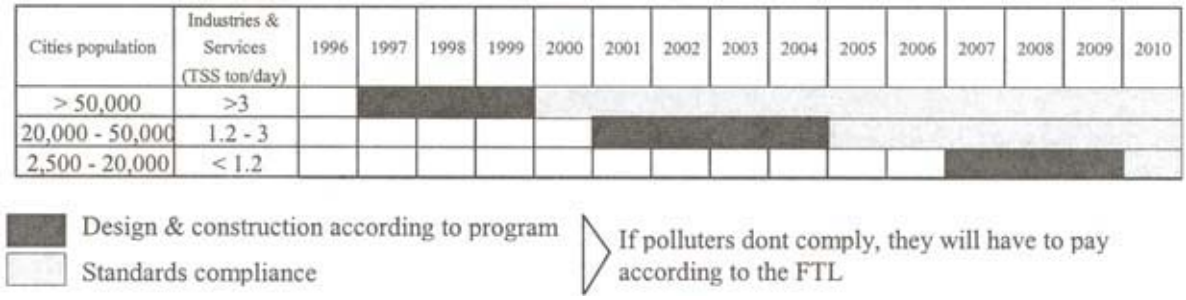


Figure 5. New Wastewater Disposal Standard

Users will have to comply only with the limits established for those pollutants they produce. The new standard takes into account both the use of the receiving body water as well as its vulnerability. It incorporates gradualism (Figure 5), by stating that major polluters must comply on the year 2000, intermediate ones in 2005 and minor ones in 2010. However, existing plants must continue operating according to their original discharge permits or the new standards, depending on the user's will. In case the quality of their discharge exceeds the new standard, they can apply for a bonus. Polluters who exceed in more than five times the limits for any of the parameters of the new standard, have to present immediately a program to improve their wastewater quality. The rest of them, have to present a similar program several years before their target compliance date. If they do, they will be exempted from paying discharge levies during the construction period given they progress according to their programs.

The design of the new standard is such that it is feasible that users comply with it and that the authority will be able to enforce it. Once the watershed councils are operating, it will be up to the users to agree on quality standards for the water bodies within their geographical jurisdiction, and to enforce them in collaboration with NWC.

Water Rights Expiration

The spirit of the NWL regarding expiration of water rights related to volumes not used during three years is to make them available for others users who could benefit from them and to prevent monopolic practices. However, in practice users may be affected when they have not used their water rights for reasons alien to them, or when they have made investments in efficient use technologies in order to save water and increase their production or expand their installed capacity.

The Technical Board of the NWC has approved the Commission to issue guidelines in order that those users who prove they have not used their water rights because of the reasons stated above, can be exempted from expiration of their water rights.

Water Rights Trade

According to the NWL, water rights may be traded by users and reported to the WRPR, in case that only the user changes as a result of the transaction. This means that the buyer will use the same volume of water for the same purpose, withdrawing it from the same point as the original user. All other cases, except water rights trades within the same irrigation district or in areas where the Director General approves a simplified procedure, must be approved by the NWC in order to prevent third party or ecological negative effects.

So far, 341 trades have been registered in the WRPR for a total yearly volume of 118 million cu m, mainly in dry regions or areas with tight water balances. The largest number (222 transfers, 47 million cu m) has been within irrigation users and the largest volume (61 million cu m , 40 transfers) has been from industry to industry.

Water markets are considered to be a useful tool to allocate water more efficiently and to alleviate groundwater overdraft. However, presently in Mexico the following problems must be solved before water markets can be fully enforced:

- The water abstractions regularization process must be completed in a watershed and hydrological balances computed as a prerequisite to water markets, in order that buyers are certain of the water rights they are buying.
- The NWL and its by laws establish that in areas where abstractions have been prohibited by the Federal Executive, water rights must be sold along with land. The Technical Board of the NWC has approved the Commission to issue guidelines in order to use the figure of usufruct instead of sale, which could allow water trades to be made without selling the related land.

Management of Federal Zones and Building Materials

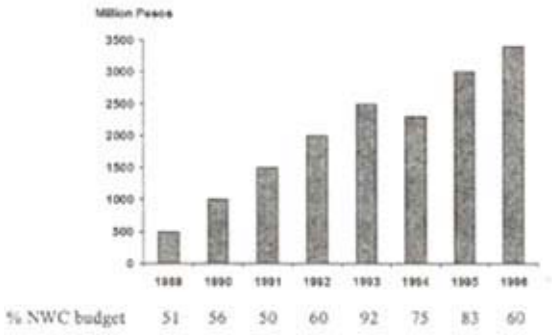
Legislation considered federal zones as national property since 1870 and since 1934 the state started managing national building materials in river beds. Before the 1992 NWL, several thousands permits to use federal zones, and sand and gravel as building materials, had been issued. Since 1992, more than 20,000 concessions to use 7,500 ha for agriculture and 2,400 ha for livestock and gardening have been granted. Also, 1,271 concessions to use sand and gravel have been granted. However, the following problems make it difficult to manage these public goods:

- Field work to delimit federal zones is costly and time consuming.
- Most federal zones and river beds in urban areas are illegally occupied by permanent constructions, which create flooding risks and ecological problems.
- Users are not aware of their flooding risks.
- Withdrawal of sand and gravel without technical support disrupt the environment and modify runoff regimes.

These problems make law enforcement in federal zones and river beds an impossible task for the NWC. Therefore, a participatory scheme of state and local authorities, as well as stakeholders within the watershed councils, is needed.

Water Levies Collection from 1989 to 1996

The Federal Tax Law considers water abstraction levies according to the kind of water use and to the relative scarcity of the water source, as well as charges for titling and other services, and for irrigation and drinking water provided by the NWC itself (Figure 6). The collected amount has increased yearly in current pesos, with exception of 1994, because in that year the Federal Power Commission obtained an exemption for levies related to hydropower water abstractions and Mexico City didn't pay on time its water supply charges. The yearly income has represented a substantial percentage of the Commission annual expenditures budget. In 1993 it reached 92 percent. However, in real terms, it has decreased due to inflation. It is interesting to mention that periodic increases in water abstraction levies have induced water savings in industry and a more rational geographical allocation of water demanding activities. Also, the threat to pay wastewater discharge levies to users who don't comply with standards, has induced construction of many treatment plants.



Distribution 1996 (% of NWC income)

	Water abstraction	O & M	Waste water discharge	Others
Industry & services	44		3	
Water supply	6	18		
Hydro & Thermalpower	13			
Irrigation	0	4		
Debts	2		4	
Various				6

Figure 6. Water Levies Collection

The income distribution shown for 1996 is representative for the other years. From a purely economic standpoint, it could be argued that the structure of water levies induce cross subsidies from industry and services to water supply whose tariffs are substantially less, and to irrigation which is fully exempted from this contribution even though it is responsible for 80 percent of the consumptive use in the country. A future gradual decrease in these cross subsidies will have to take into account social and political considerations as well as the need to fund with federal money the various programs of water resource development and management.

The NWC income distribution also shows a very low participation of levies collection from wastewater disposal. There are three reasons. One is that industries and municipalities are exempted while they build their treatment plants. Second, the financial weakness of most water supply utilities. And third, insufficient resources for full law enforcement.

FURTHER IMPROVEMENTS

A substantial advance in the regularization process was achieved during the last four years, but improvements are still needed regarding the legal framework, information systems, enforcement tools and capacity building. The challenge is to carry on this improvements, without slowing down day to day operation.

Legal Framework

A detailed study is being carried on in order to modify the NWL by-laws, in order to remove the main following restrictions (some of them will be partially removed with the guidelines for excepting the expiration of some water rights and for facilitating water markets, which were previously described).

- Users, specially those from the rural sector, have difficulties to fulfill cumbersome requirements to obtain their concessions. Procedures must be simplified, recognizing socioeconomic and hydrologic regional differences.
- Expiration of water rights without consideration of the reasons which stop water use.
- Water rights market transactions are limited by present regulations.
- Social participation through the watershed councils needs a more precise definition in order to increase stakeholders participation. Also, the present regulations may hinder NWC interventions in emergency situations which require immediate action.

Information Systems

So far, four main independent systems have been implemented in order to monitor the attention given to users requests, issue concession titles, operate the WRPR, and register and control water levies payments. At least one more system must be developed to follow-up on field monitoring of water abstractions and wastewater disposals. Because of the enormous amount of legal and *de facto* users, the complex procedures involved, and the need to link central offices with six regional agencies (which soon will become 13) and at least one user-oriented office in each of the 32 states, the following actions have been started:

- Improvement of existing systems, in order to improve day-to-day operation.
- Gradual modernization including e-mail and full integration of the independent systems, without jeopardizing daily operation.

These actions are being on considering the best available technology, but carefully phasing the process with the required institutional capacity building, and giving priority to the following needs:

- Information required to support administrative and fiscal law enforcement.
- Information required by decision makers at all levels and geographic locations.

Law Enforcement

Taking into account the 300,000 users who are expected to be regularized during the following 20 months, sound statistical sampling must be carried on in order to verify that users are in fact complying with:

- Abstraction volumes and duration stated in their concession titles.
- Parameters limits stated in their wastewater disposal permits.
- Payment of their self-declared levies.

In particular, in the very near future, NWC will have to verify, also through *ad-hoc* samples, that, while adhering to the presidential decrees, users in fact declare truthfully the water volumes they are using or their installed capacity, as well as their rate of progress in their proposed programs to improve the quality of their wastewater discharges.

Also, it will be necessary to use the best available technology (direct, remote sensing and real time, among others), for flow measurement and water quality monitoring, but again, phasing it properly with institutional capacity building.

Capacity Building

This is probably the most important future challenge that must be properly faced if the water use management process is to be implemented in a successful and sustainable manner. The following are the main aspects of capacity building that are being implemented or will be developed in the near future:

Regarding institutional development, the legal framework will be improved to overcome some drawbacks that have been identified while implementing laws and by-laws during the past four years. A better geographical organization will be soon achieved by substituting six state-oriented regional agencies with 13 watershed agencies. Also, several operative functions have been transferred to users organizations, such as O&M of most of the irrigation districts in the country; as well as to state governments, as part of a national federalization process. This last action will speed up as state governments establish water offices to take care of many of the functions now carried on by NWC. However, the Commission will retain the functions related to water use management which, according to the Constitution, are federal responsibility in order to assure that water is used for the benefit of all Mexicans, specially for future generations.

Developmental of human resources and *ad-hoc* technology is not an easy task, mainly because water use management has not caught yet the interest of universities and research institutions. There are many mathematical, economics, and computer models that are indeed useful for parts of the processes involved in water allocation, or in simulation of the behavior of complex surface and groundwater systems. But very little has been developed and written on the practical tools that are needed to solve, with an interdisciplinary approach, complex water use management problems that deal with social, anthropological, political, technical, historical, legal, economic, administrative and fiscal aspects. It is urgent to develop a water use management discipline and to catch the interest of academia in this task.

Nevertheless, we cannot wait. On the job training of specialists must continue until a formal discipline is developed, procedures must be re-engineered and user-oriented total quality managerial techniques must be implemented at central, regional and state offices. There is also the need to develop a civil service career and adequate retirement programs.

Water use management would be an impossible task without social participation. The implementation of watershed councils will be enforced by *fora* with water users, as well as mass communication and formal education to rise consciousness on water problems.

Finally, it must be recognized that capacity building is needed not only for NWC, but for the whole water sector. In fact, as more operative functions are transferred, as water rights market becomes a more important tool to allocate water more rationally, and as water conflicts among users increase, there will be more need to improve the capacity to deal with water problems of users organizations, water utilities, consulting firms, universities and research institutions, and even of the legislative and judicial powers and private lawyers as well.

Implementation Program

The time frame to face the challenges which have been delineated cannot be measured in months, but in decades. Figure 7 shows a program for the next 15 years,_considering that 2010 is the target date for minor polluters to comply with the new waste water disposal standard. After most water abstractions and wastewater disposals are regularized, watershed councils implemented and the legal framework as well as the water availability and quality database substantially improved, it will be feasible to implement, with users participation, regulations for water allocation and use as well as pollution control. It is estimated that this process might take more than ten years, but it is considered that only with the participation of water users and polluters it will be possible to recover hydrological balance in overdrafted aquifers, establish rational rights that take variability of surface water into account, and set up water quality standards for lakes and rivers which may be feasible to reach. In other words, it is the only way to set the basis for water resources sustainable development.

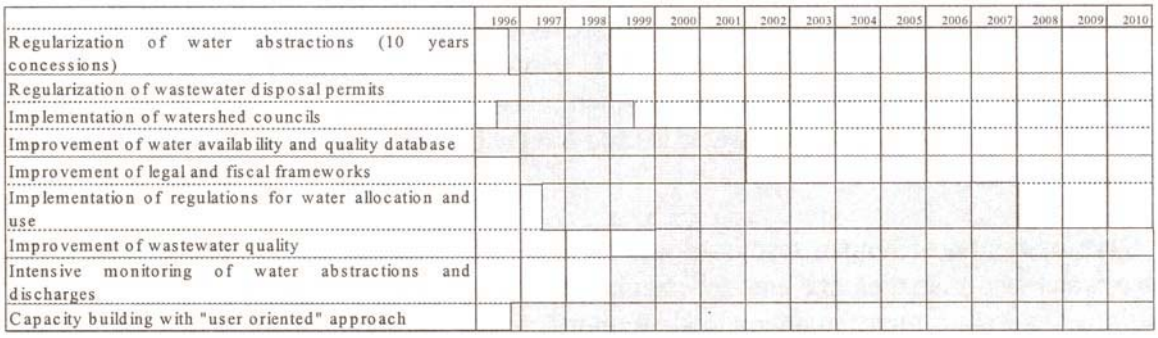


Figure 7. A 15 Years Programs

CONCLUSIONS

The Mexican experience on water use management during the last four years shows the need for a trial and error approach for water legislation implementation. Practice has provided plenty of elements to feedback the legal framework. The process has been first to try to solve implementation or enforcement problems modifying procedures which are approved by the Director General of the NWC. If this proves insufficient, propose changes to the NWL by-laws, which are approved by the Federal Executive. Only after trying these two solutions, propose changes to the law itself. But also political support at the highest level has been very important. Without the Presidential Decrees, the regularization process would be impossible.

Legal regularization of all water abstractions and wastewater disposals, as well as a better knowledge of water availability, along with social participation are necessary to achieve water sustainability from the ecological standpoint. However, permanent capacity building of the whole water sector is mandatory to achieve social and institutional sustainability.

The best available metering, computing, and telecommunications technology should be utilized to support water use management, but again capacity building plays a key role, in order that the technological instruments are properly maintained and fully utilized.

Finally, the most important lesson is that laws, by-laws and procedures should be designed and permanently reviewed in such a manner that users can comply with them and the authority is able to enforce them. In fact, if the law and its by-laws were to be drafted now, the following recommendations should be seriously considered:

- Recognize regional socioeconomic and hydrological differences. A law that assumes complete uniformity though all the territory imposes unnecessary bureaucratic burdens both on users and on the authority.
- Give serious thought to implementation feasibility.
- A realistic transition period should be considered since the day the law is issued in order to give illegal users enough time to comply with the law. In other words, the approach of the authority should be to work with users to help them to regularize their situation.
- Gradual implementation goals are desirable, either starting with some groups of users or in certain critical watersheds. This would give the organization time to learn and build up its capacity and at the same time achieve useful results soon after the law is issued.
- Simultaneously and in close coordination with the drafting group, a second group, preferably with participation of users, should develop an implementation model, in order to simulate the process in advance anticipating as many problems and their solution as possible.

MODERNIZATION OF THE WATER LEGISLATION: THE SPANISH EXPERIENCE

by

Jose Juste Ruiz

Professor of International
Law University of Valencia

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I. THE TRADITIONAL LEGAL REGIME

A. NORMATIVE FRAMEWORK

The traditional legal regime concerning continental waters in Spain is marked by the country's characterization as a progressively arid land, heavily depending on the use of water as a scarce natural resource. This fact led both to an early development of a rich body of law in the matter and to its grounding in the principle that water was essentially a public concern to be properly administered by the State.

Spanish water law was essentially composed by the Water Act of 3 August 1866, applicable to both continental and marine waters, and by the Water Act of 13 June 1879, concerning specifically continental waters. These two basic Acts were largely inspired by the historical legal heritage on the matter and they were completed by the provisions of the Civil Code of 1889 in Articles 407-425. With time, many other specific regulations were adopted with respect to particular aspects of the use of waters, conforming a legislative package quite harmonious and technically advanced.

B. BASIC LEGAL REGIME

The legal regime referred to above was inspired by the consideration of running waters as part of the public domain (*dominio publico*) while contemplating localized waters, as an element accessorial to the land in which they were located.

1. Public water

The Water Act of 1886 defined as public waters: a) all those springing in public lands; b) the waters of springs (*manantiales*) and streams (*arroyos*) running through their natural channels; and c) the rivers[34]. The Civil Code specifically added to the list the waters of lakes and ponds formed in public lands and their beds, rainfall waters running through public lands and underground waters located in public lands.[35] It also contemplated the public nature of waters originating in private lands, once they trespassed the limits of the originating estate.[36] Thus, it can be concluded that all water springing or located in public lands as well as all surface water running through their natural channels - with the channels and the beds thereof-were a part of the State's public domain.

The use of public water was, nevertheless, generally permitted for some common purposes and could also be obtained by public or private persons through specific authorization or concession for other special uses. The so called "common uses", all of them of a minor entity, were legally open to anyone; they included both consumptive uses, such as drinking by humans and cattle[37] or small domestic, agricultural or industrial activities[38], and non consumptive uses, such as fishing, navigation, washing, bathing etc.[39] In contrast, other "special uses" of public waters, comparatively more important both by their volume and their

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[34] Water Act 1879, article 4.

[35] These underground waters could be only explored with an administrative permit, but once discovered they shall be the property of the discovering person. CC article 418.

[36] CC article 407, 8.

[37] Water Act 1879, article 126.

[38] Water Act 1879, article 128.

[39] Water Act 1879, articles 129-146.

consumptive (and exclusive) character, were possible only by administrative concession to public or private persons or by prescriptive acquisition by peaceful users during 20 years[40]. The granting of administrative concessions was submitted to a prioritized list of activities, contemplating: (1) the supply of water to towns, (2) the supply of water to railroads, (3) irrigation, (4) channels for navigation, (5) mills and other factories, ferryboats and floating bridges and (6) reservoirs for aquaculture[41].

2. Private water

The law considered as private all surface waters, that is, waters springing in a private property[42] and rainfall waters[43], but only for its use in the riparian land and while not trespassing the limits of the estate, as well as all underground waters located therein without any legal general restriction.[44] With regard to the latter, i.e. underground water, only the owner of the land was entitled to explore the existence of it; but, should the owner of an estate, or the Administration in the case of public lands, permit anyone else to explore the existence of underground water, then the water so discovered would belong to the discoverer.

The use of private surface water was free and quantitatively unlimited for its owner, while not trespassing the limits of the land in which it sprang or was located, and totally free for its owner in the case of underground water. In any case, the owner of private water, above or underground, could also proceed to any legal transaction concerning the exploitation, transmission or permutation of it as individual property.[45]

However, in addition to the inherent legal limitation concerning the use of surface water "within the limits of the land", the use of private water could be subject to administrative discipline according to the provisions of the Act of 13 June 1879 and other special laws and regulations. That was also the approach of the Civil Code of 1889 which defined private waters as "special property" submitted to some restrictive constrains.[46]

C. APPRAISAL

The working of this legal regime, which lasted for more than a century, offers a quite satisfactory record.

First of all, the system was grounded on the historical heritage and was responsive to the prevailing natural and social conditions of the country. Secondly, the laws were very well drafted with some of their sections been considered as a masterpiece of legal writing. Thirdly, the laws were construed as basic institutional Acts susceptible of further legislative and administrative development and were actually interpreted by the Courts in a very evolutive way. That is why the Spanish water Acts were generally commented with praise and regarded as a model for similar laws in other countries.

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[40] Water Act 1879, article 149.

[41] Water Act 1879, article 160

[42] Water Act 1879, article 5 and CC, article 408, 1.

[43] Water Act 1879, article 1 and CC, article 408, 4.

[44] Water Act 1879, article 18 and CC. article 408, 3.

[45] CC article 424 in fine.

[46] CC articles 413, 415, 420-422.

Nevertheless, with the course of time it became apparent that certain shortcomings of the Acts were somehow structural and were not in line with the dramatic technological, economic, social and ecological changes that have occurred in recent times. On the one hand, the increasing amount of the number of concessions granted for the use of surface waters, often without any realistic consideration of the desirable limitations, brought the rivers and lakes almost to a total saturation of their quantitative potential as well as to a very high degree of environmental degradation. This provoked a progressively intensive use of underground waters, which started to show signs of exhaustion or salinization; moreover, the excessive impact on underground aquifers started to affect also the conditions of surface waters, due to the interrelationship between underground and surface waters in the hydrologic cycle. And, on the other hand, while important uses of waters were not contemplated outright by the 1866 and 1879 Acts (such as for hydroelectric purposes, for instance), many other important potential uses appearing with technical development where lacking appropriate legal coverage and could hardly be coped with through special regulations.

All these considerations gave the legal regime described above a certain sign of exhaustion and obsolescence and little by little it become apparent that a new comprehensive Act was needed, more in line with the new constitutional chart (the Spanish Constitution of 1978) and with the changing hydrological situation.

II. THE WATER ACT OF 2 AUGUST 1985

A. LEGISLATIVE DEVELOPMENT

The aim of the Water Act 29/1985 of 2 August is to adapt the traditional legal regime concerning the ownership and the use of continental waters in Spain to the new constitutional structure of the State and to the prevailing modern conceptions regarding this particular natural resource.

The first set of elements focused specially on the new territorial organization of the State, formed by 17 Autonomous Regions holding very substantial powers in the matter; as the preamble of the Act stated, the traditional legislation "is unable to provide answers for the needs arising from the country's new territorial organization pursuant to the 1978 Constitution"[47]. The second set of considerations concerned the need to incorporate to the law the modern scientific paradigms of the unity of the hydrological cycle and the preservation of its ecological quality, as well as the social demands concerning the availability of sufficient water and its equitable allocation for different (and eventually successive) uses.[48] These latter considerations were all the more compelling, due to the traditional scarcity of water in the country and the progressive aggravation of the situation by a long standing process of drought, which has brought important parts of the territory to a situation of clear desertification.

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[47] Water Act Preamble, para. 6.

[48] See also Water Act Preamble, paras. 1-4.

B. POLITICAL OPTIONS AND LEGISLATIVE PROCESS

It seems clear that all the above objectives could have been theoretically achieved through distinct processes of legislative renewal, inspired by different political options.

Under a "conservative" model, the new Act's modernizing purposes could have been achieved by simply expanding the legislative dimensions of the social function of private ownership over waters and amplifying the administrative powers to regulate the use of all waters in the light of the new hydrological, ecological and social imperatives, while not affecting established property rights and other patrimonial water rights. In contrast, a more "progressive" legislative approach would have support to place all waters in the hands of the State itself, while increasing its powers to directly apportion and manage the utilization of the said waters according to the already mentioned hydrological, ecological and social imperatives.

After having obtained an overwhelming majority in the several 1982 elections it was clear that this second option would be the one actually retained by the socialist Government, thus making the new Water Act one of the legislative flagships of the new political majority. With this very clear design in mind, the Water Act was carefully but hastily prepared by a large and competent team of experts (including both governmental civil servants and independent persons appointed in consideration of their expertise) and extensively reviewed before being presented to the Spanish Parliament (*Cortes Generates*) for its adoption. During the preparation of the Act, there was little public debate on the matter since the administration favoured an exclusively internal process of discussion in order to be able to cope with the very tight politically accepted deadlines. Once the draft Water Act started its parliamentary process, and notwithstanding the amplitude of the debate that it provoked both in the Congress and in the Senate, it was apparent that the project would not be subject to significant modifications, since it could be easily adopted with the votes of the socialist members absolute majority.

The Water Act 29/1985 was finally adopted on the second day of August of 1985 and published in the Official Journal six days later.[49]

C. MAIN SOLUTIONS AND FEATURES

The Water Act 1985 has formally adopted quite clear-cut positions on most essential issues.

First of all, it declares the public ownership of most surface and underground waters, as part of the State's public domain[50]. This essential feature of the Water Act is yet another significant example of the decline of the legal consideration of water as a commodity privately owned by individuals[51]. As the Preamble of the Act has stated "an updated regulation

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[49] *BOE* 189, of 8 August 1985

[50] The Water Act employs the terms "hydraulic public domain" (*dominio publico hidraulico*)

[51] BURCHI, S. "Recent Trends in the Law and Administration of Freshwater Resources in Western Europe", in KISS, A/SHELTON, D Manual of European Environmental Law. Cambridge (Grotius) 1993, p. 242.

of the necessary legal categories ... should be centred around ... the legal characterization of this resource as public property".[52]

Secondly, the Water Act is consistent with the principle of the unity of the hydrologic cycle in as much as it provides for a uniform legal regime for all kinds of continental waters, "in order to ensure that, in all cases it is treated evenly, regardless of its immediate origin, surface or underground."" In effect, as the Preamble of the Act expressly affirms:

> "Therefore, when considering water as a resource, no distinction should be made between surface and underground waters. Both are closely related, have identical characteristics and functions and both must be subordinated to the public interest and be at the service of the Nation"

Thirdly, the Water Act provides for a management system based on administrative planning and, in most cases, direct implementation by administrative bodies. As one observer put it "Spain's 1985 Water Act and attendant implementing regulations offer convincing evidence of the central role assigned to water resources planning in the overall legal framework for the management of a country's water resources".[54] Regionalization of Government water administration and integration of water management functions at river basin level, with the participation of the general public, are other outstanding features of the 1985 Water Act.

Fourthly, the new legal regime provides for a integrated regulatory approach consistent with the requirements of the protection of the aquatic environment and other related needs. With respect to the prevention of water pollution from point sources, the Water Act relies on the waste discharge permit system complemented by a charging system designated to penalize the discharges of waste into water, the so called "waste discharge fee"

Some of these apparently radical solutions fade away, nevertheless, if one takes into consideration the real content of the specific provisions in which they are articulated and the manner in which they have been applied in practice. In particular, the principle of public ownership is actually conciled with the resilience of residual private waters as well as with the possibility of interested parties to maintain their pre-existing rights over private waters "in the same manner as hitherto".[55]

All this makes the Water Act less "aggressive" than it was reputed by some when adopted, and more close to the historical regime from which it seemed initially to have dramatically departed.

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[52] Water Act; Preamble, para. 5.

[53] *Ibid.*, para. 5

[54] BURCHI, S. *Op. cit*, p. 240.

[55] Water Act, Transitory Provisions First to Third. See also *infra* pp.

III. THE LEGAL CONDITION OF WATERS UNDER THE WATER ACT 1985

A. THE PRINCIPLE OF PUBLIC OWNERSHIP

The main objective of the Water Act 1985 is the regulation of the public domain over the waters, the use of the water and the exercise by the Government of its powers in matters related to such property[56] for the satisfaction of the general interest.[57] Some of the waters under the State's public domain were formerly susceptible of appropriation, such as underground waters, but this possibility is now precluded by the current Water Act.

The State's public domain over the waters extends to all continental waters forming part of the hydrological cycle, both above and underground, and, according to the provisions in article 2, includes specifically the following:

(a) Inland waters, including surface waters and renewable underground waters, regardless of the renewal lapse of the latter;

(b) The beds of natural, continuous or discontinuous, streams;

(c) The beds of lakes and ponds and those of surface reservoirs in public watercourses;

(d) Underground aquifers as far as disposal of their water resources is concerned.[58]

Mineral waters and thermal springs, although governed by their own specific legislation, shall be considered as belonging equally to the public domain of the State.[59]

In addition to it, riverbanks are submitted to an easement area (*zona de servidumbre*) of 5 meters in-ward for public use and to an additional controlled area (*zona de policia*) of 100 meters in which the use of land and the activities thereon shall be limited. The width of both areas could be extended in the cases contemplated in article 6.

Many of the legal provisions concerning the components of the State's public domain over the waters rise interpretative questions, due either to the lack of sufficient precision in drafting or to the inherent ambiguity of the technical terms employed. These questions should be clarified further when examining the possible extent of private ownership under the next section.

B. THE RESIDUAL SPACE FOR PRIVATE OWNERSHIP

Although the extent of the State's public domain over the waters is overwhelming, the Water Act itself recognizes, either explicitly or implicitly, some cases in which private ownership may be asserted.

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[56] Water Act, article 1.

[57] In accordance with article 149 of the Constitution.

[58] Water Act, article 2.

[59] Water Act, articles 1 and 4.

- In the first place, the Water Act explicitly admits the private nature of the waters of pools (*charcas*) situated in privately-owned land, provided that they are used for the exclusive benefit of such land.[60]

- In the second place, the First additional provision of the Water Act affirms that those lakes, ponds and pools registered in the Real Estate Property Register "shall keep their legal status" upon the entering into effect of the Act. According to this provision, the waters of the said lakes, ponds and pools located in privately owned land[61] and duly registered, which formerly had the legal status of private waters, would continue to remain under private hands[62].

- In the third place, the article 2 of the Water Act implicitly excludes non renewable underground waters (i.e., fossil waters not flowing or running) from the hydraulic public domain of the State[63]. This exclusion has led the dominant legal opinion to the conclusion that such underground waters are *res nullius* that anyone who explores and discovers them (included the riparian owner) could appropriate[64].

- Fourthly, and lastly, in conformity with the second and third transitional provision of the Water Act, pre-existing private titles over surface or underground waters can be optionally maintained "in the same manner as hitherto" although they would be excluded from the new Water Register.[65] This would mean, in the case that the option is exercised with respect to the maintenance of property rights, that the waters concerned would continue to be legally characterized as private water.

The provisions concerning the possibility of maintaining the private legal condition of some surface and underground waters[66] have had in practice a quite extensive effect, thus running against the asserted aim of the Water Acts to put most waters under the State's public domain. In spite of their characterization as legally residual, as a vestige of the old riparian principle now abolished, private waters have continued to have a quite extensive presence in practice.

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60 Water Act, article 10.

61 Since only those waters located in privately owned land were susceptible of private ownership under article 408, 2, of the CC.

62 In this case, according to the interpretation made by Martin Retortillo these waters could be used by its owner without the restriction contemplated in article 10 of the Water Act: *Titularidad y aprovechamiento de las aguas,* Madrid, 1995.

63 Water Act article 2, a), *a contrario sensu.*

64 This interpretation has been upheld by the Spanish Constitutional Court in its decision 227/1998 of 29 November, para. 12.

65 See *infra* pp.

66 Private ownership can be inferred, implicitly, with regard to rainfall waters, provided that they run from their origin only across private owed estates. In effect, on the one hand, the Water Act formally affirms the private ownership of the channels by which occasionally rainfall waters run (article 5,1) and, on the other hand, it confers to the owner of the land the exclusive use of these waters (article 52). Although private ownership of the waters themselves is not formally affirmed, it seems that the confluence of the private ownership of the bed and the exclusive use of the waters by the owner of the estate falls short of that assumption.

IV. THE DIFFERENT USES OF PUBLIC WATER UNDER THE WATER ACT 1985

As part of the public domain of the State, public water can be used by public and private persons in accordance with the provisions of the Water Act, which differentiates between "common uses" and "exclusive uses", without formally defining them.

A. COMMON USES OF PUBLIC WATER

In general, "common uses" of surface public waters, while they flow along their natural beds, can be made by anyone who so wishes in accordance with applicable Laws and Regulations, for the purposes specified by the Water Act, that is for drinking, bathing and other domestic purposes as well as for livestock watering[67]. It has been said that this provision essentially prolongs the historical regime, but it is noteworthy than the Water Act excludes from these common general uses such important activities as fishing and navigation (formerly included), as well as aquaculture (formerly not mentioned), regulated under separate legislation.[68] When carrying out a common use of public surface waters, users must avoid any modification of the volume and quality of the waters used and, when they flow along artificial channels, should comply with the restrictions applicable for the protection of the waterway; in no event, shall the waters be diverted from their channels and the rules governing normal use shall be observed[69].

Other more specific "special common uses" of public waters can be made also with a previous administrative authorization. These special uses are specifically limited to three series of activities, namely: a) navigation and floating, b) the operation of ferryboats and the construction of piers therefor, and c) "any other use, which does not exclude the use of the resource by third parties".[70] Although not formally mentioned in the provisions referring to special uses requiring previous authorization, it seems clear that other uses such as fishing, aquaculture or discharges regulated elsewhere, should be also included here.[71]

B. EXCLUSIVE USES OF PUBLIC WATER

Exclusive uses of public water, in fact the most important ones by their economic significance, can be obtained only by legal conferment (i.e. by operation of the law) or by the grant of an administrative concession, but not by prescription like it used to be the case.[72]

1. Legal conferment of the exclusive use of public water

The Water Act itself provides for two different cases of legal conferment of the exclusive use of public waters, under article 52.

- In the first place, the owner of a plot of land may use the rainwater that flows or accumulates within its boundaries without any restrictions other than those provided for in the Water Act

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67 Water Act, article 48, 1.

68 Water Act, article 48, 3

69 Water Act, article 48, 2

70 Water Act, article 49.

71 See: Parada Vasquez, *Derecho Administrativo, vol. III*, Madrid, 5° de 1993, p. 121.

72 Water Act, article 50.

and those which may result from the recognition of third party rights and from the principle of prohibition of abuse of rights.[73]

- In the second place, subject to the terms which shall be established in implementing legislation, waters originating in springs situated within a plot of land and underground watercourses can be used, provided the total annual volume abstracted does not exceed 7,000 cubic meters

This latter provision, although theoretically offering only a minimal exclusive right to the use of water to the owner of the land in which it springs or is situated, has proved to be in practice a major "leak" in the legal regime established by the Water Act, due to the lack of effective control of its exercise by the riparian owners. Specially with regard to the use of underground water, the possibility contemplated in this provision has permitted many riparian owners to irrigate extensions of land using volumes of water far beyond the modest amount permitted, in violation of the Act.

2. Administrative concession of the exclusive use of public water

The other way to obtain the use of public waters is by administrative concession.

The decision to grant a concession belongs to the discretion of the conceding administrative organ but the Water Act imposes that all resolutions concerning a concession shall state the grounds thereof and be adopted only in the public interest. Any concession would be granted taking into account the joint rational exploitation of surface and underground resources, pursuant to the provisions of the Hydrological Plans and they shall be limited to a term not exceeding 75 years.[74] The order of preference for purposes of granting a concession could be established in the Basin Hydrological Plan and in the absence of it should be the following: (1) drinking supply; (2) irrigation land and agricultural uses; (3) industrial uses for electricity production; (4) other industrial uses; (5) aquaculture; (6) recreational uses; (7) navigation and water transportation; and (8) other uses[75]

In any case, the owners of land affected by an application for underground water exploration shall have preference to be granted the relevant extraction in the order of priorities mentioned above.[76]

V. PUBLIC WATER ADMINISTRATION AND INSTITUTIONAL FRAMEWORK

The administration of water is under the authority of the Government, subject to the following principles stated in article 13:

1. Unity of management, comprehensive treatment, water usage saving, distribution and decentralization of authority, co-ordination, efficiency and users' participation;

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[73] Water Act, article 52.

[74] Water Act, article 57.

[75] Water Act, article 58.

[76] Water Act, article 65.

2. Respect for the water basin as the main unit of action, of the hydraulic systems and the hydrologic cycle and

3. Compatibility of public control of water with territorial planning and development, preservation and protection of the environment and restoration of nature.[77]

The Government exercises its powers, in particular, with respect to the public domain over waters, for the functions provided for in article 15. The Autonomous Regions must exercise their powers over water of drainage basins wholly within their boundaries subject to the same principles and with the modalities set for in article 16.

A. HYDROLOGICAL PLANNING

The main tool for the purposes of administration is hydrological planning, which shall be aimed at the satisfaction of water demand, the harmonization of regional and sectoral development, the increase of the availability of the resource, the protection of its quality and the saving and rationalization of its use in harmony with the environment and other natural resources.

Planning shall be implemented by means of the National Hydrological Plan and Basin Hydrological Plans.[78] As one observer put it "the Spanish law provides an elaborate set of rules outlining the topology of plans (there shall be a River Basin Plan and National Hydrological Plan), the contents of the plans, the process of forming, approving and revising the different plans and the effects of approved plans."[79]

1. The National Hydrological Plan

The National Hydrological Plan shall be approved by means of an Act of Parliament and shall contain in any event:

(a) Measures necessary for the co-ordination of the different Drainage Basin Hydrological Plans.

(b) The preferred option when various possible alternatives are offered by the above.

(c) Plans and conditions for any transfer of water resources between areas covered by different Drainage Basin Hydrological Plans.

(d) Any foreseen changes in the use of the resource which may affect existing uses for the supply of towns or irrigation.[80]

All hydraulic works which are of general interest or which affect more than one Autonomous Region shall be equally approved by an Act of Parliament and included in the National Hydrological Plan.[81]

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[77] Water Act, article 13.

[78] Water Act, article 38.

[79] BURCHI, S. *Op. cit.*, p. 241.

[80] Water Act, article 43.

In view of its formal and material profile, the National Hydrological Plan has a paramount normative character, corresponding to the superior powers of the State for the general planning of the economic activities with regard to Autonomous Communities.[82] In particular, water resources planning is to be co-ordinated with other sectoral planning exercises, most notably in the fields of agriculture, energy, and land use, and such co-ordination is to be effected at the level of the National Hydrological Plan.[83] In fact, the National Hydrological Plan acts as a framework for the development of the different Basin Hydrological Plans that shall be adapted to it.

Be that as it may, the fact is that the adoption of the National Hydrological Plan has proved to be a more difficult task than it was expected when adopting the Water Act in 1985. In fact, more than twelve years later, and in spite of the continuing efforts made by the former socialist Government, the National Hydrological Plan has not yet been adopted, in particular due to the difficulties raised by the possible transfer of water resources between areas covered by different Drainage Basin Hydrological Plans.

2. The Basins Hydrological Plans

The Basin Hydrological Plans shall apply the general goals of hydrological planing to each natural basin. The territorial scope of each Basin Hydrological Plan shall be determined by appropriate legislation.[84]

The Basin Hydrological Plans shall be approved by the Government under the terms it deems more appropriate and according to the public interest.[85] Further revision or modification of approved Basin Hydrological Plans, in the case of those basins wholly contained within the boundaries of one Autonomous Region, could be made by the corresponding administrative authority.[86] The Basin Hydrological Plans shall comprise all the elements enumerated in article 40 of the Water Act.

Although the National Hydrological Plan has not been adopted yet, most Basin Hydrological Plans have been currently approved and entered into force. But, surprisingly enough, this inversion of the framework approach contemplated by the Water Act has not produced much distortion in practice.

B. ECOLOGICAL PROTECTION

For the purposes of satisfying the environmental imperatives of hydrological planning, Title V of the Water Act is devoted to the protection of water and the quality of inland water. It contains provisions covering pollution from both point sources and diffuse sources,

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81 Water Act, article 44.

82 This interpretation has been upheld by the Spanish Constitutional Court in its decision 227/1988, grounded on articles 131 and 141, 1, 3 of the Spanish Constitution and article 38, 4 of the Water Act.

83 BURCHI, S. *Op. cit.*, p. 241.

84 Water Act, article 38, 2.

85 Water Act, article 38,5.

86 Water Act, article 39.

although there is not a corresponding systematic differentiation in the text.[87] Moreover, the provisions of this Title cover not only "pollution" but also other forms of "degradation" of the public domain over the water, terms which are defined in a quite comprehensive manner.[88]

1. General provisions

The objectives of the protection of the public domain over waters against degradation shall be: (a) to achieve and maintain a suitable level of water quality; (b) to prevent the accumulation of dangerous or toxic compounds in the subsoil, capable of polluting underground waters; and (c) to prevent any other activity that may degrade the water.[89]

To that effect, the Water Act establishes protective measures of a general scope such as the compulsory realization of an environmental impact assessment (EIA) as part of the procedures for obtaining authorizations or concessions[90] and the establishment of protected areas around the beds of lakes, ponds and reservoirs[91]. More specific prohibitions, concerning both point sources and diffuse sources of pollution, are provided for in article 89:

(a) To carry out discharges which, directly or indirectly, contaminate the waters.

(b) To accumulate solid waste, rubble or substances which create or might create a risk of pollution of the waters or degradation of their surroundings.

(c) To carry out actions in the physical or biological environment attached to the water which have or might have a harmful effect on such environments.

(d) To carry out activities, within the protection perimeters established in the Hydrological Plans, if such activities could create a risk of pollution or degradation.[92]

The Water Act also provides for the possible restriction of the use of affected aquifers, without limitation, as well as for the redistribution of the location of the existing uses, if necessary, in order to protect underground waters from intrusion of salt water.[93] In contrast, there are no specific legal requirements that a minimum flow be maintained in a watercourse, for the protection of fish habitats, such as with other European legislations.[94]

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87 Although the awareness of the interdependence of land and water resources is not absent in the Water Act, this land-water interface has not been fully developed with respect to the control of water pollution from diffuse sources. In this regard, the Spanish Water Act relies implicitly on the application of the appropriate EC legislation.

88 Water Act, article 85.

89 Water Act, article 84.

90 Water Act, article 90.

91 Water Act, article 88.

92 Water Act, article 89.

93 Water Act, article 91.

94 I.e., France's 1984 Inland Fisheries Law and Britain's 1989 Water Act. See BURCHI, S. *Op. cit.*, p. 244.

2. Waste discharge

The Water Act applies the so called "waste discharge permit system", based on uniform, nation-wide, effluent quality standards for point-source pollution discharges. Thus, article 92 provides that:

All activities that might pollute or degrade the public domain over waters, in particular, sewage and discharge of waste material that could pollute inland waters shall require prior administrative authorization

For the purpose of this Act, discharge shall be deemed as any disposal of waste carried out, directly or indirectly, on the beds, irrespective of their nature, as well as those carried out in the subsoil, land, ponds, excavations by discharge, injection or depositing.

Discharge permits shall set forth in detail the requirements provided in the applicable regulations, including a description of the necessary treatment plants and their monitoring devices, as well as the restrictions placed on the content of the effluents and the discharge fee provided for in section 105 (the so called "waste discharge fee").[95] Discharge activities which may give rise to infiltration or accumulation of substances that might pollute aquifers or underground waters will only be authorized if a prior hydrogeological assessment will show their-harmlessness.[96]

Administrative permits for plants or industries potentially polluting will be granted subject to the condition that the proper discharge permit is obtained.[97] Such authorization could be suspended or modified by the competent Basin organ and could be cancelled by the Government in view of a substantial change of the prevailing conditions[98] or as a consequence of its violation.[99] The Government may order the suspension of those activities which produce any unauthorized discharge, without prejudice to any civil, criminal or administrative liability.[100]

Authorized discharge activities shall be subject to payment of fees to be allocated to the protection and improvement of the resource in each drainage basin, the amount of which would be established in accordance with the provisions of article 105. Therefore the licensing requirements of the Water Act are complemented by a charging system designed to penalize the discharge of waste into waters, introducing a waste discharge fee to be paid by all authorized discharges as long as the discharge continues. This innovative provision could be considered as an application of the so-called polluter-pays principle or principle of internalization of environmental costs; it should be compatible with the financial aids contemplated in article 102.

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[95] Water Act, article 93.

[96] Water Act, article 94.

[97] Water Act, article 95.

[98] Water Act, article 96.

[99] Water Act. article 98.

[100] Water Act, article 98.

Wetlands

Marshlands or areas subject to flooding, including those created artificially, shall be considered wetlands.[10,]

In order to protect these wetlands, all activities affecting such areas shall require prior administrative authorization or concession. Drainage Basin Authorities and the relevant environmental administration shall co-ordinate their efforts in order to effectively protect wetlands of ecological or aesthetic interest and the former may file petitions for the declaration of certain wetlands as of "special interest", as provided for in the environmental legislation. Drainage Basin Authorities may also start proceedings, subject to a favourable report being previously given by the appropriate environmental bodies, to drain those wetlands declared unhealthy or when such action would be deemed in the public interest.[102]

C. INSTITUTIONS AND PUBLIC PARTICIPATION

The institutional framework established by the Water Act aims at a functional integration of the government water resources administration; it provides for bringing government water administration closer to the regional levels of government as well as for the integration of water management functions at river basin level.

The highest authority for the administration of the public domain over the waters is the Central Government, which currently exercises these functions through its Ministry of the Environment. The Central Government powers extend to all aspects concerning the administration of water and, in particular, to the exercise of the functions enumerated in article 15 of the Water Act. Those powers of the Central Government shall be reconciled with these held by the Autonomous Regions which, pursuant to their Statutes, have powers over water of drainage basins fully within their boundaries, subject to the principles set forth in article 16.[103]

Under this political framework a specialized institutional structure is created composed by a consultative national body, the National Water Board, and a number of special public authorities, the Drainage Basin Authorities, in all drainage basins extending beyond the boundaries of more than one Autonomous Region.[104] Although these latter bodies include representatives of the users, specific provisions of the Water Act provide for the creation of "Users Associations" as independent bodies channeling public participation.

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[101] The Water Act is silent about the application of the provisions concerning wetlands to those partly or fully formed by marine waters. The Regulation of the Hydraulic Public Domain (Royal Decree 849/1996, of 11 April) extend the definition of wetlands as to cover also areas of marine waters, in accordance with the provision in article 1 of the Convention on the Protection of Wetlands of International Importance, Ramsar, 2 February 1971.

[102] Water Act, article 103.

[103] This complex relationships has given rise to several pronouncements of the Spanish Constitutional Court. In its decision of 29 November 1988 (referred to in detail *infra*) the Spanish Constitutional Court by a large upheld the 1985 Water Act which it found respectful of the constitutionally established role of the Autonomous Regions and the various Charts (*Estatutos de Autonomia*) of the appellant Regions.

[104] Water Act, article 19.

1. The National Water Board

The National Water Board is the highest advisory board, consisting of representatives from the State's Administration and the Autonomous Regions, the Drainage Basin Authorities and the most important national professional and business organizations related to the different uses of waters.'[105] It has been officially established on 23 December 1991.

The functions of the National Water Board are essentially consultative and consist in giving prior advice on most normative projects of a national scope, as well as on questions affecting more than one Drainage Basin Authorities and even on the blueprints of drainage basin hydrological plans, before being approved by the Government. The National Water Board shall also give advice on any other matter submitted to it by the Government or by the Executive Bodies of the Autonomous Regions and it may propose to the public authorities study and research projects for the development of water technologies.[106]

2. The Drainage Basin Authorities

The Drainage Basin Authorities are public agencies established for the governance of all drainage basins exceeding the territorial limits of any Autonomous Region. They retain the traditional denomination of Hydrographic Confederations (*Confederaciones Hidrograficas*).[107] Currently there are eight such Drainage Basin Authorities covering the North (all Cantabric and Atlantic drainage basins), the Duero river drainage basin, the Tajo river drainage basin, the Guadiana river drainage basin, the Guadalquivir river drainage basin, the Segura river drainage basin, the Jucar river drainage basin and the Ebro river drainage basin.[108]

They are composed by a Governing Board and the Chairman and several management Committees: the Users Committee, the Reservoir Discharges Committee, the Exploitation Committee and the Works Committee, whose functions are established in articles 24 to 34 of the Water Act.

The Drainage Basin Authorities are public agencies with full and separate legal personality, acting in their respective territorial limits which may comprise one or more hydrological basins; they enjoy full legal capacity[109] and patrimonial and financial autonomy[110]. They exercise most administrative, executive and operational functions in their respective territorial basins, as provided for in articles 21 and 22. In particular, the Drainage Basin Authority has the function of preparing the Basin Hydrological plan, administering and controlling the use of the water as well as those uses which are of public interest, and designing, building and exploiting water works.[111] In order to carry out their functions the Drainage Basin Authorities shall have, among others, the power to grant water authorizations

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[105] Water Act, article 17

[106] Water Act, article 18.

[107] These Confederations were introduced during the Dictatorship of Primo de Rivera by a Decree of 5 March 1926. They were a typical example of the so called "institutional participated administration", mandatorily associating with the Administration all the corporate interests involved in a given economic sector. See: Parada Vazquez, R. *Derecho Administrativo.*, Vol. III, Madrid 5° of 1993, p. 132.

[108] RD 650/1987, 8 May (*BOE* 122, of May 22 1987).

[109] Water Act. article 20.

[110] Water Act. articles 35-37.

[111] Water Act, article 21.

and concessions and to inspect and monitor the fulfillment of the conditions of the water concessions and authorizations.[112]

To ensure the appropriate co-ordination for the performance of their respective functions, the Drainage Basin Authorities and the Autonomous Regions may establish a collaboration, in particular, by means of the incorporation of the latter into the government bodies of the Authorities.[113]

3. The Users' Associations

Users of water and other properties subject to public domain who take the water from a single source or whose rights derive from a single concession must form a Users' Association which shall be named according to the intended collective use of the water (i.e., Irrigation Association ...)[114] These *comunidades de regantes* have traditionally achieved a very prominent function in the administration of water for agricultural uses and they continue to do so today.

The administrative structure of a Users' Association is composed by a General Meeting (*Junta General* or *Asamblea*), a Governing Board and one or several Juries, having the powers and functions enumerated in article 76.

The Users' Associations are defined as Public Law Corporations attached to the Drainage Basin Authority; this ascription implies a subordinated link with regard to its general administrative status. Irrespective of that and independently of their mandatory constitution, the Users Association enjoy a large amount of autonomy in their internal regulation and a vast range of powers, including some of a truly executive character. Actually, the Users' Associations have the power to adopt decisions which are legally binding for their members; they may directly execute those decisions in case of non-compliance, charging the costs to the affected user and they can avail themselves of the expropriation procedures and the imposition of the servitudes needed for the performance of their functions.

The Water Act contemplates the mandatory creation of Users' Associations in a given basin[115] or whenever the better use of waters so indicates[116], if the Drainage Basin Authority so decides. The same is also required as a condition to obtain concessions for the supply of water to more than one town[117] or for public' entities, corporations or private persons that "need" to discharge water or waste.[118]

VI. THE CONSTITUTIONAL COURT DECISION OF NOVEMBER 29,1988

Several aspects of the Water Act were challenged before the Spanish Constitutional Court on the bases of substantial unconstitutionality and violation of the allocation of powers

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[112] Water Act. article 22 a) and b)

[113] Water Act, article 23.

[114] Water Act, article 73.

[115] Water Act, article 79.

[116] Water Act, article 80.

[117] Water Act, article 81.

[118] Water Act, article 82.

to the Autonomous Communities. As to the first set of claims, the more important for the purposes of the present paper, two constitutional provisions were particularly envisaged: e. i., article 9, 3, concerning due process of law[119], and article 33 concerning the right to own property and not to be arbitrarily deprived of it.[120] The Spanish Constitutional Court rendered its decision in November 29,1988.[121]

A. THE PRINCIPLE OF PUBLIC OWNERSHIP OF WATER

The first set of considerations dealt with by the Spanish Constitutional Court concerns the formal legal nature of the Water Act, which has been adopted as an ordinary legislative Act. The decision of the Court recognizes that the Water Act is indeed a purely ordinary legislative Act, not having the nature of a "Harmonizing Act" (article 150,3 SC) nor having the rank of an "Organic Act" (article 81,2 SC). Moreover, the Water Act does not have a constitutional character nor it implies the exercise of powers in substitution of the Constitution; it is solely a legislative Act submitted to the requirements of the Constitution.

The second set of general considerations is more far-reaching in as much as it concerns the substance of the Water Act, that is, the Act's asserted will to place all the water cycle under the hands of the State as part of its hydrological public domain. As to this very crucial point the decision of the Spanish Constitutional Court is very clear in affirming that the legislative power is free to adopt its preferred option within the limits of the Constitution:

> "the legislative power enjoys a vast amount of normative freedom to translate into legal rules the different political options ... expressed through the system of parliamentary representation".[122]

Should this freedom of selecting its preferred options be considered arbitrary, capricious, unsound, distortive or generating inequities, this contention should be articulated in detail and demonstrated in principle in a convincing manner. In the opinion of the Spanish Constitutional Court, in the case at hand, such a demonstration has not been made by the claimants, thus allowing for the consideration of the option adopted by the Water Act as a legitimate way of ensuring a better management of water.

In addition, the decision affirms that the legal characterization of water as a part of the public domain of the State is in line with other provisions of the Constitution affirming that "all the wealth of the Country is subordinated to the general interest" (article 128, 1) and imposing to the public authorities the duty to "care for the rational use of all natural resources" (article 45, 2). Moreover, article 132, 2 of the Spanish Constitution, while

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[119] Article 9. 3: "The Constitution guarantees the principle of legality, the normative order, the publication of the norms, the non-retroactivity of punitive provisions which are not favourable to, or which restrict, individual rights, legal security, and the interdiction of arbitrariness of public powers"

[120] Article 33: "(1) The right to private property and inheritance is recognised. (2) The social function of these rights shall determine the limits of their content in accordance with the law. (3) No one may be deprived of his property and rights except for justified cause of public utility or social interest in accordance with the provisions of law."

[121] Spanish Constitutional Court, Decision 227/1988 of 29 November (hereafter Decision)

[122] Decision, para. 7.

excluding some categories of goods from private ownership, permits the legislator to declare the public ownership of others.[123]

In the manner that it has been legally articulated, the option adopted by the Water Act can not be said to have been achieved in a disproportionate manner, or with excessive or unneeded sacrifice of the rights of private persons. In the opinion of the STC three considerations support this conclusion: first, the most part of the concerned water resources were already part of the public domain of the State; second, the Water Act permits the continuance of former rights over private waters in the same manner as before; and third, the same limitations are imposed for the future on both public and private waters.

B. THE RESPECT OF DUE PROCESS OF LAW

A series of claims addressed against the Water Act concerned is purported lack of respect to some basic imperatives of the principle of due process of law as established in article 9, 3 of the Spanish Constitution.

A first element giving rise to objections is the supposed retroactive character of the Act, in as much as it is said to deprive former holders of private water rights from the continuing enjoyment of such rights. The decision of the Spanish Constitutional Court cuts short on this point by affirming that any consideration of the retroactive character of the Water Act should be denied *in limine*, as a misinterpretation of the legal sense of the principle of non-retroactive effects of the law. In the opinion of the High Court:

> "There is not retroactive effect whenever an Act regulates in a manner different and *pro futuro* legal situations created previously to its entering into force ... The Act 29/1985 introduces a new regulation of individual rights over continental waters, without altering the legal effect of rights recognized by the former legislation while being in force. This is a different thing from the fact that the new legal regime does not recognize, from now on, some of the former rights or regulates them in a different manner ... The legislator can modify, in a restrictive manner and with effects *ex nunc*, the pre-existing legal regime of individual rights, whenever this is compatible with the other provisions of the Constitution"[124]

A second element subject to contention was the lack of legal security introduced by the Water Act and its arbitrary character in as much as it had determined substantial changes on the legal titles over waters without being sufficiently justified by the general interest. With respect to the issue of legal security, the decision of the Spanish Constitutional Court underlines that the law is not unclear in its drafting nor is it in contradiction with the imperatives of legal ranking, formal publicity and non-retroactive effect. Moreover, the Act is not arbitrary nor lacks of reasonableness with respect to the licit purposes by which the legislator intends to give an answer to the changing social reality. In conclusion, as the decision reads:

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[123] Article 132(2): Property in the public State domain, as determined by law, is, in any case, the offshore zone, the beaches, the territorial sea, the natural resources of the economic zone, and the continental shelf."

[124] Decision, para. 9.

"... the Act does not violate the principle of legal security, which, one must insist, does not sustain the need to preserve indefinitely the legal regime established in a given historical moment with respect to specific rights or situations."[125]

C. THE RESPECT OF PRE-EXISTING WATER PATRIMONIAL RIGHTS

The most difficult issues raised before the Spanish Constitutional Court referred to the provisions of the Water Act concerning the maintenance of pre-existing water ownership and other patrimonial rights, concerning uses of water, acquired under the legislation since repealed.

In accordance with the first transitional provision of the Water Act , titles to use of public waters acquired by concession or prescriptive acquisition, when duly accredited, may continue for a maximum of 75 years from the entering into force of the Act. And, in accordance with the second and third transitional provisions of the Water Act, those enjoying rights concerning the use of private waters, be they surface or underground, could either voluntarily register them as a temporary use for a maximum of 50 years or else maintain them "in the same manner as hitherto", without then enjoying the administrative protection deriving from the inscription in the Register of Waters. The voluntary maintenance of water rights "in the same manner as hitherto" apparently permits riparian owners to continue to maintain their former rights to use private waters, both surface or underground, in as much as this use would not exceed the amount of water actually abstracted before. In addition, the second and third transitional provisions of the Water Act also affirm that any increase or modification of the use of water would require a new concession covering the exploitation in its entirety; and that the concerned exploitations would be affected by any legal limitations imposed on the use of the hydraulic public domain.[126]

It was claimed by the appellants that this new legal regime violated in some respects the property and other patrimonial rights, protected under article 33, 1 and 3 of the Spanish Constitution, particularly with regard to compensation in case of expropriation. In addition, it was claimed that the provisions concerned violated also the principle of equality before the law, protected under Article 14 of the Spanish Constitution.

1. Limitations on pre-existing rights concerning the exploitation of public waters

The decision of the Spanish Constitutional Court addresses first the issue concerning the limitation to a maximum of 75 years of pre-existing rights for the exploitation of public waters, obtained either by concession or by prescriptive acquisition and possibly established for a longer period or even with a perpetual character.

The decision starts by construing Article 33 of the Spanish Constitution in a quite extensive way, since it affirms that it covers not only "measures depriving of property rights

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[125] Decision, para. 10.

[126] Water Act, Transitional provisions second and third, 4: "In any event, those water uses refereed to in this Transition Provision shall be subject to the regulations governing the overexploitation of aquifers, the uses of the water in the event serious drought or urgent need and, generally, those relating to the restrictions of use of the public domain of the waters."

strictly" but also any other measures depriving individual subjective rights of legitimate interests of a patrimonial nature, such as exploitation rights of goods in the public domain.

This notwithstanding, the decision reads, the situation under consideration does not face the Court to a real expropriation or depriving measure, calling for compensation, but rather with our other type of restrictive intervention not requiring economic compensation.

> "Legal measures generally delimiting or regulating the content of a right which, without depriving of it to its holders, establish a regulation *ex novo* of the pre-existing legal situation are distinct from the concept of expropriation or other forced measures embodied in Article 33, 3 of the Constitution.[127]

In the case provided for in the first transitional provision of the Water Act it can not be said that the essential content of the right has been diluted, since the perpetual nature inherent in property rights does not equally characterizes the rights to exploit goods in the public domain which have been obtained by administrative concession. In conclusion, the decision reads:

> "... the establishment of a maximum period of 75 years is not arbitrary nor creative of lack of legal security, since, although it can imply a diminution of the expectations of patrimonial profit arising from situations created under the former legal regime, this new temporary limit is reasonable and sufficient for the paying off of the works needed for the normal exploitation of the concession, most of all when considering the possibility to have a prorogation of it as provided for in article 57, 6 of the Water Act".[128]

2. Limitations on pre-existing patrimonial rights concerning private waters

The last and most difficult question dealt with by the Spanish Constitutional Court concerns the compatibility with the Constitution of the second and third transitional provisions of the Water Act giving the holders of pre-existing patrimonial rights over private waters the choice to either transform them into a temporary exploitation right for 50 years or to maintain their rights "in the same manner as hitherto" with the limitations already explained at the beginning of this section.

With respect to this issue, the decision of the Spanish Constitutional Court does not find necessary to go as far as the German Federal Constitutional Court did when it affirmed in a similar case that the measures under consideration merely introduced a general limitation on the content and scope of the property right or a transformation of individual legal situations for the benefit of the common interest, not giving a right to compensation. The basic argument of the SCE is that the contested provisions of the WE are compatible with the Constitution in as much as they permit the optional maintenance of any existing patrimonial rights "in the same manner as hitherto". Since the legislation now repealed provided only for limited rights to exploit, extract or dispose of surface waters springing in an estate or of underground waters effectively abstracted and used, the provisions permitting to maintain the existing rights in the same manner as before

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[127] Decision, para. 11.

[128] Decision, para. 11.

> "fully respect, with the same degree of use or material benefit enjoyed up to the date of its entering into force, the same rights and faculties inherent in the estate ownership, that is, in the manner that they accrued to the patrimony of the holder"[129]

This legal freezing of the material contents of formerly vested rights does not imply in any way a partial expropriation of them, for it only eliminates mere expectations of eventual increments in competition with possible third parties' preferential rights. This leads the Spanish Constitutional Court to conclude on this point that:

> "... from the moment that all surface and renewable underground waters become *ex lege* waters on the public domain it is fair that, taking into account the respect of pre-existing rights, the increments over the private flows could only be obtained by administrative concession".[130]

CONCLUSION

The legal regime of water in Spain has experienced an important process of modernization under the Water Act 1985 which, in general, has had positive effects. The most controversial provisions of the Act have been challenged before the Spanish Constitutional Court which, in a landmark decision rendered in November, 1988, upheld the constitutionality of the disputed provisions of the Act with respect to the public ownership of water and the preservation of pre-existing private rights over the water. Nevertheless, with the course of time, it has become apparent that the provisions of the Water Act have not been totally effective in ensuring that all water would be put under the public domain of the State. In fact, the transitional provisions of the Act have survived constitutional scrutiny but have failed to provide enough incentive or pressure to make private owners or users voluntarily put their water rights under the control of the State.

Be that as it may, the Water Act 1985 should be considered as a cornerstone in the modernization of water law in Spain. The imminent completion of the remaining Basin Hydrological Plans would permit to adopt the National Hydrological Plan, thus achieving the full implementation of the Act. However, following the announcements made in its election campaign, the new conservative Administration (*Partido Popular*) is promoting the amendment of some aspects of the Waters Act 1985. According to the explanatory note annexed to the "Draft Bill Amending the Water Act 29/1985"[131], the main objectives of the intended revision are: a) to stress the environmental dimension of the inland waters; b) to regulate the desalination of marine water and the re-use of wastewaters in order to enable the Water Act to extend its intended codifying scope to all water resources; c) to regulate hydraulic works as a specific class of public works, in order to fill a legal gap which generates legal insecurity; d) to facilitate the effective implementation of the financial provisions of the Act, ensuring the elimination of generalized non-compliance situations; e) to introduce transparency through consumption .measurements and the provision and regulation of information rights, in order to promote a water saving policy; f) to develop the functions and

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[129] Decision, para. 12.

[130] Decision, para. 12.

[131] See: *Borrador del Anteproyecto de Ley de Reforma de la Ley de Aguas,* 16 May 1997, and *Memoria explicativa de la reforma de la Ley de aguas* (working documents).

powers of user communities of underground waters, thus responding to a need generated by the transfer of such waters to the State's public domain; g) to make the current legal regime of concessions more flexible so as to accommodate changing situations at a faster pace than permitted by the existing procedures; h) to permit an effective collaboration between the National Water Administration and the Autonomous Regions; i) to reinforce the powers of the organs of users' participation of the drainage basin authorities; and j) to establish effective mechanisms to prevent polluting emissions to inland waters, by introducing operational systems to regularize existing emissions, thus overcoming a situation in which it is more profitable to pollute.

In order to achieve these goals the Draft Bill Amending the Water Act 1985 introduces several changes and additions which may be summarized as follows. It regulates desalination of marine waters by providing for prior administrative scrutiny (art. 12 bis 1) and for administrative concession (art. 12 bis 3) and by declaring desalinated waters as pertaining to the State's public domain (art. 2(e)). The new article 13 regulates the right of access to information concerning waters, in conformity with Act 38/1995, of 12 December implementing Directive 90/313/CEE of 7 June 1990 on "freedom of access to environmental information". The legal regime of the Drainage Basin Authorities is amended to accommodate new legal and judicial developments; the powers of their Governing Boards are increased and co-operation among these Authorities and the Autonomous Regions promoted. A set of most interesting amendments aims at simplifying the administrative procedures for the transfer of concession rights, through a new system of cession contracts which can be registered in the Water Rights Register; these amendments intend to overcome the current paralysis of the transfer procedures defined by the Act of 1985 which are too rigid and ill-adapted to respond to situations of scarce water resources and to the needs of small concessionaires. Other amendments relate to the duty to measure water consumption through approved devices (art. 53(4)), the promotion of the users' participation in the management of underground waters (art. 79)[132] and the reinforcement of the environmental consideration of the rights to use waters (arts. 90, 92, 93(3) and 118)[133]. Finally, the Draft Bill Amending the Water Act 1985, modifies the financial regime of the current Act (arts. 104-106)[134] and regulates hydraulic works with a view to equating its legal regime to that of other public works (arts 114-117).

The extent to which these draft amendments will finally be adopted and provide for genuine improvements in Spain's water legislation compared to the 1985 Water Act, as claimed by their proponents, is yet to be seen. While some of the proposed amendments respond to political positions inspired by the idea of "water markets", others seem founded on non-partisan grounds. Among the latter group, mention should be made of the proposed

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[132] The amendments to article 79 provide for the mandatory constitution of users' associations in the case of aquifers which are, or may be, overexploited (new para. 2) and contemplate the possibility of passing agreements between the Drainage Basin Authorities and users' associations in order to cooperate for the effective control of water rights (new para. 3).

[133] These amendments provide for the reinforcement of environmental impact assessment procedures with respect to authorisations and concessions to use public water (art. 90) or to construct water works of a general interest (art. 118); they also provide for the introduction of the "best environmental techniques" criteria in combination with quality objectives for different waters (art. 92), which could result in a reduction of the amount of the "emission fee" (art. 93(3)).

[134] These amendments provide for the payment by concessionaires of an "occupation and use" fee (*canon de ocupacion y utilization de bienes de dominio publico hidraulico*) (article 104), for the payment of an "emission fee" (*canon de vertido*) which should be employed for the study, control, protection and improvement of the affected drainage basin (art. 105) and for the payment of a "regulatory" fee (*canon de regulation*) by the beneficiaries of water works financed fully or partly by the State (art. 106).

relaxation of the rigidity of the current concessional regime, the regulation of the desalination and reuse of water, the regulation of hydraulic works as a specific class of public works and the establishment of more effective mechanisms to prevent polluting emissions to inland . waters.

HOW STATES IN THE UNITED STATES HAVE HANDLED THE TRANSITION FROM COMMON LAW RIPARIANISM TO PERMITTING REGULATION

by
Eric L. Garner

Partner
Best Best & Krieger LLP
Riverside, California

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TABLE OF CONTENTS

I. INTRODUCTION

This paper highlights the issues that have been involved in a number of states within the United States in the transition from common law riparian systems to systems where a permit is required for the diversion of water. The purpose in highlighting the different issues involved in this transition and in discussing how different states have handled them is to provide guidance to the Government of the Republic of South Africa as it drafts a new law to govern its water resources. Part II of this paper discusses briefly the convergence of the riparian and appropriative water law systems in the United States. Specifically, it suggests that the riparian doctrine and the prior appropriation doctrine are converging into a common system that may be similar to the one adopted for the Republic of South Africa. This section discusses five common themes in the convergence of these two systems. Unfortunately for the individual states in the United States, movement towards incorporating these themes into their water laws must be laboriously accomplished through ad hoc legislative reforms or court decisions. The Republic of South Africa has an opportunity to profit from this knowledge and to incorporate these themes directly into the new law it is drafting. Part III of this paper discusses the issues in making the transition from common law to permitting and how individual states have made this transition.

II. THE CONVERGENCE OF PRIOR APPROPRIATION AND RIPARIANISM IN THE UNITED STATES: THEMES OF THE TRANSITION TO PERMITTING

The past twenty-five years in the United States has seen a gradual convergence of the doctrines of riparianism and prior appropriation. Although this convergence is far from complete, individual states are gradually moving towards comprehensive water systems that, similar to the ones being drafted in the Republic of South Africa, incorporate elements of both the riparian and appropriative doctrines and include a comprehensively regulated permit system. In the eastern United States, states are moving away from a pure riparian doctrine and in the western United States, states are moving away from a strict prior appropriation doctrine. In this process, eastern states have adopted certain aspects of the prior appropriation doctrine, while the western states have modified the doctrine of prior appropriation with some elements that are historically riparian in origin.'This convergence is evidenced by five themes which are important to consider in the transition from a riparian to a permitting system:

A. The Programmatic Scope of Water Regulation;

B. Quantification;

C. Priorities and Public Interest;

D. Environmental Protection/Instream Flows; and

E. Conservation.

A. Programmatic Scope of Water Regulation

Most western states adopted the doctrine of prior appropriation on a state-wide basis. Now, however, a number of western states have enacted legislation authorizing the establishment of groundwater management areas which are designed to meet the specific and distinctive needs of a particular region. In contrast, in eastern states, which have had little state-wide regulation, programs regulating the use of groundwater on a site-specific basis are gradually evolving into state-wide regulation. These trends emphasize the importance of

having water regulation that suits a particular area, and acknowledge that geographical and regional differences may make differing regulations appropriate within the same jurisdiction.

B. Quantification

Because appropriation requires that a diverter have a right to a defined amount of water, water rights in western states have always been quantified. This specificity is now reflected in the laws of many eastern states, most of which have enacted legislation establishing registration or permitting requirements. This trend demonstrates the importance of specificity and certainty in water rights regulation. Rights that do not have a fixed quantity create future uncertainty that can be detrimental to existing and prospective future users.

C. Priorities and the Public Interest

Under the strict doctrine of prior appropriation, priority is the controlling mechanism for distributing water. In eastern riparian jurisdictions, all water users share the resource. Both eastern and western states have adopted legislation requiring the consideration of certain factors, or "the public interest," in considering applications to appropriate water.

D. Environmental Protection/Instream Flows

The strict doctrine of prior appropriation requires the diversion of water from a watercourse before a right to the water is established. This prohibits the recognition of instream flows as an appropriative use. Under common law, riparian water users are governed by reasonable use limitations. However, this typically does not include instream uses. Now, both eastern and western states are taking steps to protect instream flows. This is often a disruptive process, because it tends to displace at least some existing uses. Thus, it is preferable to deal with instream uses in the permitting process instead of after permitted rights have been granted.

E. Conservation

The doctrine of prior appropriation discourages water conservation because water rights are only established if water is diverted and put to beneficial use. This is being changed in a number of western states, which have given the right to use or convey conserved water to a person implementing conservation measures. In a number of eastern states, water conservation must now be considered when granting permits for proposed water users.

III. ISSUES IN TRANSITIONING

A. Permitting

1. Who is the Decisionmaker?

Most states have a central agency that makes permitting decisions. In Delaware, the Division of Environmental Control, through its Secretary, administers the permit system. In Georgia, a water user must obtain a permit from the Director of the Environmental Protection Division of the Department of Natural Resources. In Indiana and Iowa, centralized agencies

also administer permitting. The same is true in Kentucky, Maryland, Minnesota, New Jersey, Wisconsin and Arizona.

Florida has a different system. In Florida, Regional Water Management Districts share responsibilities for implementing Florida's allocation policies with a central state agency. It is these five Regional Water Management Districts that directly administer the permit system and provide the regulatory diversity necessary in different areas of the state.[135] Each Regional Water Management District has flexibility in implementing the permit system.

Certain other states, such as North Carolina, South Carolina and Virginia, have no general permitting requirements but allow the designation of certain management areas, particularly for groundwater. A central state agency regulates and permits water use within these management areas.

2. Standard for Agency Permitting Decisions

Most states require that water use be reasonable and beneficial. The consideration of the "public interest" is also fairly common in permitting and non-permitting jurisdictions. In Florida, to obtain a permit an applicant must establish that the proposed use is a reasonable beneficial use, that it will not interfere with any presently existing legal water use and that it is consistent with the public interest. [136] Reasonable beneficial use is "the use of water in such quantity as is necessary for economic and efficient utilization for a purpose and in a manner which is both reasonable and consistent with the public interest."[37] In determining what is a reasonable beneficial use, the decisionmaker generally must balance the value of the use to society against any harm caused by the use. Techniques that can be implemented to reduce or eliminate the harm are usually factored into the decisionmaking process.

In Georgia, competing applications must be given due consideration and an attempt made to allocate a reasonable supply of water to these applicants. Specific factors are enumerated that must be considered in making a decision on competing applications. Among these factors are the: (1) number of persons using the water source; (2) the object, extent, and necessity of their uses; (3) the nature and size of the water source; (4) the nature and duration of any adverse effect on the water source; (5) the economic consequences of the water uses; (6) the extent of any injury that may be caused by the water uses; (7) the effect of any diversion from or reduction of flows in other watercourses; and (8) prior investments in, and plans for, water use on affected lands.[138] If two applications are equal on these factors, permits may be granted on a prorated basis if feasible.[139] Preference must be given to a renewal application over an initial application.

Georgia has a separate statute that governs groundwater. In considering permit applications, the factors to be considered are similar to those for surface water applications. They include the physical and chemical nature of any impairment of the aquifer adversely

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[135] Florida Statutes, section 373.069.

[136] Florida Statutes, section 373.223(1).

[137] Florida Statutes, section 373.019(4).

[138] Code of Georgia, section 12-5-31(e).

[139] Code of Georgia, section 12-5-31(f).

affecting its availability or fitness for other water uses. [140] The permit application may be denied if the effect of the proposed use is contrary to the public interest.[141]

Indiana has separate legislation addressing surface water and groundwater. Its primary purpose is not to regulate riparian users, but to maximize the use of its water including allowing access to water by non-riparian owners. Domestic water users have preferred status.[142] Indiana also regulates certain designated areas of the state where groundwater withdrawal exceeds or threatens to exceed natural replenishment. These are called restricted use areas.[143] Water users in restricted use areas must obtain a permit if they increase their groundwater withdrawals by more than 100,000 gallons per day. If they do not they are exempt from permitting requirements.[144] Public utilities which serve municipal users are exempt from permitting requirements. In granting or refusing a permit request, the government agency must consider the effect additional groundwater withdrawal will have on future supplies, the proposed use, the effect on present users and the public, and the likelihood and extent of future natural replenishment, and the anticipated demands of future water users.

In Kentucky, a permit may be issued if the proposed use will not be detrimental to public interests or to rights of other water users. No "responsible applicant" that establishes a need for water for a useful purpose may be denied a permit if the water is available.[145]

Maryland requires a permit be obtained to use any waters of the state, whether surface or underground. The permit may be granted if the proposed use provides for the greatest practicable use of the state's waters and will promote the general welfare. A permit may be denied if the proposed use is inadequate, wasteful, dangerous, impracticable or detrimental to the best public interest.[146]

Minnesota has a specific statutory system of water use priorities.[147] Domestic water supply has first priority. Any water use consuming less than 10,000 gallons per day has second priority. Agriculture irrigation consuming more than 10,000 gallons per day and the processing of agricultural products has third priority. Power production consuming more than 10,000 gallons per day has fourth priority. All other uses involving consumption of more than 10,000 gallons per day has fifth and lowest priority.

North Carolina and South Carolina have similar groundwater extraction statutes. In both states certain capacity use areas may be established for groundwater or surface water if the state agency deems it necessary to protect the interests and rights of the public or area residents. In considering permit applications, the state agency may consider the number of persons already using the water source and the object, extent, and necessity of their uses. It may consider the nature and size of water source and the nature and severity of any harm to the water source to be caused by the new user. It also may consider the kinds of businesses and activities affected, the importance and necessity of the uses for which the permit is sought and the extent of injury the new use is expected to cause to existing businesses and activities.

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[140] Code of Georgia, section 12-5-96(d).

[141] Code of Georgia, section 12-5-96(c)(4).

[142] Indiana Code, section 14-25-1-3.

[143] Indiana Code, section 14-25-3-4.

[144] Indiana Code, section 14-25-3-6.

[145] Kentucky Revised Statutes, section 151.170(2).

[146] Annotated Code of Maryland, section 5-507.

[147] Minnesota Statutes, section 103G.261(a).

The prior investment of the applicant in a parcel of land and plans made for using water in connection with the land must be considered in granting an permit. A permit application may be denied if the proposed water use is contrary to the public interest. Non-consumptive use permits contain fewer restrictions and are held to a lower standard."[148]

South Carolina has a groundwater use act that is similar to that of North Carolina. In considering permit applications the commission must consider the number of persons using the aquifer and the object, extent, and necessity of their respective uses, the nature and size of the aquifer, the nature of any impairment of the aquifer, the nature and importance of activities to which the various uses are related, the extent of any injury expected to be caused to the public, and the diversion from or reduction of flows in other watercourses or aquifers.[149]

In Wisconsin if a proposed withdrawal will adversely affect the water availability to any public utility, a permit must either be denied or granted approval with conditions ensuring that the public utility's water supply remain unimpaired. The permit conditions may limit location, depth, pumping capacity, rate of flow, and ultimate use.[150]

3. Exemptions and Prior Users

No class of water use is expressly exempted in Delaware, but the permitting agency has the authority to publish a list of activities not requiring a permit.[151] Pursuant to this authority, reasonable-beneficial uses in existence prior to the adoption of the permit system are exempted, as are wells constructed for ordinary domestic or agricultural purposes. Florida exempts no users at the state-wide level.

In Georgia, a permit must be granted for farm uses, or for any withdrawal, diversion or storage of surface water of less than 100,000 gallons per day. Persons who were withdrawing, diverting, or impounding surface waters for farm uses prior to the effective date of the permitting legislation automatically get a permit for the highest yearly amount they were using in the five years before the act became effective. If the diversion for farm uses occurred after the effective date of the legislation, these diversions are reviewed and granted in light of what is reasonably necessary to meet the water users' needs.[152]

Georgia also has a separate statute regulating groundwater. If the permit applicant was withdrawing water prior to the effective date of the statute, the state agency must take into consideration the extent to which the prior use was reasonably necessary to meet the users' needs and must grant a permit which meets these reasonable needs if other water users in the area will not be adversely affected to an unreasonable extent.[153]

In Iowa, the law purports to leave unimpaired "vested rights" although it regulates riparian rights existing at the time the statute became effective as well as the right not existing at that time.[154] Exempted uses include all beneficial uses of water not exceeding 25,000 gallons

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[148] General Statutes of North Carolina, section 143-215.15(b).

[149] Code of Laws of South Carolina, section 49-5-60.

[150] Wisconsin Statutes, section 144.025(2)(b)(2)(e).

[151] Delaware Code, section 6003(e).

[152] Georgia Statutes, section 12-5-31(g).

[153] Georgia Statutes, section 12-5-97(f).

[154] Iowa Code, section 455B.265(2).

per day. Users who diverted water before the effective date of the legislation are given priority according to the date of their initial diversion or withdrawal. Thus, Iowa grants previously existing water users a large measure of protection.

In Kentucky, permits are not required for agricultural purposes, domestic uses, steam-generating plants and underground injections for oil and gas drilling.[155] Permits also are not required for companies, such as steam generating plants, whose water use activities are regulated by another state agency such as an energy regulatory commission.

In Maryland, domestic uses and agricultural uses of less than 10,000 gallons per day are exempted from regulation. Permits must be granted for agricultural users who were diverting water prior to 1 July 1988. In Minnesota, only domestic uses serving less than 25 persons are exempted. [156]

In New Jersey, only uses under 100,000 gallons of water per day are exempted.[157] A previous permit system was already in place, and all permits issued prior to the new statute are to remain in effect until modified.[158]

In North Carolina, a user must obtain a permit to pump more than 100,000 gallons per day of surface or groundwater.[159] If an applicant was using water prior to the date that a capacity use area was declared, the permit must be granted if the quantity of water being withdrawn is reasonably necessary to meet the applicant's needs and that continued water use will not adversely affect existing or potential public and private uses in the area.[160] In South Carolina, the law is similar except that the prior investment of the applicant in his land, and plans made for water use in connection with this land, must be considered.[161]

In Virginia, no permit is required for agricultural or livestock watering or for withdrawing less than 50,000 gallons of water per day. Beneficial uses in existence at the time that a groundwater management area is created also do not require a permit. However, existing users must file a registration statement with the state to preserve their rights. In Wisconsin, no user may operate a well to withdraw more than 100,000 gallons of water per day from underground sources without a permit.

Arizona has a complex system for dealing with prior users. There are three classes of grandfathered rights in Active Management Areas ("AMA") all based on historic use. Irrigation grandfathered rights are rights to use groundwater for irrigation that are based on historic use on designated irrigation acres. They are fixed at the amount used for actual irrigation in the five years before the act. Type 1 non-irrigation grandfather rights allow use for non-irrigation on lands that were entitled to be irrigated after 1965 and were retired from irrigation before the act in anticipation of a non-irrigation use. The amounts of use under this right may not exceed 4.5 acre-feet per acre multiplied by the years between retirement and the year 2025 minus the actual withdrawals' from 1980-2025. Type 2 non-irrigation grandfather

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[155] Kentucky Revised Statutes, section 151.170(2).

[156] Minnesota Statutes, section 105.41(1).

[157] New Jersey Statutes, section 58:lA-7.

[158] New Jersey Statutes, section 58:lA-6(a)(l).

[159] General Statutes of North Carolina, section 143-215.15(a).

[160] General Statutes of North Carolina, section 143-215.16(e).

[161] Code of Laws of South Carolina, section 49-5-70(G).

rights arise from a history of non-irrigation in an AMA. Holders of Type 2 rights may withdraw an amount equal to the maximum annual non-irrigation groundwater use in any one year in the five years before the act.

Municipal and private water utilities are granted service area rights for non-irrigation uses which allow them to withdraw as much groundwater as needed from within their service areas, subject to conservation requirements. Service areas are the actual areas served and can increase in size with new service connections. Existing wells and new wells of less than 35 gallons per minute are exempt.

4. Procedure for Application

Most states use the same type of procedure. The water user must submit a permit application to the appropriate governmental agency. Upon receiving the application, notice is published in newspapers and perhaps in other forums. A public hearing must be held on the application if one is requested or if the government deems it to be in the state's best interests. The decision by the agency on the permit may be challenged by an appeal to another governmental board or directly to a court.

5. Length of Permit and Process for Renewal

Delaware specifies no duration for water permits, and does not establish a mechanism for suspension, revocation, renewal or transfer. Florida allows permits to be granted for a period of up to 20 years, although Regional Water Management Districts frequently only issue short-term permits of up to 10 years and often only 2 to 3 years when environmental impacts of the consumption have not been fully determined. Renewal of permits in Florida is not guaranteed and the state agency may allocate the water to a more productive use.[162] In Georgia, permits are granted for not less than 10 years or more than 20 years. The duration is based on any reasonable system of classification that includes factors such as source of supply and type of use. A 50 year permit may be authorized for municipalities or other governmental bodies if such a period is required for the retirement of financial obligations such as bonds.[163] Renewals are given preference over new applications. Pursuant to Georgia's groundwater statute, permits may be issued for 10 years or for the period the division finds necessary for reasonable amortization of the applicant's investment in water withdrawal and water use facilities.[164] Permits are renewable.[165]

In Indiana, where permits are required for restricted use areas, there is no provision for modification, renewal or transfer. Presumably once a permit is acquired, it will be effective as long as the restricted use area exists. In Iowa, permits are generally issued for a 10 year period and may be renewed for additional 10 year periods.[166] Kentucky does not specify a permit duration, but declares that a permit merely represents a limited right of use and does not vest ownership or confer an absolute right to withdraw or use water.[167]

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[162] Florida Statutes, section 373.239(2).

[163] Code of Georgia, section 12-5-31(h).

[164] Code of Georgia, section 12-5-97(a).

[165] Code of Georgia, section 12-5-97(b).

[166] Iowa Code, section 455A.20.

[167] Kentucky Revised Statutes, section 151.170(1).

In Maryland permit duration is not limited, but the state is required to review each permit every three years to assure compliance with its terms. In New Jersey, all permits must specify duration, quantity of water and the nature of the permitted use. They may be renewed upon expiration and may be transferred, but only for an identical water use.[168] In North Carolina and South Carolina, permits can be granted either for 10 years, the duration of the capacity use area designation, or for a sufficient time to allow for amortization of the applicant's water withdrawal or water use facilities, whichever is longest.[169] Permits are renewable at expiration and may be transferred.[170] In Wisconsin, every 5 years, the state agency must review all permits issued since 1957 and may revoke a permit.[171]

B. Enforcement

The Delaware permit program can be enforced with civil and criminal sanctions.[172] In Florida, a permit may be revoked for violation of its conditions or for non-use.[173] In Georgia, a permit may be modified if the holder shows that an existing or proposed change in conditions necessitates additional water or that the proposed modification will allocate water more efficiently than the existing permit.[174] The director also may revoke, suspend, or modify a permit for non-use or violation of its conditions.[175] In New Jersey, a permit may be modified, suspended or terminated for violation of permit conditions or agency regulations or orders.[176] There are other similar provisions in most other states.

C. Allocation of Surplus Water

Several states actively encourage the diversion of surplus water. In Indiana, any person with the permission of the Flood Control and Water Resources Commission may divert flood water (defined as a water that is flowing or standing above the top level outside the banks of a watercourse) from any watercourse for any lawful purpose including storage. This diversion must not injure riparian landowners or water users in the watershed from which the water is taken.[177] In Minnesota, appropriation and use of surface water from a stream during periods of floods and high water is encouraged, subject to considerations of purpose, quantity and the number of persons appropriating water. In Wisconsin, surplus water may be diverted from any stream to maintain the normal level of any navigable lake or to maintain the normal flow in any navigable stream.

D. The Issue of Taking Private Property

It is frequently alleged that the regulation of water rights constitutes an unconstitutional taking of private property. Most states that have transitioned from riparian to permitting systems have avoided the takings issue by fully exempting prior users or giving them a preference in the permitting process. Oregon did not, and received a constitutional takings

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[168] New Jersey Statutes, section 58:1A-8(a)(b)(g).

[169] General Statutes of North Carolina, section 143-215.16(a).

[170] General Statutes of North Carolina, section 143-215.16(b).

[171] Wisconsin Statutes, section 30.18(3), 6(d).

[172] Delaware Code, sections 6005(b)(1), 6013.

[173] Florida Statutes, section 373.243.

[174] Code of Georgia, section 12-5-31(i).

[175] Code of Georgia, section 12-5-3 l(k).

[176] New Jersey Statutes, section 58:1 A-8(i).

[177] Indiana Code, sections 13-2-1-4(7), 13-2-1-6(1).

challenge at both the state and federal level. The Oregon Supreme Court upheld the water code requirement that riparian rights could be adjudicated according to a statutory procedure. It held that although the right to the use of water is a property right that cannot be arbitrarily or unreasonably interfered with by the legislature, water rights are nonetheless subject to reasonable regulations which are essential to the general welfare. (In re Willow Creek (1914) 74 Or. 592, 616.) Provisions of its water code were held not to be arbitrary, unreasonable, or unduly burdensome, and since the system included ample notice and hearing provisions for the protection of vested rights, it was not a taking of property without due process of law. The federal Ninth Circuit Court of Appeals also upheld the statute against a takings challenge. (California-Oregon Power Company v. Beaver Portland Cement Company (9th Cir. 1934) 73 F.2d 555.)

When Arizona adopted its Groundwater Code in 1980, it also received both state and federal takings challenges. In Town of Chino Valley v. City of Prescott (1981) 131 Ariz. 78 (Chino Valley II), the court rejected the takings argument, stating that "there is no right of ownership of groundwater in Arizona prior to its capture and withdrawal from the common supply." (*Id.* at 82.) Therefore, Chino Valley had the right to groundwater use only after its removal from the common supply. The court also held that the Groundwater Code was a valid exercise of the state's police power. (*Id.* at 82-83.) The federal court followed Chino Valley II, holding that no right of ownership in groundwater exists prior to its capture, and therefore no unconstitutional taking occurred. (Cherry v. Steiner (D.Ariz. 1982) 543 F.Supp. 1270.) The court also found that the state properly exercised its police power in choosing the public interest in water conservation over the private interest of unrestricted use. (*Id.* at 1278.)

Challenges have also been brought against state laws that allow unused riparian rights to revert to the state. The State of Washington has found that this is not an unconstitutional taking. In "In the Matter of the Determination of the Rights to the Use of the Surface Waters of the Dead Man Creek Drainage Basin" (1985) 103 Washington. 2nd 686, the Washington Supreme Court stated that it is well established that riparian rights may be extinguished or limited by statute. It went on to say that a state has the power to either modify or reject the doctrine of riparian rights because it is unsuited to the conditions in the state and that riparian rights may be limited in order to further state policy encouraging beneficial use. The court found that there had not been an unconstitutional taking by allowing unused riparian rights to be forfeited to the State of Washington because the adoption of its water code had provided sufficient notice and opportunity for the exercise of unused riparian rights.

The Montana Supreme Court reached a similar conclusion. Although Montana is a prior appropriation state, it had adopted a water code which required the registration of riparian rights. The court held that the loss of a riparian right by failing to register it was negligence on the part of the owner and not a result of excessive and unreasonable state action and therefore there was no unconstitutional taking of a private property right. (In the Matter of the Adjudication of the Existing Rights to the Use of the Water Within the Yellowstone River (1992) 253 Montana 167.)

California has a dual system where riparian and appropriative rights co-exist and does not have a permit requirement for the use of riparian rights. However, the rationale used by its courts in regulating riparian rights is very instructive in considering how to avoid a successful takings challenge. Through a series of court decisions, California has redefined the riparian right. In 1928, California adopted article X, section 2 which requires all water uses in the state

to be reasonable. The cases redefining riparian rights flow from the adoption of this constitutional amendment.

In Gin Chow, v. City of Santa Barbara (1933) 217 Cal. 673, the City of Santa Barbara constructed the Gibralter Dam upstream from Chow's property. It was uncontested that Chow had a valid riparian right by virtue of his land ownership, and Chow brought an action to prevent the City of Santa Barbara impounding or diverting any waters of the river above his property. The court found that Chow did not have a right to the full natural flow of the river, that he was getting very little benefit from the extraordinary flood waters of the river, and that his use of these waters constituted a waste of water. The significance of the "Gin Chow" case was that it held that reasonableness was not a fixed concept, but a finding based on the facts of each case.

Similarly, in City of Lodi v. East Bay Municipal Utility District (1936) 7 Cal. 2d 316, an upstream municipal water user built a dam that threatened to impact the well levels of the City. The court held that the City was not entitled to absolute, constant well levels, but could endure a reasonable drop in its well levels that did not significantly impact its pumping. Subsequent case law held that a beneficial use could be unreasonable in certain circumstances, and that a court must consider all the needs of water users in an area and all factors involved including methods of use and methods of diversion. As the court noted in Tulare Irrigation District v. Lindsay-Strathmore Irrigation District (1935) 3 Cal.2d 489, what is reasonable in an area of great water excess may not be reasonable in an area of great water scarcity.

This doctrine was expanded even further in the case of Joslin v. Marin Municipal Water District (1967) 67 Cal.2d 132, which involved a rock and gravel business and an upstream dam. The dam that had been built by the municipal water user threatened to put the rock and gravel company out of business. The court said that this case could not be resolved without consideration of state-wide conditions of transcendent importance, namely that California is a water scarce state. The court found the use of the flow of the river by the sand and gravel company unreasonable in an arid state, and upheld the right of the dam builder to divert the water which resulted in the rock and gravel company going out of business.

People ex rel State Water Resources Control Board v. Forni (1976) 54 Cal. App.3d 743 followed Joslin in holding that a beneficial use could be unreasonable. In Forni, riparian vineyard owners were enjoined from taking water for frost protection in spring months because this dried up the river and made water unavailable to other vineyards with junior appropriative rights. The court held that the water use in this period by the senior riparian water users was unreasonable because it created an unnecessary water shortage. The court found that the only way for the riparians to reasonably exercise their right was for them to build storage reservoirs at their own expense.

In "In Re Waters of Long Valley Creek System" (1979) 25 Cal.3d 339, the court upheld the power of the State Water Resources Control Board to redefine the unexercised right of a riparian owner. "Long Valley" stands for the proposition that an unexercised riparian right can have a lower priority than existing appropriative rights and it may even have a priority below future authorized appropriative uses. The primary basis for this decision was the court's belief that users suffered too much from the uncertainty created by granting an unexercised riparian right a high priority. Thus far this rule has only been applied in statutory stream adjudications.

Finally, in "Imperial Irrigation District", v. State Water Resources Control Board (1990) 225 Cal. App. 3d 548, 573, the California Court made its most expansive judicial statement to date on the modern water use right:

> "All things must end, even in the field of water law. It is time to recognize that this law is in flux and that its evolution has passed beyond traditional concepts of vested and immutable rights ... California is engaged in an evolving process of governmental redefinition of water rights ... 'California has regained for the public much of the power to prescribe water use practices, to limit waste, and to sanction water transfers.' ... the concept that 'water use entitlements are clearly and permanently defined,' and are 'neutral [and] rule-driven.' is a pretense to be discarded. It is a fundamental truth, ... that 'everything is in the process of changing or becoming' in water law (footnote omitted). In affirming this specific instance of far-reaching change, imposed upon traditional uses by what some claim to be revolutionary exercise of adjudicatory power, we but recognize this evolutionary process, and urge reception and recognition of same upon those whose work in the practical administration of water distribution makes such change understandably difficult to accept."

The holdings in these court cases, while perhaps initially surprising, are based upon a conception of property rights in water that is fairly widely held in United States courts. This is a view that the right to water is a right to the use of water not a right to its ownership, and that the fundamental rule of water use is that beneficial use is the basis, measure and limit of a property right in water.[178] Part of this beneficial use limitation is a component of reasonableness, which is contextual and changing in nature. When uses cease to be seen as beneficial and reasonable, however longstanding, they have often been repudiated in favor of modern conceptions of beneficiality and reasonableness.

Water rights are property, but they have no greater protection against state regulation than any other property rights. In fact, water rights have traditionally less protections than most other property rights for the following reasons: (1) because their exercise may intrude on the public domain, they are subject to several limitations such as the navigation servitude and the public trust, and to laws protecting the public domain, such as water pollution laws; (2) their original definition, limited to beneficial, reasonable, and non-wasteful uses, imposes limits beyond those constraining most property rights; (3) insofar as the water rights, unlike most other property rights, are granted by permit, they are subject to the constraints articulated in the permits. Finally, it is not unconstitutional for regulation to constrain pre-existing uses or rights that were legal when initiated. Retroactivity is not the test of compensability. Rather, the test is the diminution in economic value to the property right caused by the regulation.

The history of water law has been one of change. Originally, riparian law was based upon the natural flow doctrine. This doctrine worked well in a pre-industrial society where the highest value of water was instream, for navigation and recreational use. As the industrial revolution began, and as water as a source of power for mills became crucial, the natural flow doctrine (which effectively prohibited diversion of water from streams) gave way to the reasonable use doctrine, which allowed some diversions. The prior appropriation doctrine was

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[178] The concepts below are based in part on two law review articles: (1) Sax, J.L., The Constitution. Property Rights and the Future of Water Law (1990) 61 University of Colorado Law Review 257; and (2) Sax, J.L., The Limits of Private Rights in Public Waters (1989) 19 Environmental Law 473.

the product of necessity in the western United States, and certainly upset the expectations of holders of federal lands who thought that riparian rights were an incident of ownership of riparian land. Thus, it should really come as little surprise to water users that their rights are subject to change.

This is not a new concept. One of the most distinguished jurists in the history of the United States, Supreme Court Chief Justice Oliver Wendell Holmes, wrote in Hudson Water Co. v. McCarter (1908) 209 U.S. 349:

> "[F]ew public interests are more obvious, indisputable and independent of particular theory than the interest of the public of a State to maintain the rivers that are wholly within it substantially undiminished, except by such drafts upon them as the guardian of the public welfare may permit for the purpose of turning them to a more perfect use. This public interest is omnipresent wherever there is a State, and grows more pressing as population grows. It is fundamental, and we are of opinion that the private property of riparian proprietors cannot be supposed to have deeper roots.
>
> ... The private right to appropriate is subject not only to the rights of lower owners but to the initial limitation that it may not substantially diminish one of the great foundations of public welfare and health. (Footnote omitted.)"

Thus, it can be seen that the regulation of water rights has often changed the way in which they can be exercised, yet rarely if ever, has it been considered a taking.

IV. CONCLUSION

This paper has outlined a number of the issues in transitioning from the common law riparian system to a permitting system. Although it has discussed a variety of issues, one of the most difficult issues is how to persons using water before the permitting system is adopted. As can be seen from the examples discussed above, most states chose to avoid this by allowing existing uses to continue. However, if this is not possible in the Republic of South Africa, examples have been shown where states survived constitutional challenges to regulating previously unpermitted uses. Furthermore, California has radically redefined rights of water use without ever receiving a successful takings challenge. Finally, because of the nature of the property right in water, the Republic of South Africa should feel some comfort in

TRADABILITY OF WATER RIGHTS: EXPERIENCE OF THE WESTERN UNITED STATES

by

James W. Johnson
Lauren J. Caster

Directors of Fennemore Graig, P.C.
Phoenix, Arizona

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TABLE OF CONTENTS

1. INTRODUCTION

This paper presents a menu of options for water trading culled from the experience of the western United States. It is hoped that these examples will suggest ideas and perspectives to the drafters of the National Water Bill. The authors are honored to have been asked to undertake this work, but it has been done on short notice and in a very limited amount of time. The authors have no experience or knowledge of the water situation in South Africa nor of the local social, economic, and hydrologic conditions which ultimately determine water doctrine in any particular area.

The western United States[179] (the "western states") are predominantly arid to semi-arid, although portions of some states are quite moist. However, throughout the western states, water supplies have been under increasing demand for decades, and many innovations have extended finite supplies of water to the maximum number of users. If the ideas in this paper are not directly transportable, perhaps they will suggest concepts that can be modified to meet conditions in the Republic of South Africa and illustrate the flexibility that the various water doctrines prevalent in the western states have been able to achieve.

This paper also discusses some of the impediments to tradability of water in the western states. Local or national policies may deem certain trades or types of trades not to be in the public interest and take affirmative steps to restrict trading of water under those circumstances. The western states have experience with the effects of those policy limitations on water trading which can be weighed in the context of the policies the Republic of South Africa is seeking to implement in its National Water Bill.

As a premise for this paper, the authors have been referred to the 28 fundamental principles and objectives for a new water law and an introduction to those principles by Professor Kader Asmal, M.P., Minister of Water Affairs and Forestry. That introduction points out that more than 12 million citizens lack access to clean water. A paper supplied to the authors in connection with this project states that at least one-third of the population of South Africa does not have access to an adequate water supply. Because making water available to all citizens on an equitable basis seems to be one of the primary objectives of this legislation, the authors have focused not only on the tradability of water rights but also on how water law doctrine and legislation have been able to "create" new water without impairing existing uses. In providing water to the people who need it, the effect is the same whether the water was acquired through trade or by other means. Further, the pre-conditions for trading water are often the same predicated as those for developing water by legislation.

Arizona figures prominently in this paper. The authors are from Arizona and are most familiar with the situations there. In addition, Arizona is one of the most arid of the western states and a combination of circumstances have required it to adopt a comprehensive, forward-looking statute to control and reduce groundwater pumping within the state. The Arizona Groundwater Management Act won the Ford Foundation Award for Innovations in State

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[179] There is no precise definition of western states. This paper calls upon the experience of Arizona, California, Montana, Idaho, Wyoming, Colorado, New Mexico, Utah, Nevada, Oklahoma, Nebraska, Washington, and Oregon.

Government in 1986[180]. Also, Arizona distinguishes surface water from groundwater more sharply than does any of the other western states. It therefore follows and integrates three separate water law doctrines: prior appropriation as to surface water, the English doctrine of reasonable use as to groundwater outside active management areas, and a completely regulatory approach for groundwater inside active management areas.

2. PRE-CONDITIONS TO EFFECTIVE WATER TRADING

The western states' experience has shown that certain conditions facilitate effective water rights trading. Among them are:

2.1 Persons Must Have Water Rights to Trade

2.1.1 Ownership of Water Rights

Persons must be recognized as owning or "having vested rights" in the water or the right to use water. Throughout the west, a water right is recognized as a right to use the water and not ownership of the water itself. However, a right to use water is a property right protected from confiscation without compensation by the state and federal government, except to the extent it may be taken or modified in a general exercise of the police power or modified by regulations governing use of the right. It should be noted that water rights are generally always defined by state law, not national law. National (or federal) law applies only to certain federal reservations, and there is no accepted body of federal common law applicable to water.

2.1.2 Certainty of Water Rights

Water rights must be secure and certain in their fundamental attributes. The amount and source of the water and other defining attributes must be known and free from dispute in order that persons trading or acquiring water rights are willing to risk capital in reliance on those rights. There are numerous examples in the western states of potentially beneficial water trades failing to come to fruition because of uncertainty concerning the underlying water rights.

2.1.3. Registry of Water Rights

Generally, the state maintains an accurate catalog of legally sanctioned water rights and their attributes. As trades occur, the catalogs are updated. There is a ready reference where all water rights related to a water system and source can be identified.

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[180] The Ford Foundation Letter, Vol. 17, No. 6 (December 1986). Max Sherman, Dean of the Lyndon B. Johnson School of Public Affairs at the University of Texas, said of the Arizona Act: "No other state has tried to manage its water resources so comprehensively. Arizona built a consensus around its policy and then followed through to make it work in practice. That kind of government has application well beyond natural resource management."

2.1.4 Protection of Other Water Users Who Share the Same Source

Water rights trades usually involve the transfer of use from one type of use to another or from one parcel of land to another. The new use may be considerably distant from the original use. All such trades have the potential to injure other users. The western states all have procedures to review the potential effect of trades on third parties and to assure that they are not injured.

2.1.5 Severability of Water Rights from Land

Most water law doctrines tie water rights to the particular parcels of land upon which the water represented by those rights is used. To establish tradability of water rights, water law doctrines must provide a means whereby water can be severed from particular land and transferred to uses on other land. The laws of all the western states allow such severances and transfers of water rights defined under state law. Laws and regulations applicable to state and federal water development projects, such as dam construction, often do not allow water rights to be so freely transferred. Consequently, transfers of rights under such projects are rare, and the inability to transfer water rights to new uses and thus respond to changing social needs has been one of the often leveled criticisms of such projects.

2.1.6 Type of Use Can Be Changed

Almost all water trades in the western states result in the transfer of water used for irrigation to new types of uses. Water law doctrine must accommodate changes in use. One of the most significant differences between irrigation use and municipal and industrial use is that there is usually return flow to the common source from an irrigation use, while municipal and industrial uses are often 100 percent consumptive. Western water laws commonly take this into account by assuring that the amount of water traded away from a source basin is no greater than would otherwise have been permanently lost had the original use continued.

2.2 Institutional Restraints on Water Marketing Should Be Limited To Essential Government Purposes

Water markets work best where institutional restraints are the least. Throughout the west state and federal laws seek to limit tradability of water for governmental purposes. Federal and state water projects typically prohibit trading in project water allocations for profit and prohibit the use of water off the original project lands. Often these governmental restrictions are motivated by public policy. At the same time, these restraints are criticized as impeding the efficient and socially desirable allocation of water. Where they have been most effective has been in assuring water for basic human consumption, as opposed to use for commercial purposes, and for developing supplies of water needed to preserve wildlife habitat and instream flows. Their effectiveness in other areas is questionable.

Although there are many large well known national water projects in the west, almost all of them irrigation projects, these projects account for only 20 percent of irrigation water

development in the west. At the same time, 85 percent of the nation's irrigation occurs in the 17 western states[181].

3. SPECIAL CONSIDERATIONS IN WESTERN STATES

3.1 Prevalence of Irrigation

Most water trades in the western states involve the transfer of water from irrigation use to municipal or industrial use. The Water Strategist, a publication that tracks water trades in the west, reported 142 transactions in 1996, nearly all of which were transfers from irrigation to some other purpose; 102 were for municipal purposes, 32 were for public trust purposes.[182] 80 to 90 percent of the water used in the western states is used for irrigation, yet irrigation is a relatively uneconomical use of water. In Arizona, 89 percent of water use is devoted to irrigation, but irrigation produces only 2 percent of state's personal income[183]. Increasingly, as water supplies become fully allocated, states are looking to the retirement of irrigated land to make more water available for other purposes. This procedure has become almost essential in Nevada and Colorado and is becoming so in California and Arizona. Arizona has enacted statutes which affirmatively encourage the cessation of irrigation in a number of ways. Given the consumption of water by irrigation compared to other uses, a small percentage reduction in irrigation use or a small increase in irrigation efficiency could easily double the amount of water available for domestic and industrial use.

3.2 Water doctrines Are Biased Toward the Most Dependable Water Supplies

Not all would agree with this statement, but the prevalent water doctrine in each state appears biased in favor of the most dependable water supply available to it. It is universally recognized that surface water and groundwater are hydrologically related in a single hydrological system, but no state has succeeded in treating surface water and groundwater identically under a single water law doctrine. Where groundwater aquifers have limited capacity and are dependent upon annual recharge and where there is fairly dependable surface runoff, states have been more successful in applying the surface water law doctrine of prior appropriation to both groundwater and surface water. In states, such as Arizona, where aquifers contain vast amounts of water in storage, where annual recharge is not essential, and where surface water runoff is erratic, groundwater assumes much greater importance, and a sharper distinction is drawn between surface water and groundwater than in other western states. Where groundwater is a potentially important source of supply, emphasis on hydrological connection, hydrologic cycle, and habitat protection could hold large usable supplies of groundwater captive unless specific provision is made to enable withdrawal of groundwater. These issues directly affect tradability. For example, in New Mexico, surface water rights can be acquired to support groundwater pumping. It has also been speculated that an efficient water allocation system might affirmatively require surface water diversions to be

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[181] Saliba, Water Markets in Theory and Practice, Studies in Water Policy and Management, No. 12, West View Press, Boulder, Colorado (1987) at 36.

[182] 1996 Annual Transaction Review: Markets Evolving to Include Public Trust Purposes. WATER STRATEGIST, Winter 1997, pp. 4 & 16

[183] Inventory of Resources and Uses: Phase I Arizona State Water Plan 148 (July 1975) at 140; Saliba, *supra* note 3, at 36.

replaced with groundwater withdrawals to help support instream flows and wildlife habitat, particularly where surface water flows are not large.

4. DOCTRINE OF PRIOR APPROPRIATION

The doctrine of prior appropriation is the dominant water law doctrine in the western states. It was adopted in the western states in direct response to arid conditions. Until the west was settled, the riparian rights doctrine had been the main surface water rights doctrine in the United States. But that doctrine is unsuited to the conditions in the western states for two reasons. The riparian rights doctrine was developed in the context of an abundance of water and where all water uses occurred near a water source. The prior appropriation doctrine was developed in the west by custom and usage among miners[184] who found that water supplies were limited and that much of the mineral they wanted to work tended to be located away from the stream, sometimes considerable distances away. The western states that initially followed the riparian rights doctrine have since supplanted it with prior appropriation. Although other water doctrines apply in certain western states to certain sources, virtually every western state applies the doctrine to its surface water sources, and several states apply it to groundwater as well. By far, the vast majority of water trades in the west occur under this doctrine. The essential features of this doctrine are discussed below. The application of the doctrine varies in each state according to local conditions, and no state applies the doctrine in its pure form.

4.1 Essential Features of the Doctrine of Prior Appropriation

The doctrine of prior appropriation assigns a priority date to each right based on commencement of the water use, and as a general rule appropriative rights are enforceable in priority, that is, the most senior right is entitled to be satisfied fully before the next most senior right receives any water. Inherent in the doctrine of prior appropriation is the possibility that the stream flow in some reaches will be consumed entirely by one or a series of appropriations. With the advent of modern surface water codes, appropriative rights generally can be obtained only by application to a state agency, which evaluates the application under legislatively defined criteria. If the application is granted, the applicant must put the water to the beneficial use identified in the application within a designated time or lose the water right. An appropriative water right can be lost by failure to use the water during a period established by statute, e.g., five or more consecutive years, unless one of the exceptions created by statute apply, such as lack of water to satisfy the right.[185] This is known as forfeiture of the right. An appropriative right also can be lost if the appropriator decides not to make use of the water again. No passage of time is required for loss in this manner. This is referred to as abandonment. The purpose of the forfeiture and abandonment mechanisms is to free water from the burden of existing but unused water rights so that it may be made available for use by others.

State law identifies those uses it regards as beneficial, and ranks those uses by relative value. In Arizona, for example, the ranking is: (1) domestic and municipal, (2) irrigation and stock watering, (3) power and mining uses, (4) recreation and wildlife, including fish, and (5)

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[184] National Audubon Society v. Superior Court, 658 P.2d 709, 724 (Cal.), cert, denied, 464 U.S. 977 (1983).

[185] Ariz. Rev. Stat. Ann. §45-189 (West Cum. Supp. 1996).

storage underground that is designated as non-recoverable.[186] This ranking most often is significant when the regulatory agency is considering competing applications to appropriate a water supply inadequate to satisfy all applications, but also is an important expression of public policy.

4.2 Water Rights Transfers Under the Doctrine of Prior Appropriation

A change in place and purpose of use will be permitted if others will not be injured in the enjoyment of their water rights.[187] Applications for change in use must usually be made to the State Water Engineer or the Director of the Department of Water Resources, and hearings may be held on the necessary factual determinations. Several issues may arise in such determinations.

4.2.1 Lack of Injury to Other Users

When irrigation water rights are purchased for conversion to a non-irrigation use, the amount which may be transferred to the non-irrigation use is usually limited to the prior consumptive use of the farm. The reason for this requirement is that the amount of water not consumptively used by farming is ordinarily returned to the water supply for reuse by other water users. To allow the full amount of the withdrawal to be changed to a new place of use would increase the net loss to the water supply to the injury of downstream appropriators.

Determination of the consumptive use right of a particular farm calls for considerable fact-finding and administrative headache. First, consumptive use determinations depend on soil conditions, climate conditions, types of crops grown, field grade, proximity to recharge areas, and a host of other factors. Second is the problem of the period of time over which the consumptive use should be determined. Are the crops "historically grown" those grown over the past five years or fifty years? What allowance should be made for years in which fields have lain fallow? Reconstruction of crop histories for more than a few years can prove to be a monumental job. Third is the problem of how to avoid penalizing the farmer who has irrigated efficiently, and avoid rewarding the farmer who has purposely converted to highly water-consumptive crops in order to increase the amount of water right he has for sale. Fourth are issues of seasonality. Industrial and municipal uses tend to withdraw their water at a relatively constant, year-round rate whereas irrigation makes almost all of its diversions in the beginning and middle of the irrigation season. What effect does substituting a year-round demand for a seasonal demand have on the water supplies available for other users in the same basin?

Unfortunately, in many instances, a purchaser will not know what water rights he has bought until he has been through a complicated and expensive administrative process that may include one or more appeals to the courts.

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[186] Ariz. Rev. Stat. Ann. § 45-157(B) (West Cum. Supp. 1996).

[187] See, e.g., Kan. Stat. Ann. § 82a-708a (1977); Mont. Rev. Codes Ann. § 85-2-402 (1979); N.M. Stat. Ann. § 72-12-7 (1978); Utah Code Ann. § 73-3-3 (Supp. 1979); Wash. Rev. Code Ann. § 90.03.380 (Supp. 1980); Wyo. Stat. Ann. § 41-3-104 (1977).

4.2.2 Lack of Flexibility and Damages as a Remedy

Either because it is difficult to show no injury or because it is rarely possible to change a point of use or type of use without somehow causing an injury, these change of use provisions are difficult to use absent agreement between the transferor and the affected water users remaining on the water course. Significantly, a change of use will normally be prohibited if any injury, regardless of degree, would result. Usually, no provision exists to allow a change in use subject to payment of damages for insubstantial injury.[188] One approach would recognize the availability of damages together with groundwater management programs as an adequate substitute for the prohibition on change of use where potential injuries might occur.

4.2.3 Protection of Non-Users in the Source Basin

Experience under the Arizona Groundwater Management Act, discussed below, illustrates how persons in the watershed who are not water users may also be affected and receive protection. Arizona law allows such transportation where other users in the basin are not injured, after taking into account the amount of water that would otherwise have continued to be consumed within the basin. It also provides that if there is injury, the water may be transported subject to payment of damages to other water users who are injured.[189] As cities began acquiring water rights in remote basins, local residents and governments objected. They saw the transportation of water and the retirement of irrigation as an economic loss to their area, resulting in fewer jobs and less tax revenue. They were also concerned about the loss of opportunity for economic development; if the water were transported out of the basin, there would be no opportunity to convert the irrigation water use to some higher economic use within the source basin. The Arizona Legislature responded to these protests in several ways, including enacting provisions for the payment of real property taxes, groundwater withdrawal taxes and economic development fees to the county of origin. Also, transferors have entered into voluntary agreements with local governments to leave certain portions of the water in the source basin to be used for the commercial development of the retired irrigated land.

4.2.4 Public Interest and Public Trust

Consideration of the public interest and the public trust as they relate to protection of wildlife habitat and in-stream flows is a relatively recent development in the western states, and the law in this area is in the formative stage. Considerations of public interest arise from the statutes of the various states which generally prohibit the issuance of a certificate of water right for uses that are not consistent with the public interest. The public trust doctrine derives from the declaration of the United States Supreme Court that land underlying navigable waters is owned by the states.[190]

The courts of some states have interpreted the public trust doctrine to empower the state to limit the use of water, even under previously granted water rights, in order to preserve values associated with riparian habitat.[191] Perhaps the most famous example of this was the

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[188] Governor's Commission to Review Calif. Water Rights Law. Final Report. 54, 72 (Dec. 1978).

[189] See Ariz. Rev. Stat. Ann. §§ 45-545; 45-551-45-559.

[190] Oregon ex rel. State Land Board v. Corvallis Sand & Gravel Co.. 429 U.S. 363. 370 (1977).

[191] See, e.g., National Audubon Society v. Superior Court. 658 P.2d 709 (Cal.), cert, denied. 464 U.S. 977 (1983); United Plainsmen Ass'n v. North Dakota State Water Conservation Comm'n. 247 N.W.2d 457, 462 (N.D. 1976); Morse v. Oregon Division of State Lands. 581 P.2d 520, 525 (Or. App. 1978).

California Supreme Court decision in National Audubon Society v. Superior Court.[192] commonly called the "Mono Lake case." Mono Lake is a navigable natural saline lake that historically supported a large population of brine shrimp, which in turn fed vast numbers of nesting and migratory birds. In 1940 the City of Los Angeles acquired a state appropriative right to virtually all of the flow of four of the five non-navigable streams discharging into Mono Lake. As a result of the city's diversions, the level of the lake dropped; its surface area shrank by one-third; the water became increasingly saline; and islands that once served as nesting areas protected from predators became peninsulas. The California court concluded that the state as sovereign retains continuing supervisory control over its navigable waters and lands beneath those waters. This principle, according to the court, prevents any party from acquiring a vested right to appropriate water in a manner harmful to the interests protected by the public trust. Nevertheless, the state has the power to grant appropriative rights to take water flowing in streams for use at distant locations, even though the exercise of that right will harm the trust uses in the source stream. It is incumbent on the state to take the public trust into account in the planning and allocation of water resources, and to protect the public trust whenever feasible. The court found that this includes the authority to reconsider decisions granting appropriative rights, a process that takes into account the impact of the water diversions on public trust interests as well as the impact of any reallocation of water on the current water right holder.

4.2.5 Environmental and Other State and Federal Restrictions on Transfers

Restrictions on changes in the use of water, as well as continued use of water under rights issued by the state, may be impacted by federal environmental laws as well. There is a growing tension between the requirements of the federal Endangered Species Act"[3] and the exercise of privately owned water rights. The Endangered Species Act establishes broad protections for species of animals and plants formally determined by the federal Fish and Wildlife Service to be "endangered" or "threatened." When designating a species as endangered or threatened the agency must identify its critical habitat, which includes specific areas it occupies that are essential to its conservation. All persons are prohibited from harming individual members of the endangered or threatened species or degrading its habitat to the detriment of the species as a whole. As a general rule, a water rights holder may not impair critical habitat or harm members of endangered or threatened species by a new diversion or a trade of water rights, even if that diversion or trade is otherwise authorized by state law. Thus, if a trade would result in impairment of critical habitat at any location by reducing the amount of water available to it, the trade would be prohibited.

Other significant limitations on water transfers are prohibitions generally contained in authorizations and regulations for federal reclamation projects, such as the Central Arizona Project. Persons are often prohibited from profiting on transfers of allocations of water from the Project from using Project water outside the Project lands that are responsible for repayment of the Project, and sometimes from changing its use. Similar restrictions apply under some state projects such as the California State Water Project.[194] These restrictions are coming under intense criticism and pressure for change. Nearly all of the reasons for maintaining these provisions can be satisfied with arrangements for financial surety or advance payment. The difficulty in acquiring water rights for use off of major governmental

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[192] See preceding footnote.

[193] 16U.S.C.A. § 1531 et seq.

[194] Saliba, *supra* note 4, at 112.

projects is illustrated in California by the Castaic Lake Water Agency in Valencia which recently purchased the entire Devil's Den Water District, including all of its land, solely to obtain its water rights. For the time being, the land will continue to be farmed, but the intention is to use the water off of the land elsewhere as needed.

4.2.6 Conflict Between Prior Appropriation doctrine and Policies for Protection of Wildlife

Use of the public trust doctrine or any other principle to deny or revisit appropriative water rights when water is otherwise available is conceptually inconsistent with the doctrine of prior appropriation. In the western states, the prior appropriation doctrine rose to prominence because, unlike the riparian rights doctrine, it permitted water use to occur away from the stream and result in depletion of stream flow. In at least one state the legislature has attempted to reverse the impact of judicial public trust enforcement[195], by declaring that the doctrine does not apply to the appropriation or use of water or the granting or administration of water rights.[196] In some states alternative measures are being developed to accommodate maintenance of riparian conditions without abrogating the prior appropriation doctrine. One such approach is to recognize instream flows as a beneficial use of water and allow new appropriations of available surface flows for instream purposes. A second approach is to allow those interested in reestablishing or enhancing riparian conditions to acquire existing water rights granted for other purposes and to transfer them to instream use. These acquisitions can be temporary through leasing or permanent through purchase or condemnation. As noted above, there were 32 such water rights trades in the western states in 1996 alone.

4.2.7 Advantages of the Doctrine of Prior Appropriation

Despite the administrative difficulties and restrictions on transferring water under the prior appropriation doctrine, the doctrine has proven quite flexible in allowing the transfer of water from one place and type of use to another. It has significant advantages over the riparian rights doctrine in that it allows water to be used on land distant from the source of the water. Also, the prior appropriation doctrine allows all water, both the firm supply and surplus water of high flow periods, to be appropriated. For the last appropriator on the stream, water may be available only intermittently when the stream experiences high flows or flood stages, but if that person is willing to make the investment to store or use the water when it is available in his turn of priority, then the water may be appropriated.

5. OTHER WATER LAW DOCTRINES: THE DOCTRINE OF REASONABLE USE

5.1 Essential Features of the Reasonable Use Doctrine

Some states like Arizona[197] govern groundwater use separately under the doctrine of reasonable use. A landowner may withdraw and use groundwater from his land for the reasonable use of that land. The concept of priority is inapplicable, and unless modified by statute the doctrine does not restrict the landowner to the use of a particular quantity of water

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[195] E.g., Kootenai Environmental Alliance. Inc. v. Panhandle Yacht Club. Inc.. 671 P.2d 1085 (Idaho 1983).

[196] Idaho Code § 58-1203 (Michie Cum. Supp. 1996).

[197] Ariz. Rev. Stat. Ann. § 45-453.

nor guarantee the landowner that the groundwater supply under his land will be preserved from depletion by the withdrawals of others. The doctrine allows landowners to withdraw and use groundwater in whatever quantities they need for reasonable and beneficial purposes until the underlying groundwater supply is exhausted.

5.2 Transfers of Water Under the Reasonable Use doctrine

Under the doctrine of reasonable use there are no water rights, such as may be evidenced by certificates. Every owner overlying the basin has a co-equal right with all other owners overlying the basin to withdraw as much water from the basin as is needed for the beneficial use of his property.

However, water may not be transported off the land from which it is pumped if others are injured. If water is being transported to the injury of others, it can be enjoined.

The Arizona Supreme Court entered an injunction in a noteworthy case that did allow groundwater to be transported out of the source basin under certain circumstances. The City of Tucson acquired large tracts of irrigated land in an adjoining basin and transported the water from those lands to the City. Neighboring landowners sought to enjoin the transportation. The Supreme Court allowed the City to transport from the land the same amount of water that crops previously grown on the land would have consumed if those crops had continued to be grown.[198]

This approach was subsequently codified by the Arizona Groundwater Management Act. It allows water to be transported away from a source basin in an amount not to exceed 3 acre feet per acre for each acre of land retired from irrigation.[199] Again, there are no water rights evidenced by certificate. This is simply a statutory determination that there is no injury so long as the amount of water transported does not exceed the amount previously consumed by irrigation. The Groundwater Code contained the further provision that water could be transported away from a groundwater basin without threat of injunction so long as the transporter pays damages to those in the source basin who are injured and pays all costs of the injured party.[200]

6. OTHER WATER LAW DOCTRINES: THE ARIZONA GROUNDWATER MANAGEMENT ACT

In 1980, the legislature determined that unlimited application of the doctrine of reasonable use was causing unacceptable declines in the groundwater table in certain areas of the state. It enacted the Groundwater Management Act which largely abrogated the doctrine of reasonable use and replaced it with a completely unique system of statutory regulation. The Act created four "active management areas" co-terminous with the groundwater basins in which they are located. Within those basins, which include 70 percent of the state's

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[198] Jarvis v. State Land Dep't. 550 P.2d 227 (Ariz. 1976).

[199] Ariz. Rev. Stat. Ann. § 45-463.

[200] Ariz. Rev. Stat. Ann. § 45-543. Subsequent legislation significantly narrowed this language to specify that groundwater could be transported away from only certain designated basins or for certain purposes. See generally Ariz. Rev. Stat. Arm. § 45-541-557.

groundwater overdraft and 80 percent of the state's population, the Act comprehensively regulates water withdrawal and usage.[201]

6.1 Essential Features of the Groundwater Management Act

At the time the law was enacted, prior statutes already prohibited opening any new land to irrigation. The 1980 Groundwater Management Act[202] froze all other uses of groundwater at their then-existing levels. Then existing uses of groundwater, other than municipal uses, were grandfather and water rights, called grandfather groundwater rights, were issued for those uses of water. Groundwater may be used in an active management area in only one of three ways: pursuant to a grandfather groundwater right, the service area right of a city or town, or a groundwater withdrawal permit. Permits for groundwater withdrawal can only be issued under limited circumstances, and few have been granted.

Three types of grandfather rights were recognized. The right of land to continue to receive groundwater for irrigation is recognized as an irrigation grandfather right. The law allows irrigation grandfather rights to be converted to non-irrigation use at the rate of 3 acre feet per acre, and these converted water rights are called type 1 non-irrigation grandfather rights. Partly to encourage the retirement of irrigated land and the replacement of irrigation with other uses, irrigation grandfather rights and type 1 non-irrigation grandfather rights are attached to the land which was previously irrigated and for all practical purposes cannot be severed and used elsewhere. There is a third type of grandfather right called the type 2 non-irrigation grandfather right, which represents uses of groundwater for purposes other than irrigation that were in effect upon passage of the Act. These rights may be freely marketed and their locations of withdrawal and use changed within the active management area.

While cities and water companies did not receive grandfather rights for their then-existing uses and therefore have no water rights which can be transferred or evidenced by certificate, they did receive the right to pump water from within their service areas to meet the needs of their customers. This means that so long as they pump from within their service areas, even as those service areas increase in size, cities and towns may continue to pump groundwater in quantities sufficient to meet the needs of their customers. This is similar to the expanding appropriation for municipal purposes under the doctrine of prior appropriation. It may also be said to recognize the distinction between water needed for basic human existence as opposed to commercial uses of water and effectively gives water for human consumption a priority over all commercial uses of water.

Notwithstanding the right of municipalities and water companies to pump groundwater from within their service areas, subsequently adopted regulations mandate that, in the case of providing water for new development and for certain existing development, they must either limit groundwater to no more than 7 percent of the total new demand or pay to replenish that groundwater within the basin with water imported from other sources.[203] This does not negate the cities' expanding service area right, but only places a tax on the use of groundwater for the purpose of augmenting the overall groundwater supply for the benefit of all users.

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[201] Arizona Department of Water Resources (July 1980).

[202] The Arizona Groundwater Management Act is set forth at Ariz. Rev. Stat. Ann. § 45-401 et seq.

[203] Arizona Department of Water Resources, Assured Water Supply Regulations, 7 February 1995.

6.2 Transfers of Water Under the Groundwater Management Act

One of the significant features of the Groundwater Management Act in terms of tradability is the elimination of the complicated, time-consuming, and expensive procedures that apply under the doctrine of prior appropriation when water is transferred from an irrigation to a non-irrigation use. Unlike the doctrine of prior appropriation, there is no determination of natural flow, safe yield, amounts of water consumptively used by crops, seasonality of water use, return flows to the common supply, or the like. The Arizona Groundwater Management Act simply provides that irrigation groundwater rights may be converted to non-irrigation use at the rate of 3 acre feet per acre. Transfer proceedings therefore do not exist. An application if filed with the Department of Water Resources together with the old certificate of irrigation grandfather right, and a new certificate is issued. Prior experience has shown that crops grown in the active management areas of Arizona typically use approximately 3 acre feet per acre of the water applied to it. Therefore, that rule was simply codified.

Type 1 rights, however, may be transported off the land from which they are irrigated at the rate of 3 acre feet per acre, but no use of groundwater may then occur on the land from which the water is transported. This is consistent with the original intent to reduce the overall amount of water usage by retiring irrigated land. That purpose would be defeated, if the prior consumptive use of the irrigated land could be transported off the land while groundwater could be used to support new uses on the same land. Similarly, there are no quantification issues present with type 2 non-irrigation grandfather rights. This may reflect the recognition that non-irrigation uses, typically municipal and industrial, are 100 percent consumptive. These non-irrigation grandfather rights, unlike those which had their origin in irrigated land, are freely transferable within the same groundwater basin.

Another significant aspect of the Groundwater Management Act is that the rules of forfeiture and abandonment generally do not apply. The doctrine of prior appropriation is frequently criticized for its "use it or lose it" rule that if water is not put to a beneficial use for 5 years or more, it may be forfeited or deemed abandonment. To avoid losing rights, users who would otherwise not use their water right continue using the right to avoid forfeiture. Under Arizona law, groundwater rights are not forfeited if they are not used. As a consequence, a large proportion of type 2 non-irrigation rights, in particular, are not used, and the draft on the common basin supply is accordingly reduced.

The Groundwater Management Act permits transportation of groundwater away from basins even where they cause damage to lands in the source basin provided the transferor pays damages to the persons injured. This eliminates the threat of injunction where agreement cannot be reached concerning transfers since, as noted above, it is often difficult to prove that a proposed transfer will not cause some degree of damage to other water users.

6.3 Advantages of the Groundwater Management Act

The Groundwater Management Act offers the same advantages for trading water as the doctrine of prior appropriation. Water may be severed from the land and moved to new land. The type of use may be changed. The land on which the water is used may be distant from the source from which it is withdrawn. In addition, it offers advantages not present under the

doctrine of prior appropriation. Administrative hearings over the extent of natural flow, consumptive use of crops, and the like are avoided. Further, it offers the advantage of not having to determine the amount of flow or safe yield of a subterranean water supply which is almost impossible to calculate on an annual basis as is required under the doctrine of prior appropriation. Uncertainty concerning the amount of water available for transfer is removed. Grandfather groundwater rights are quantified from the beginning. Irrigation grandfather rights and type 1 non-irrigation grandfather rights may be traded for new uses at the rate of 3 acre feet per acre without additional inquiry. Type 2 non-irrigation grandfather rights may be freely moved within the same groundwater basin at their face amount. Finally, transfers of water can be permitted conditioned upon the payment of damages even where there may be injury to water users in the source basin.

7. DEALING WITH SHORTAGE

How the applicable water law doctrine deals with water shortage in dry years has a profound effect on the type of market that develops for water rights. Under the doctrine of prior appropriation, the person with the earliest water right is entitled to have that right fully satisfied before the person with the second highest priority is entitled to receive water, who in turn is entitle to have his right fully satisfied before the person with the third highest priority and so on. Under this system, rights with earlier priorities have greater value than rights with later priorities. Agreements may be reached for senior right holders to forbear exercise of their water rights in times of shortage for the benefit of certain junior appropriators. Several appropriators may join together in a mutual association or ditch company, pooling all of their water rights, and agreeing to share the shortage proportionately. This allows water rights to be transferred very easily in the form of shares to the mutual water company or ditch association.

Arrangements can be made where one class of user suffers a shortage before other users are curtailed. For example, under the Central Arizona Project, any shortage of water available to Arizona from the Colorado River is absorbed first by irrigation users. Not until water deliveries to irrigation users have ceased are municipal and industrial uses curtailed. Drought protection plans in several communities throughout the west specify which classes of users will absorb what portions of water shortages when there is not enough water to go around.

Generally, shortage is not an applicable concept under the groundwater doctrine of reasonable use because each landowner has the right to pump as much water as is needed for the beneficial use of his property even though his neighbors may suffer. However, some states have modified this doctrine. In Nebraska, the doctrine of reasonable use has been modified by the courts to provide that if there is not enough water to meet the requirements of all landowners, then each is entitled to a reasonable proportion of the whole.[204] In California, the courts created the correlative rights doctrine, which allows all landowners over a common groundwater supply to make beneficial use of the supply underlying their lands, but in times of shortage the common supply is apportioned among overlying owners on the basis of their reasonable needs.[205]

Some trades are made specifically with the idea of shortage in mind. No water transfer takes place until there is a shortage. At that time, an agreement is already in place to shift

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[204] Olson v. City of Wahoo. 248 N.W. 304, 308 (Neb. 1933).

[205] Katz v. Walkinshaw. 70 p. 663, 74 P. 766 (Cal. 1902-03).

water supplies. In some instances, a shortage is not actually a physical shortage at all, but a shortage in the traditionally available supplies of water, and trading agreements simply specify who pays for higher cost water under those circumstances.

Several examples of water trades designed to be activated only in the event of shortage are discussed below. Severe shortage has been rare, and it is suggested that agreements and normally applicable provisions of water law doctrine are apt to be set aside by a general exercise of the police power where the shortage is so severe that it could impair the availability of water for domestic use or severely disrupt local economies.

8. COMMON LAW TRADES

8.1 Forbearance Agreements and Agreements to Allow Water To Be Taken Out of Priority

The effect of marketing can be achieved through so-called forbearance agreements under certain circumstances. A senior appropriator, in exchange for compensation, agrees with a junior appropriator that he will not assert his priority, thus allowing the junior appropriator to utilize water that otherwise would be diverted by the senior appropriator. This arrangement succeeds only if the senior appropriator can avoid forfeiture of his right due to nonuse. It also assumes that water right holders with rights senior to the contracting junior appropriator will not object to the agreement as an unauthorized severance and transfer, or capture the unused water for their own purposes before it can reach the diversion point of the junior appropriator.

There are several examples of forbearance agreements throughout the west. A good example is the stipulated decree entered in United States v. Gila Valley Irrigation District which allowed the Coolidge Dam to be constructed in Arizona.[206] The national government financed the construction of a major dam to develop water by conserving flood flows for the benefit of downstream users, particularly the Gila River Indian Community. The Gila River Indian Community claimed the first and highest priority rights on the river. Since the dam affected the water rights of other claimants to the river, a decree was entered which allows other parties under certain circumstances to take water in disregard of the prior rights of the Indians. Thus, the Indians forbear to assert their earlier priorities in exchange for construction of the dam and development of the water supplies which are conserved by it.

8.2 Upstream/Downstream Trades

The classic water trade involves an upstream water user diverting water from a stream that would otherwise flow downstream to another appropriator. The upstream appropriator does not have water rights in the stream, but it does have access to other water which can be delivered to the downstream user. Thus, for example, the Salt River Project in Arizona, which largely controls the water rights in the Salt and Verde Rivers, has concluded exchange contracts which allow water users to divert water upstream on the Verde River in return for the delivery of Central Arizona Project water downstream to the Project's water distribution system.

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[206] United States v. Gila Valley Irrigation District (Globe Equity No. 59), U.S. D. Ct, Dist. of Ariz.

Sometimes, neither party has direct access to the water course. For example, the Metropolitan Water District ("MWD") of southern California has an agreement with the Desert Water Agency which serves Palm Springs, California. Both MWD and Desert Water Agency have State Water Project rights. Desert Water Agency, however, has no access to the California aqueduct that delivers State Project Water. On the other hand, it does have access to the Colorado River aqueduct, but has no rights in the Colorado River. Pursuant to the agreement, MWD delivers Colorado River water to the Desert Water Agency and in return takes an equal amount of the Desert Water Agency's State Water Project water. The agreement has been amended to deal with shortages on the Colorado River. In years when there is surplus Colorado River flow, MWD pre-delivers water to the Desert Water Agency, which is recharged underground for the benefit of Desert Water Agency. Then, in dry years on the Colorado, MWD can continue to use State Water Project water allocated to Desert Water Agency. The Coachella Irrigation District has recently been included in this arrangement.

Sometimes trades can become fairly elaborate involving more than two parties. For example, in the Phoenix area of Arizona, a 3-way trade was made in order to settle claims of Salt River Pima Maricopa Indian Community against the City of Phoenix, the Roosevelt Irrigation District, and the Salt River Project. The City of Phoenix delivers 33,000 acre feet annually of treated effluent to the Roosevelt Irrigation District, an irrigation district that serves land generally west of Phoenix. In turn, the Roosevelt Irrigation District surrendered the right to pump 33,000 acre feet of groundwater from wells located in the Salt River Project service area. The Salt River Project is a federal reclamation project that delivers large amounts of surface water as well as groundwater to users generally located in the eastern area of Phoenix. Salt River Project then delivers back to the City of Phoenix 20,000 acre feet of its surface and groundwater. It also delivers 10,000 acre feet of canal water to the Salt River Pima Maricopa Indian Community located northeast of Phoenix.

8.3 Right of Substitution

Not all trades of water under the doctrine of prior appropriation need be mutual. Several western states, including Arizona, California, Colorado, Idaho, and Utah,[207] recognize the right of substitution. Under that right, the source of the senior appropriator's supply may be changed without his consent. A junior appropriator may divert water upstream in contravention of the downstream senior appropriator's rights provided the junior appropriator supplies sufficient water to the senior appropriator to satisfy his senior right. The junior appropriator may deliver to the senior appropriator water of comparable quantity and quality at the time the senior appropriator would otherwise receive water. Thus, junior appropriators have been allowed to divert water from streams or to pump water from wells, thereby diminishing the water available to downstream senior appropriators provided they delivered other water to the senior appropriator in equal quantity and quality by artificial means equally as effective.

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[207] Adams v. Salt River Valley Users' Ass'n, 89 P.2d 1060 (Ariz. 1939); Pima Farms Co. v. Proctor. 245 P. 369 (Ariz. 1926); Maricopa County Mun. Water Conservation Dist. No. 1 v. Southwest Cotton Co.. 4 P.2d 369, 382 (Ariz. 1931); City of Lodi v. East Bay Mun. Util. Dist.. 60 P.2d 439, 450-51 (Cal. 1936); Joseph W. Bowles Reservoir Co. v. Bennett. 18 P.2d 313, 315-16 (Colo. 1932); Bower v. Moorman. 147 P. 496, 503 (Idaho 1915); Current Creek Irr. Co. v. Andrews. 344 P.2d 528, 531 (Utah 1959).

8.4 Expanding Appropriations for Municipal Use; Service Area Rights

Special accommodation is generally made in the traditional appropriation system for municipal water rights. Unlike appropriations for other purposes, which can be implemented fully in a relatively brief time, appropriations for municipal purposes will be utilized at a gradually increasing rate corresponding to the growing demand of the municipal population. In Arizona, for example, a city applying to appropriate water for municipal use is required to provide the agency with an estimate of the population to be served by the appropriation and the amount of water that population is expected to require.[208] If the agency finds that the estimated needs of the city so demand, the city's application may be approved to the exclusion of all subsequent appropriations.[209] The state of Montana created a system it calls "reservation of waters."[210] The state or any of its political subdivisions or agencies, or the United States or any of its agencies, may apply to the Montana agency to reserve water in designated watersheds for existing or future beneficial uses or to maintain minimum stream flows or water quality. Reservations for instream flow or water quality purposes may not exceed 50 percent of the average annual flow on gauged streams. Subsequent conflicting applications to appropriate water may be rejected or granted on conditions necessary to protect the objectives of the reservation.

9. CREATING WATER THROUGH REGULATION

9.1 Equitable Apportionment

Particularly sensitive issues arise when a conflict develops between one state and another over their respective residents' use of water from an interstate stream. If the states are unable to resolve these disputes by agreement, they may ask the United States Supreme Court to allocate water between them under the federal common law doctrine of equitable apportionment. The Court attempts to protect existing uses to the extent possible, but is not bound by a strict application of priority.[211] It regards the water law of the states involved to be an important but not controlling factor.[212] The Court considers a variety of factors in arriving at a fair and equitable allocation of water between the states, including the water law of the states involved; the physical and climatic conditions; the consumptive use of water in the various identifiable segments of the stream; the character and rate of return flows; the extent and location of established uses; the availability of storage water; the practical effect of wasteful uses on downstream areas; and the harm to upstream areas as compared to the benefits to downstream areas if water use in the former is limited.[213] It will consider claims by a party state to a right to divert water for future uses as part of the equitable apportionment analysis.[214] The Court has invoked equitable apportionment not only to require the reasonably efficient use of water, but also to impose on states an affirmative duty to take reasonable steps to conserve and augment the water supply in interstate streams.[215]

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[208] Ariz. Rev. Stat. Ann. § 45-152(B).

[209] Ariz. Rev. Stat. Ann. § 45-153(B) (West Cum. Supp. 1996).

[210] Mont. Code Ann. § 85-2-316 (1995).

[211] Nebraska v. Wyoming. 325 U.S. 589. 618 (1945)

[212] Colorado v. New Mexico. 459 U.S. 176, 184 (1982).

[213] Nebraska v. Wyoming, supra. 325 U.S. at 618.

[214] Colorado v. New Mexico, *supra,* 459 U.S. at 190.

[215] *Id.* at 185.

9.2 Eminent Domain

Through the power of eminent domain, government may take privately owned property for the public good, provided that it justly compensates the owner. In this way cities, by compensating current water right holders, may secure additional water supplies for their growing populations. In some states the riparian rights doctrine was in effect before the prior appropriation doctrine was adopted. In this circumstance the interplay of the two doctrines can raise interesting water allocation issues, because the appropriation system permits diversion of water to the point of exhausting the stream flow, while the riparian doctrine gives the riparian owner the right to a reasonable use of the water of a stream running over or by his riparian land. In Nebraska the conflict was resolved by concluding that the riparian right is inferior to the appropriative right in the sense that the former in effect could be taken by the appropriator by eminent domain, with the riparian owner's remedy limited to just compensation.[216]

9.3 Salvaged Water

Some states recognize the concept of salvaged water. A water user may implement measures to conserve water originating in the watershed that would not otherwise be available to appropriators. Typical examples are lining irrigation ditches to prevent seepage and clearing streams of water-consumptive plants called phreatophytes.[217] The water conserved is commonly called "salvaged" water and often the person who salvages the water is entitled to use or trade it. The rule is based upon the equitable concept that a person who invests time and funds in such a project is entitled to receive the benefit of it.[218]

Some legislatures have offered incentives to salvage water. Montana and California have codified the rule that a salvager has the right to the salvaged water.[219] In Washington, funding is available to individuals to help implement facilities to save water. The water saved becomes a "trust water right" that is held by state.[220] In Oregon, a water user may submit a conservation proposal to the Water Resources Commission. If the proposal is approved, the Commission may allocate 25 percent of the conserved water to the state, with the salvager retaining the remainder.[221] This approach provides the salvager the incentive to conserve water while passing part of the benefit to the state.

9.4 Beneficial Use

The salvaged water rule appears to be substantially a creature of public policy. Not all western states have taken the same direction. While much of the law in this area appears to be in a state of formulation, the contrary view is based upon the concept of "beneficial use."

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[216] McCook Irrigation & Water Power Co. v. Crews. 102 N.W. 249 (Neb. 1905); Nebraska v. Wyoming, supra. 325 U.S. at 599-600.

[217] Pikes Peak Golf Club, Inc. v. Kuiper. 455 P.2d 882 (Colo. 1969).

[218] Wells A. Hutchins, Water Rights Laws in the Nineteen Western States, pp. 565-66 (1974). See Bassinger v. Tavlor. 211 P. 1085, 1086 (Idaho 1922).

[219] Mont. Code Ann. § 85-2-419 (1991); Cal. Water Code § 1011 (West Supp. 1992).

[220] Wash. Rev. Code Ann. §§ 90.35.005-90.38-902 (West Supp. 1992).

[221] Or. Rev. Stat. §§ 537.465-537.475 (1987).

Nearly every state, by constitution, statute, or case law, has adopted the principle that "beneficial use shall be the basis, measure and limit to the use of water."[222] The concept of beneficial use is one of reasonableness. What is reasonable changes with time and circumstances.[223] And, as generally applies with questions of reasonableness under the law, questions of beneficial use are to be determined on a case by case basis.[224]

As used historically, beneficial use appears to have meant little more than putting water to actual use for some suitable purpose and not wasting it.[225] Use was generally assumed to mean use for irrigation or municipal and industrial purposes. Leaving water in the stream for wildlife protection or storing it were not beneficial uses.

Increasingly courts are examining the reasonableness of particular use and of the amount of water used. The courts may consider the overall public interest in determining the reasonableness of a use and may protect other uses the public deems appropriate.[226] Where the amount of the individual's appropriation may have been inviolate in the past, courts may now be willing to consider that notwithstanding the amount of the appropriation, the most water that may be used is the amount which is actually required for the beneficial use considering reasonable water conservation and reasonable return on investment.[227] If the amount reasonably required for the use is less than the appropriation, then the amount reasonably required may be the maximum that can be used.

Where farmers have sought to sell to municipalities the portion of their appropriations not needed for their irrigation uses, courts have relied upon the beneficial use limitation to prevent the sale. Because beneficial use limits the appropriator to the amount of water necessary for his beneficial use and because the whole amount of his appropriation was not required for his irrigation use, as demonstrated by historical usage, his appropriation was therefore found limited to the historically used. There was no excess to sell.[228]

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[222] Ariz. Rev. Stat. Ann. § 45-141(B) (1987); See, Alaska Const, art. VIII, § 13; Cal. Const, art. X, § 2; Colo. Const, art. XVI, § 6; Idaho Const, art. XV, § 3; Idaho Code § 42-104 (1990); Mont. Const, art. IX, § 3; Neb. Const, art. XV, § 15; Nev. Rev. Stat. § 533.035 (1991); N.M. Const, art. XVI, § 3; N.M. Stat. Ann. § 72-1-1 (1985); Okla. Stat. Ann. tit. 82, § 1052 (West 1990); Or. Rev. Stat. § 537.120 (1988); Utah Const, art. XVII, § 1; Utah Code Ann. § 73-1-3 (1989); Wyo. Const, art. XVIII, § 3. See also 43 U.S.C. § 372 (1988) which applies the beneficial use requirement to federal reclamation projects.

[223] United States v. Alpine Land & Reservoir Co.. 697 F.2d 851 (9th Cir.), cert, denied. 464 U.S. 863 (1983); Empire Water & Power Co. v. Cascade Town Co.. 205 F. 123 (8th Cir. 1913); Tulare Irr. Dist. v. Lindsay- Strathmore Irr. Dist., 45 P.2d 972 (Cal. 1935).

[224] Tulare. 45 P.2d 974, 1007 (Cal. 1935); see also. Doherty v. Water Resources Director. 783 P.2d 519, 525 (Or. 1989); Imperial Irrigation District v. State Water Resources Control Board. 275 Cal. Rptr. 250, 267 (Cal. Ct. App.), cert, denied. 112 S. Ct. 171 (1991); Citv & County of Denver v. Sheriff. 96 P.2d 836, 842 (Colo. 1939); John Meier & Son v. Horse Creek Consery. Dist.. 603 P.2d 1283, 1288 (Wyo. 1979).y

[225] George W. Pring & Karen A. Tomb, "Legal Barriers to Conservation and Effluent Use of Water in the West," 25 Rocky Mt. Min. L. Inst. (1979) 25-12 to 25-16; A. Dan Tarlock, Law of Water Rights and Resources, § 516[3] [a].

[226] See Imperial Irrigation Dist. v. State Water Resources Control Bd., 275 Cal.Rptr. 250 (Cal. Ct. App.), cert, denied. 112 S. Ct. 171 (1991); Department of Ecology v. U.S. Bureau of Reclamation. 827 P.2d 275, 282 (Wash. 1992).

[227] Texas defines beneficial use as the "amount of water which is economically necessary . . . when reasonable intelligence and reasonable diligence are used in applying the water to that purpose." Tex. Water Code Ann. § 11.002(4) (West 1988). See also S.D. Codified Laws Ann. § 46-1-6(3) (Supp. 1992).

[228] Farmers Highline Canal & Reservoir Co. v. Citv of Golden. 872 P.2d 629 (Colo. 1954); Salt River Valley Water Users Association v. Kovacovich. 411 P.2d 201 (Ariz. Ct. App. 1966).

Some cases are especially interesting in that they suggest that what is a beneficial use of water may change with time and circumstance. One such is Tulare Irrigation District v. Lindsay-Strathmore Irrigation District, where the language is broader than the result:

> What may be a reasonable beneficial use, where water is present in excess of all needs, would not be a reasonable beneficial use in an area of great scarcity and great need. What is a beneficial use at one time may, because of changed conditions, become a waste of water at a later time.[229]

9.5 Mandatory Water Conservation

Mandatory water conservation imposed on all water users can be a source of additional water without impairing the uses of existing water users. Most states have statutes which prohibit waste of water, generally without defining the term waste, but water conservation can go far beyond this. In Arizona, the Department of Water Resources affirmatively limits the amount of water which can be used by each class of water user, in some cases setting individual water allotments. This is the maximum amount of water that may be used for the purposes for which those persons use water, even though their water rights may be more extensive. The water conservation regulations are rewritten every 10 years in the form of a water management plan for each decade. The water conservation standards become more stringent with each decade, based upon the availability of better water conservation technology. Although in Arizona the purpose of the water conservation regulations is not to create new water rights which can be transferred but to reduce overall groundwater use, the results have been dramatic. For example, the amount of water needed for residential use in new housing developments has been reduced by above 50 percent in the 30 years since the first management plan went into effect. Although the act applies only to groundwater use, wherever surface water is used in conjunction with groundwater, which is almost universally the case, then no more total water may be used than if groundwater alone had been used.

The largest user of groundwater in Arizona is irrigation. Since one of the goals in Arizona is to reduce the total amount of land in irrigation, prohibitions on opening any new land to irrigation have generally been in effect since 1954 in the major agricultural areas of the state. The Department of Water Resources sets a maximum water allotment for each farm based upon the crops historically grown and assuming increasingly stringent measures for the efficient application of irrigation water such as lining irrigation canals and laser leveling fields. Based upon scientific studies of the evapotranspiration rates of crops, maximum efficiency is sought. Farmers were given tax credits for the installation of meters to measure well discharge. Farms are the only class of water user in Arizona that are not actually required to use water conservation techniques; however, their maximum water allotments are set on the assumption that those water conservation techniques will be employed. The farmer has a choice either to use water conservation measures or to irrigate less land.

Mining is a large part of the Arizona economy although not to the same extent it is in South Africa. Water conservation standards for metal mining are based upon the assumption that 75 percent to 85 percent of the mines' total water needs will be met with recycled water. Water conservation standards for mines set forth requirements for maintaining prescribed

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[229] Tulare, *supra* at 1007.

tailing densities, sealing tailing pond beds, constructing interceptor wells, and managing water and tailing impoundments. Mines are required to submit water conservation plans that include analyses of the feasibility of using effluent.

Electric power plants are required to achieve seven cycles of concentration in cooling towers; new power plants are required to average 15 cycles of concentration.

Use of single pass cooling towers by industrial users is generally prohibited unless the water is reused for other purposes. All industrial users are required to "make diligent efforts to recycle water," and all industrial users of more than 100 acre feet of water annually are required to submit water conservation plans which, among other things, will identify opportunities for recycling. Sand and gravel operators are required to recycle wash water using disposal ponds or clarifiers and to submit plans for increasing water efficiency, including the use of effluent and poor quality groundwater.[230]

Municipal and domestic use is generally regulated by setting the maximum number of gallons per person per day that a water company or city may serve to its customers. This gpcd rate is decreased with each new management plan and sometimes in stages during a single management plan.[231] It is generally up to the water company and its customers to comply with these requirements, but certain specific water conservation technologies must be employed. For example, only low water use fixtures may be sold or used anywhere in the state.

9.6 Water Use Tax for New Projects

The Arizona Groundwater Code also contemplates that the state will purchase existing water rights and retire them from use, that it will conduct water augmentation programs and encourage others to do so, and that it will sponsor research on water conservation. To this end, the Code imposes a tax upon the use of groundwater, payable by all water users according to the number of acre feet consumed.[232]

9.7 Prohibition on Certain New Uses

The state may also prohibit certain new uses of water which it deems not to be a beneficial use. For example, statutes in Arizona prohibit opening new land into irrigation and constructing artificial lakes or ponds.[233] The landscaped areas of golf courses are limited to approximately two-thirds of the national average (and often they are required to be watered solely with effluent). Landscaped areas in street medians, parks, schools, commercial establishments, and subdivisions are also limited.[234]

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[230] See, e.g., Arizona Department of Water Resources. Second Management Plan. Tucson Active Management Area (1991) 144 § 6-102.2 (single pass cooling towers); 144 § 6-102.1 (recycle;) 144 § 6-103.A.2 (recycling plan); 181-182 § 6-502 (sand and gravel); 184, 188 § 6-602, 191 § 606 (metal mining); 195-96 §§ 6-702, - 703 (electric power plants); 162-63 (effluent on golf courses).

[231] See, e.g.. Ariz. Rev. Stat. Ann. § 45-565.

[232] Ariz. Rev. Stat. Ann. § 45-611.

[233] Ariz. Rev. Stat. Ann. § 45-611.

[234] See, e.g., Arizona Department of Water Resources Second Management Plan, Phoenix Active Management Area (1991), Industrial Conservation Program § 6-101 et seq.

9.8 Required Phase-Outs

The state might also require certain existing uses to be phased out over time. Examples include statutes that limit the issuance of certificates of appropriation to certain periods of time such as 20-50 years. This approach was endorsed several decades ago by the National Conference of Commissioners on Uniform State Laws in their Model Water Use Act.[235] It is utilized in Illinois (limiting permits to specific terms not exceeding 40 years)[236] and Iowa (permits may be granted for ten years, or for less than ten years if for groundwater withdrawal and the aquifer capacity is uncertain).[237] A rationale advanced for this approach asserts that the investments made in reliance upon those appropriations can be recovered together with reasonable economic return within those designated periods of time.

The Arizona Groundwater Management Act, in addition to having a unique provision that sets the maximum water duty on each farm, contains a further provision that beginning 20 years after enactment of the Code in 1980, the Department of Water Resources may reduce the highest 25 percent of water duties by up to 10 percent.[238] This again may be taken as a reflection of a reasonable phase-out. The Arizona Groundwater Management Act also contains provisions requiring cities and water companies as a condition to having certain administrative designations to effectively phase out their use of groundwater over 15 years.

9.9 Forfeiture and Abandonment

As discussed above in Section 6.2, the rules of forfeiture and abandonment can operate to make additional water legally available to other appropriators or to the state.

10. CREATING WATER THROUGH WATER CONSERVATION

10.1 Storage Projects; Conservation Pools in Dams

Natural surface stream flows in much of the western United States are abundant only during runoff due to mountain snow melt or intense seasonal rainfall. The timing of these flows tends not to correspond to the peak demand for irrigation, and the flows themselves can cause destructive flooding. To conserve the surface stream supply for gradual release and to reduce flooding, dams have been constructed throughout the region. In Arizona, for example, the Salt River flows through the Phoenix metropolitan area. Upstream from the urban area is a series of dams creating reservoirs with a combined storage capacity of nearly two million acre feet.[239] State laws contemplate that the party intending to construct a dam will apply for a storage right. The right to store surface water will be assigned a priority like other appropriative rights. A storage right is secondary to a right to put the stored water to a

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[235] MODEL WATER USE ACT § 406 (Final Draft 1958), WATER RESOURCES AND THE LAW (U. Mich. Legis. Research Center 1958). In the accompanying comment the Commissioners suggested a maximum term of 50 years, and explained that the term must be sufficiently long to allow recovery of investments and to afford enough time for repayment of municipal bond issues.

[236] 111. Comp. Stat. § 5/18 (West 1997).

[237] Iowa Code Ann. § 455B.265(3) (West 1997).

[238] Ariz. Rev. Stat. Ann. §45-566.A. 1.

[239] Vol. 1, Ariz. Dept. of Water Resources, Preliminary Hydrographic Survey Report for the Upper Salt River Watershed (Dec. 1992) at 331.

beneficial use, that is, storage itself is not a beneficial use of water.[240] On the other hand, the state may be authorized to secure the right to store water for recreation or wildlife purposes by appropriation, purchase, lease or eminent domain.[241]

Dam construction opportunities are also opportunities for trading. An often present feature of water rights settlements and water trades is the creation of some additional amount of water through the cooperative efforts of the parties. Where the total supply of water available to all parties is augmented, agreement is much easier than where an existing finite supply must be reallocated. There are frequent examples of persons paying to increase the water conservation potential of storage projects such as dams in return for receiving a portion of the additional water developed.

To promote construction of needed water storage projects, the state may grant a preference among competing appropriation applicants to those that contribute toward the funding of required storage improvements, thereby making additional water available for appropriation. Arizona again provides an example. Several cities in the Phoenix metropolitan area contributed to the cost of raising the height of an upstream dam on the Salt River system. Storage capacity was increased by more than 250,000.[242] The legislature directed the responsible state agency to prefer their applications over competing applications.[243]

10.2 Phreatophyte Control

Water conservation can be achieved by reducing losses to phreatophytes.[244] Prior to the initiation of farming in many areas of the western states, the floodplains along the streams were occupied by riparian vegetation. Early farmers cleared much of this vegetation to cultivate the floodplains. Despite these efforts, phreatophytes still grow in the main channels of the streams. The state water agency estimates that in one southern Arizona watershed the remaining phreatophytes cause the loss of 54,100 acre feet per year from the hydrologic system (89 percent of all natural losses), as compared to 64,600 acre feet per year of depletions attributable to human activities. The total estimated annual diversion for human and natural uses in the watershed is 170,090 acre feet.[245] The agency estimates that in some areas of the watershed cultivated crops use less water than the phreatophytes they replaced.[246]

10.3 Conservation Assistance

The Metropolitan Water District of Southern California serves water to 26 member agencies in southern California, including the cities of Los Angeles and San Diego, with a population of over 14 million. As its water supplies have come under strain for various reasons, including the Mono Lake decision discussed in Section 4.2.4, it has sought to finance

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[240] *Kg,,* Ariz. Rev. Stat. Ann. § 45-161 (West Cum. Supp. 1996).

[241] E.g., Ariz. Rev. Stat. Ann. §§ 45-152; 45-157(B) (West Cum. Supp. 1996); 17-241

[242] Vol. 1, Preliminary Hydrographic Survey Report for the Upper Salt River Watershed, *supra.*

[243] 1986 Ariz. Sess. Laws, 2d Reg. Sess., ch. 21, § 28.

[244] A phreatophyte is a plant with roots extending to the water table or to the capillary fringe above the water table. Phreatophytes typically have high water consumption rates compared to other plants.

[245] Vol. 1, Ariz. Dep't of Water Resources, Hydrographic Survey Report for San Pedro River Watershed 174 (Nov. 20, 1991).

[246] *Id* at 216.

conservation measures for outlying irrigation districts in exchange for the right to use conserved water. Such measures include lining the irrigation districts' canals. These irrigation districts divert water from the main stream of the Colorado River, on which several large federal dam projects have been constructed. California is also proposing that to the extent that the water diversions of the California irrigation districts from the Colorado River are reduced because of enhanced water conservation measures, that the state be allowed to store that conserved water in federal dams on the Colorado River.

10.4 Exchange Pools; Replenishment Districts

In California and Arizona, restrictions on the use of groundwater have led to creation of exchange pools and replenishment districts. In the Central and West Coast Basins of Los Angeles County, California, groundwater has been allocated by adjudication to various users. A water master operates a pool whereby water is transferred from users who do not use all of their groundwater to users who desire to use water in excess of their allotment. There are no private negotiations between water users. The basins participate in various water development and protection programs including replenishment and the charge per excess acre foot is set annually based on actual costs.[247]

In Arizona, groundwater is likewise managed on a basin-wide basis and new agency rules applicable to new development and certain types of existing development virtually prohibit the use of groundwater. However, substantial supplies of groundwater may be available to the lands planned for development. Under these circumstances, state law allows the use of groundwater notwithstanding the general prohibition provided the land is placed in a groundwater replenishment district.[248] A tax is levied upon water use on the district member lands. The tax is paid to the replenishment district which uses the money to acquire water from outside the groundwater basin and to recharge it within the basin. Thus, for each acre foot of groundwater withdrawn in excess of the allowed amount, an acre foot of water is recharged. The tax is determined year by year according to the replenishment district's actual costs for acquiring and recharging water. The replenishment tax is levied at a uniform rate per acre foot according to the number of acre feet consumed. Water users are not prevented from acquiring their own sources of supply from outside the basin or from acquiring other non-groundwater supplies, and to the extent they do so, the tax does not apply. A few large users, such as major cities, can engage in such large-scale acquisitions. For most users, the replenishment district provides a way to use groundwater in excess of the amount permitted. It is effectively a government administrated trade allowing the user to withdraw groundwater at one location in return for paying for the recharge of groundwater in another location within the same groundwater basin.

10.5 Underground Storage and Recovery; Water Banking

Water users in California and Arizona in particular are taking increasing advantage of the opportunity to store excess water underground when there is surplus flow available. The water is recharged underground subject to call or trade when needed. Discussed below in Section 11.2 is a contract concluded by the Metropolitan Water District of Southern California

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[247] Saliba. *supra* note 4, at 113.

[248] See Ariz. Rev. Stat. Ann. §§ 48-3701 et seq.

with farmers in Kern County to store water underground for farmers to use when the State Water Project is in short supply. When shortage occurs, the farmers will forgo their use of water from the State Water Project and use the water previously stored there by MWD. A similar arrangement is discussed above in Section 8.2 between MWD and the Desert Water Agency.

Arizona statute allows any person to conduct groundwater recharge projects and to receive groundwater recharge credits. These credits may either be used by the recharger or sold to other water users.[249] These credits may also provide a means to firm up supplies which are erratic. Thus, if an appropriation could be made that would supply water in only two out of three years, but sufficient water could be recharged to take care of the third year, then the appropriator's supply would become dependable. Several of the western states share the water of the Colorado River. Arizona has not yet used all of its Colorado River allocation and has passed legislation to create a state water bank to allow excess water to be stored underground in Arizona now against the contingency of shortage on the Colorado River later.[250] The opportunity to "bank" water in Arizona is available not only to citizens in Arizona but also to the other Lower Colorado River Basin states of Nevada and California. Those states may contract with the Arizona water banking authority to store water in Arizona at cost. When additional water from the Colorado River is needed by those states, Arizona will forbear making diversions from the Colorado River and will instead recover water previously stored in Arizona by these agencies. A demonstration project is underway pursuant to a 1992 agreement between Arizona and the Metropolitan Water District. Three-hundred thousand acre feet of water are expected to be banked under this agreement.

Arizona law also allows what has been referred to as in-lieu recharge. Instead of recharging water underground directly into a water bank, a person may deliver that water to a farmer to be used by the farmer in place of water the farmer would otherwise pump from wells. This effectively leaves in the ground, water the farmer would otherwise have pumped The in-lieu recharger receives groundwater credits, which again may be used by the recharger or traded. The current demonstration project between MWD and Arizona allows for in-lieu recharge. Viewed another way, this is an example of one water user substituting a water supply to another water user. Or, it can be viewed as constructing a compensating water development project. It is noteworthy that in-lieu recharge works in Arizona because Arizona has prohibited the development of new land for irrigation and has imposed a strict regulatory system for the use of groundwater. Thus, when water is delivered for use pursuant to an in-lieu recharge project, the water conserved remains in the ground and is not taken up by other users.

10.6 Effluent Reuse; Desalinization

Effluent is an important source of additional water. Effluent can be used for purposes for which high water quality is not required, such as industrial cooling, certain industrial processes, landscape watering, and irrigation of certain crops. Several cities and counties require certain types of users to employ only effluent and not potable or fresh water, especially golf courses. State statute requires users to accept water from poorer quality sources if they are acceptable for their purposes at a reasonable cost. Further, if during the term of a

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[249] Ariz. Rev. Stat. Ann. § 45-801.01 et seq. (West. Cum. Supp. 1996).

[250] Ariz. Rev. Stat. Ann. § 45-2421 et seq. (West Cum. Supp. 1996).

groundwater withdrawal permit, effluent or other water of acceptable quality becomes available, the Director of the Department of Water Resources may require the poorer quality water to be substituted.[251]

The Irvine Water District in Orange County, California has an extensive program for treating and re-using effluent. Effluent is injected along the coast to create barriers to salt water intrusion to groundwater aquifers. Effluent is also specially piped into large office buildings for interior non-potable uses including toilet flushing.

In Arizona, especially, and other states, programs are now under way for treatment of effluent for underground recharge for eventual use as drinking water.

Arizona also has a statutory program for creating groundwater recharge credits through recharge of effluent. Effluent, after being treated to a suitable quality, can be injected into the ground, and the injector can receive groundwater pumping credits equal to the amount of effluent withdrawn. The groundwater may be withdrawn either at the same location or at other locations within the same basin. These credits may also be sold or traded to others who may likewise use them at any location within the basin.

Desalinization of sea water is very little used in the western states. The cost of desalinating sea water is still excessive when compared to the cost of treating other poor quality water supplies such as effluent or purchasing water from irrigators. It has been pointed out, however, that because nuclear power plants are unable to shut down during non-peak hours, desalinization projects could be a good use of power that might otherwise be wasted.

Any of these projects present opportunities for trades. Persons near water courses but without water rights might be allowed to use water from those water courses by paying the cost of developing water from these other sources that can be exchanged to holders of water rights in the nearby water courses.

11. HYBRID WATER TRADES

11.1 Mutual Stock Companies

Where water users are organized into mutual irrigation districts, water rights are often pooled with the result that all of the lands share equally in the available supply of water regardless of priority. If there is a shortage, all lands share the shortage proportionately. Sometimes these mutual companies are organized over vast areas of land with the result that water rights can be transferred simply by signing over a stock certificate. A good example is the Colorado-Big Thompson project and the North Poudre Irrigation Company in the Northern Colorado Water Conservancy District. Shares in these projects, which were originally allocated largely to irrigation, have been the vehicle for increasing transfers of water from irrigation to urban use as cities and water companies purchased the shares.

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[251] See, e.g., Ariz. Rev. Stat. Ann. § 45-514-515.

11.2 Contingent Leases

The Metropolitan Water District of southern California has considered agreements with farmers in other areas whereby MWD could call upon the farmers to cease irrigating temporarily or reduce irrigated acreage in dry years so that water might be diverted to MWD when the water is needed in drought years.[252] An agreement along these lines which has been concluded involves a conjunctive use program whereby MWD stores water underground in Kern County. Farmers in this area are served water by the same aqueduct of the State Water Project which delivers water to MWD. In the event of shortage, it is contemplated that MWD may make a call on the water the farmers would otherwise use from the State Water Project aqueduct, and the farmers would then pump the water previously stored there by MWD during high flow years.

12. CONCLUSION

No water rights system in its pure form has been able to address all of the situations that arise under local hydrologic, economic, and social conditions. Where the laws have encouraged flexibility in water marketing and trading, there has been almost limitless ingenuity in adapting the law to meet local conditions and objectives. Institutional restraints are necessary to assure that water development is consistent with national social and economic policies. However, where the rights to the use of water are certain and institutional restraints are at a minimum, the water rights systems of the western states have shown the ability to adapt quickly to meet the demands of new situations as they arise.

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[252] Saliba, *supra* note 4, at 116.

INSTITUTIONAL AND LEGAL ISSUES RELEVANT TO THE IMPLEMENTATION OF WATER MARKETS: A REVIEW OF EXPERIENCES*

by

Miguel Solanes

Regional Advisor Water Legislation
United Nations Economic Commission For Latin America and the Caribbean

* Based on "Water Rights Markets: Institutional Elements" by the same author in UN/Economic Commission for Latin America and the Caribbean, 59 CEPAL Review 83 (1996)

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SUMMARY

Modern water legislation is concerned with improved water allocation. Water marketing is an important tool for obtaining such improvement. There are examples in Latin America of economic rigidity and non-efficient water allocations resulting from legal provisions not allowing markets to play a role in the allocation of water resources.

However, some authorities have indicated that marketing may need regulations to control -to the extent possible- undesirable environmental and social effects. Consequently, "mature" water marketing systems have developed sets of rules and regulations with a view to strike a balance between market forces-and social and environmental concerns.

Main and foremost among these rules is the conditioning of the existence and valid transfer of water rights to the rule of effective and beneficial use of the waters to be transferred. The purpose of this condition -*sine qua non* for the existence of a valid water right, and therefore of public interest- is to prevent monopolies and speculation sustained on the hoarding and accumulation of non-used water entitlements.

This rule is often summarized as the "use or lose principle".

With the privatization of large scale public services, the importance of the rule becomes immediately apparent: without the condition of effective and beneficial use water rights can be used to block entry into service markets, restricting competition and allowing purveyors to obtain monopolistic rents. Water, and attached rights on it, may then become part of the market power policies and strategies of individual firms. The paper brings about specific examples in this regard.

Other conditionalities and regulations applying to water marketing intend to prevent the causation of negative transactional impacts on other users, special groups, communities, society at large, and the environment. Thus, mature water marketing systems have developed rules on the amounts of water to be transferred, protection of area of origin, environmental impacts, community interests, priorities and preferences, water rights of aboriginal citizens, and other concerns.

Water rights marketing is also affected by other legal, administrative, economic, and investment related factors. They include, *inter alia,* the quality of the right to be marketed, the size of the transaction, the profile of the parties, the reliability of records and registries, the availability of appropriate infrastructure, location, and other relevant elements.

Thus, while water markets improve the efficiency of water allocation, water legislation must allow water reallocations, considering the existence of environmental and social frameworks where market failures are common. The paper deals with legal systems allowing water marketing and provides examples of regulations intended to cope with externalities and other concerns specific to particular societies.

INTRODUCTION

Modern legislation has considerably broadened the type and scope of issues to be considered in the regulation of water resources.

There is concern with improved water allocation through water marketing. However, some authorities have indicated that marketing must be regulated to prevent unwanted environmental and social effects. It has also been noticed that the performance of water markets is contingent to the situation of each particular place.

While water legislation and water management are influenced by the need to improve the economic efficiency of water allocation and use, the processes for improved allocation take place within environmental and social frameworks where market failures and externalities are common. This is best exemplified by two contemporary trends in water management: development of water markets on the one hand, and need for water planning and control of externalities on the other. Both are needed. Thus, economic flexibility may require accommodation with the environmental requirements and social concerns posed by sustainable development.

STRUCTURAL AND REGULATORY NORMS IN WATER LEGISLATION

Because water is a flow resource, a scarce one, and also prone to negative externalities proper management of water-and of water related activities- are crucial to the implementation of successful and sustainable processes of water development and conservation.[253]

However, the role of institutional and legal arrangements is not limited to water management and regulation of water related activities. The legal-institutional design determines the framework within which the private sector is prompted to invest in water development and conservation, therefore performing a structural function of socioeconomic engineering, determining the manners in which economic agents relate to economic resources.[254]

This function of the law has tremendous relevance to conservation and development goals, since consequent on its operation economic agents are prompted to invest, if economically beneficial, in water development and conservation, of their own free will and on regular basis.[255] Security and flexibility of rights are two main structural features of legislation in general and water law in particular.

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[253] M.L. Livingston, "Designing Water Institutions: Market Failures and Institutional Responses", originally prepared as background to the World Bank Water Policy Paper, 1993, Greeley, Colorado, USA. pp. 1-5.

[254] See United Nations, Economic and Social Council, "Permanent Sovereignty Over Minerals and Water Resources". Report of the Secretary General to the Committee on Natural Resources, E/C.7/1993/2. p. 10

[255] See Ciriacy Wantrup, S.V. "Dollars and Sense in Conservation" Circular 402, University of California, Berkeley, California, USA, 1951.

Main Structural Elements

Structural elements primarily relate to ownership of water resources, legal nature and stability of rights on water, effective and beneficial use; transferability of water rights and acknowledgement and respect of uses and customary entitlements at times of incepting formal water legislation or causing other legal changes to take place.

1. Ownership of Water Resources

Most systems of water law explicitly include water within the public domain of the state, the people or the nation. This concept has traditionally being expressed by legislation stating that water belongs to the public domain, a terminology resulting from the notion that the particularities of water resources and their importance to economy and life do not allow private ownership of water as a resource.[256]

There are, however, exceptions to the terminology. A draft water law for Peru replaces the traditional terminology of public domain for the terms "national patrimony". On the meaning of this latter terminology, within the context of the French water law of 1992, Gazzaniga states that the use of the term "national common patrimony" did not effectively change the legal regime of the water resources of the country. Peruvian authorities argue that the draft law proposed for Peru would in fact disaffect water from the public domain.[257]

It is apparent that the term "national patrimony" does not have the same precise legal meaning than "public domain". If the intent is to include water within the public domain of any given country it is advisable to use the traditional terminology. Otherwise, an element of uncertainty would be introduced in new legislation.

2. Water Rights

The issue of uncertainty raised in the previous section becomes particularly relevant when creating a system of rights on water.

While in most countries water, or at least the most important water sources, belongs to the public domain, water rights granted to private individuals or corporations are protected under the property provisions of national and, in the case of federal countries, state or provincial constitutions.

Thus, stability of water rights is an important principle in water law, which some authorities have traced back to roman law.[258]

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[256] Argentinean Civil Code, article 2340; Chilean Civil Code and Water Law, articles 589 and 5to; Ecuadorian Water Law, article2; Spanish Water Law, State Water Laws in the United States [see Abstraction and Use of Water, UN, 1972, p. 16]

[257] See Gazzaniga Jean-Louis, *Loi Sur L'Eau du 3 Janvier 1992;* Environment, Fascicule 610, p. 6 , Editions Techniques-Juris Classeurs-1993, France, August 8, 1993; also Garcia Montiifar en *Ley de Tierrasy Aguas: Fomentando la Inversion Privada*$_L$ *El Peruano,* p. B-6, Lima, Peru, 21 June 1995.

[258] Lex Coloniae Genetivae Iulae, 43 A.D. according to which waters in public lands open to colonisation were subjected to the same uses and charges existing under previous ownership, according to Costa *Le Acque nel Diritto Romano,* Bologna, Italy, 1918, pp. 16-18, according to quotation by Dante Caponera in "Principles of Water Law and Administration"^ Balkema, Netherlands, 1992, pp. 30 and 50.

A system of stable water rights is an incentive to invest in the development and conservation of water resources. Stable water rights are useful collaterals, assets, or appurtenances for credit purposes, and also important assets when assessing properties for taxation. Additionally, the stability and certainty of water rights and appurtenant uses provide recognition to existing economies and prevent the social unrest that would result from ignoring uses existing at times of changes in water legislation.[259]

A water right usually is a right to use, and ownership of a water right does normally means a usufructuary power, and not ownership of the corpus of water itself. However, in some legislation the usufructuary power can be traded.

3. Effective and Beneficial Use

The relevance of water rights as property assets is related to the availability of the resource. The scarcer resource is the most valuable. Therefore, most water laws have provisions that require the effective use of water entitlements, either for a right to be born and kept, or for the maintenance of a valid water right.

The principle of effective and beneficial use is widespread. While the terminology is not uniform the notion that water rights risk forfeiture if not used, or if not used according to the terms of a license or permit, is found in the German law, as amended on 23 September 1986, the Spanish law of 1985, the new Mexican water law, the legislation of most Argentinean provinces, and the laws of the states of the American west.

The rationale behind the principle has been precisely and clearly constructed by the authorities, judges, and legislation of the United States. A typical statement of the rule of beneficial use is: "Beneficial use is the basis, the measure, and the limit of all rights to the use of water in this state"..."consistent with the interest of the public in the best utilization of water supplies".[260]

The tenets of the doctrine of effective and beneficial use are: a) water is not to be obtained for speculation or let run to waste (reality of use); b) the end use must be a generally recognized and socially acceptable use; c) water is not to misused (reasonable efficiency); d) the use must be reasonable as compared against other uses;

A common idea was that the quantity of water was to be no more than needed, the concern being with the possibility of "vesting an absolute monopoly on a single individual".[261] This antimonopoly- antispeculation concern where claimants do not have an specific use in mind continues today.

For a long time it was difficult to assess what happens in practice when water legislation does not have a requirement of use. The reason being that national systems of water

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[259] United States Supreme Court 1984, Syllabus and Opinions. No 80; Argentinean Supreme Court, La Pampa Vs Mendoza. 1987, L-195-XVIII; Francoise Conac "Land and Water Rights Issues in Irrigated Schemes in Sub-Saharan Africa: Conflicts to be Avoided" DVWK Bulletin No 16, Verlag Paul Parcy, Hamburgh, Berlin 1989; Beck and Goplerud : "Waters and Water Rights". Vol. 1, .366 pp. and following.

[260] See Beck Robert and Goplerud, "Waters and Water Rights", The Michie Company Charlottesville, Va. USA, 1991. Vol. 2, 106 pp. and following.

[261] See Beck and Goplerud, Vol. 2. pp. 107 and 108.

legislation did not normally grant exclusive-non riparian-based water rights, without adding the requirement of effective and beneficial use.

At present, the state of flux of water legislation in general, and legislation related to water-based public services in particular, has prompted specific research on the subject of water rights and on the consequences of creating water rights severed from the requirement of effective and beneficial use. It has helped that assessments of the Chilean experience (where water rights are not conditioned to effective and beneficial use) are becoming widely available.

Natural resources economists argue that non-use, if not penalized with forfeiture may result in "sleeper rights" which increase uncertainty on the quantities of available waters.[262]

The Chilean experience on the issuance of non-conditioned water rights is an apparent validation of the forebodings behind the requirement of effective and beneficial use. A study on the impact of the legal system for water allocation in Chile has found that:

> "It is also common a state-owned monopolies that benefited from exclusive rights be privatized with them, creating legal barriers to entry that maintain the monopolistic characteristics of the sector"... "As mentioned above the regulatory framework [for electricity] is based on the existence of competition in the generation of electricity"..."However, competition practically does not exist in Chile"... "The water rights of the main hydroelectrical projects belong mainly to...[a single corporation]... "The implication of this is that the largest generator has an incentive to appraise projects considering the effects that they will have on the profitability of its intramarginal capacity. It can obtain the monopoly equilibrium overtime by postponing investments. New entrepreneurs will be unable to enter [into the generation market] because they do not have the water rights to undertake the more efficient projects"...."Water rights should have been returned to the state prior to privatization, which in turn could have granted them subject to the conditionality of their timely development ...[through new projects] by existing producers or new comers".[263]

Thus, the actual operation of the Chilean system appears to confirm the rational behind the requirement of effective and beneficial use.

Monopolization through the creation of barriers to entry resulting from the control of essential production inputs and natural resources, are standard fare in economics literature.[264] The existence of water markets does not alleviate the situation since in fact "crucial inputs of this kind are not usually traded on competitive markets".[265]

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[262] See Livingston, *op. cit.* pp. 8 and 9.

[263] Bitran Eduardo and Saez Raul, "Privatization and Regulation in Chile", Brookings Institution Conference on the Chilean Economy, Washington DC, 22-23 April 1993, pp. 50-55, permission to quote verbally requested.

[264] Sullivan, Lawrence Anthony, "Antitrust", West Publishing Co., St. Paul, Minn, USA, 1977, pp. 25, 31, 77 etc.

[265] Armstrong Mark et al, "Regulatory Reform: Economic Analysis and British Experience", The MIT Press, USA, 1994, 117 pp. and 22 footnotes.

Furthermore, for large institutional users the incentives to sell water rights, absent the penalty of forfeiture for non-use, are minor, if compared against the strategic advantages that control of a key production input represents within the market power policies of corporative practices.

Hence, it appears that the absence of a requirement of effective and beneficial use does have a negative effect on water transactions, on water markets, and on efficient water allocations. Empirical evidence on the actual working of water markets in Chile shows that with a few local exceptions market transactions of water rights in Chile have been limited.[266]

4. Water transfers

Water rights transfers are increasingly being considered as a policy alternative to encourage the optimal use of scarce water resources, through private reallocation . They are also means to postpone the development of costly new supplies. Water markets are a distinctive characteristic of water use in the American Western States. In other areas water markets are a relatively new experience.

5. Recognition of existing uses

Legislative change creates stress for existing uses and water rights. Most legislation provide for the recognition of uses and rights already existing at the time of changes in the legal framework for water allocation and management. These provisions recognize "existing economies" and prevent opposition to legal change. The procedural aspects of the process to acknowledge and recognize existing uses should be particularly careful not to affect, through difficult formalities and short forfeiture periods, the entitlements of rural and native populations.

Main Regulatory Elements

Water legislation includes a good amount of regulatory norms. They do usually address issues of water conservation, protection of water supplies, establishment of preferences and priorities, protection of water quality, technological and efficiency requirements, inception of management areas, basin management principles, monitoring of use, requirement of information, administrative rights of entry and inspection, creation and enforcement of public rights, emergency measures, registration and recording of uses and supplies and other regulatory measures.

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[266] See Bauer, Carl "Against the Current: Privatization. Markets, and the State in Water Rights. Chile. 1979-1993". Berkeley, California, USA, 1995, p. 2 "Private bargaining and exchange cannot coordinate overlapping resources without continues State intervention, through the courts, if not through other political organs"; p. 57... "these features [of the law] stimulate speculation..." they have been favored [by supporters of the law] saying that speculation improves market operations and price signals"..."they deny criticisms that speculation might distort prices through unequal bargaining power or monopoly control"... p. 171 ..."the government virtually guaranteed the under-valuation of water rights [resulting in relatively few transactions] when it privatized them without imposing any taxes, fees, or other obligations to the public interest".

WATER MARKETS

Marketing of water rights is being paid increased attention as a useful, and economically efficient, alternative for the improvement of water allocations. As supplies diminish relative to demand they become not only an efficient alternative, but also a necessary solution to problems of water scarcity.

The American Experience

Water markets are an important feature of the legal system of the states of the American west. A review of their experience is important to the understanding of the subject and its complexities.

In Colorado, Nevada and Utah water rights can be sold and bought separately from land. In other states, like Arizona, water is acquired as an appurtenance to land. Reallocation of water rights may be "with the possible exception of water quality ... the most pressing matter facing the arid west".[267]

For a reallocation to be legally valid some requirements must be fulfilled:

- water must have been beneficially used, and must continue to be beneficially used after the reallocation;
- such reallocation must not affect other users and must be in the public interest.
- in many jurisdictions, interbasin transfers or transfer outside thearea-of-origin can only take place with due consideration to local interests.
- in some jurisdictions appurtenance statutes prevent water reallocation.[268]

Marketing of water rights is a complex process, which is affected and influenced by several factors, including:

the priority of the transacted right;

the profile of the parties;

geographic flexibility;

size and economic value of the transaction;

reliability of the marketed water right;

buyer characteristics;

volume of water transferred;

changes in regional economies;

system for water administration;

availability of infrastructure to effect a change;

environmental impacts;[269]

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[267] Beck and Goplerud, Vol. 2, p. 234.

[268] Beck and Goplerud, Vol. 2, p. 234.

[269] Colby Bonnie G. et. al, "Water Rights Transactions: Market Values and Price Dispersion" in Water Resources Research Vol. 29, No. 6. June 1993, pp. 1565-1572.

While water rights markets are strongly advocated by reputable experts, there are also reservations. Conflicts over water transfers occur in the American West as large metropolitan areas look for the water supplies of rural areas. The public values at stake include the economic development of urban areas, culture, way of life, environment and the future of rural communities built around agricultural uses. "It is becoming increasingly apparent that current water law and water market oriented behavior are incapable of solving this conflict in an equitable manner". Therefore, according to some authorities, oversight and regulatory approval for water transfers and markets is required.[270]

Regulation of Water Markets in the American System271

A result of the complexities of water marketing is that the activity has been subjected to regulations in the interest of third parties and the public. Broadly stated, regulations impinging on the marketing process include:

- the appurtenancy principle, which prohibits the transfer of water rights if not as an appurtenance to the land where they are used. Its purpose was to prevent land speculation;
- transfers to be approved by judicial, legislative or administrative authorities (the approving authority varies according to the law of each state);
- public notice of the intent to transfer, with the possibility of filing protests granted to either any interested person or only to holders of water rights (again standing to oppose varies according to the legislation of each state);
- administrative recording of the transfer and filling with the authority for water management;
- issuance of permits to reallocate and use subject to existing or new conditionalities, including proof of completion of work and beneficial use;
- forfeiture of water right, (and in some states charges for misdemeanor), if prior approval is not obtained;
- limitation of transferable entitlement to historic consumptive use;
- requirement that transfer does not injure other appropriators who, even if juniors, have a right to the substantial maintenance of the stream conditions existing at the time of their appropriations. Injury might result from changes in volumes, timing, storage, means of diversion, quality, deprivation of return flows, point of diversion, or a combination thereof;
- accommodation of uses through conditions intended to mitigate or prevent injury;
- compensation and payment of expenses;

In addition to the above mentioned regulatory examples, there are also **considerations of public interest** which apply to the review of applications to transfer water rights. They apply to the review of **public value externalities.** They might include:

- considering the benefit to the applicant;

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[270] Ingram Helen M. et all "The Trust Doctrine and Community Values in Water" III World Conference on Water Law and Administration, Alicante, Valencia, Spain, 1989, pp. 10 and 11.

[271] See generally Anderson L. Owen et al, "Reallocation", in Beck and Goplerud, *op. cit.* Vol. 2 pp. 234 and following.

- effects of the economic activity resulting from the application;
- effects on fish and game resources and on public recreation;
- effects on public health;
- opportunity cost of the use;
- harms to other persons;
- intent and ability to use;
- effects on access to public and navigable waters;
- needs for water conservation;
- factors of local relevance;

Accordingly, a reallocation would not be allowed if it results in the violation of minimum health, environmental, or safety standards. However, the public interest element can be accommodated by conditioning a requirement for reallocation to measures to mitigate public interest concerns.

While there are no questions on the substantive legitimacy of public interest concerns questions on the appropriate *fora* and means for their consideration have been raised. While there is always an administrative and judicial role, for Dumars such means and *fora* should include water planning and public participation.

Additional considerations might include the assessment of the impacts that a transfer may have on the environment, the tax base or the local economy of the area of origin of the water allocation to be transferred.

South America: Chile and the Draft Water Law for Peru

Water marketing in South American countries is still incipient. In many cases there is still adherence to the appurtenance principle inherited from Spanish law and from a strong tradition of strict administrative controls. In some areas, such as the provinces of western Argentina, the appurtenancy principle has sensibly contributed, in association with other factors, (such as subsidies unrelated to effective demand for produce, and preemption of some activities from the private sector), to the stagnation, and even regression, of regional economies.

However, there are some regional experiences of water marketing worth to be brought to the discussion.

There are laws, like the Chilean Law of 1981, which authorize water transfers and marketing of water rights (arts. 6 and 21). Marketing of water rights is also endorsed by a draft Water Law prepared for Peru (arts 26 to 29).

Neither the Water Law of Chile, nor the draft water law for Peru reflect the public interest considerations or the detailed elaboration of rules to prevent injury to third parties which characterized American water law. It has already been discussed that none of them require the effective and beneficial use of waters, a fact that in Chile has favored the formation of monopolies of water rights and hydroelectric generation.

In addition, some concepts, like historical consumptive use, have not been elaborated, either by the law of Chile or by the draft proposal for Peru, since consumptive water rights allow the diversion, and eventual transfer of the full nominal entitlement of a water right and not only of the amount historically consumed, like in the American system.

There is already a Chilean case where water rights originally used for agriculture have been transferred to mining. The transfer has sensibly increased the stress on the water source. Mining is a permanent activity, while agriculture is mostly seasonal. Therefore, water abstractions have increased, without the change in use and ownership having been considered a relevant factor in order to prohibit, limit, or condition the water transfer.[272]

Both, in. Chilean law and in the Peruvian draft, the role of water administration and planning in assessing public interest elements, when dealing with water transfers have been severely limited. The assumption is that market forces will deal with externalities and issues of public interest better than government organizations, whose role should be as limited as possible. The Chilean water market system is being promoted by experts, who advocate the merits of the Chilean system when compared to the American system.[273]

However, case studies and empirical assessments of the performance of the marketing of water rights in Chile, appear to indicate that the absence of public interest conditions in the water rights system and its limited regard for externalities might be negatively affecting the performance of water rights markets. Neither the number, nor the magnitude of transactions; or the ability of markets to solve conflicts within the overall framework of present Chilean water legislation, evidence a relevant role for markets. Conflicts appear to drag along, or to be adjudicated by third parties on account of legal, political or economic considerations; rather than being negotiated and contracted according to market rules. This inability of the market appears to be particularly so when dealing with multiple uses and users, large scale economic issues, basin management and interbasin transfers.

Among the factors impairing or blocking the operation of markets is the absence of incentives to negotiate:

- public information and data are not widely available to every interested party and the administration;[274]
- water rights are free;
- water rights are not lost by non-use. Even if not presently used they are a store of future profits; at no risk or cost;

Additional factors affecting the operation of market mechanisms are:

- absence of adequate infrastructure;
- lack of reliable records and registers;

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[272] Verbal information provided by Mr. Andres Benitez, Vice Director, *Direction de Aguas de Chile.*

[273] Thobani Mateen, in "The Economist", 2 September 1995; and also The World Bank, "Viewpoint. FDP Note No 34. February 1995. Mateen Thobani "Tradeable Property Rights to Water".

[274] Actually, a good deal of data, as well a good part of the information network were privatized with the hydroelectrical sector, and are no longer available for public consultation [according to verbal information submitted by Mr. Andres Benites, Vice-Director *Direction de Aguas de Chile]*. Obviously lack of good quality public information is a strong deterrent to agree on permanent solutions.

- traditional approaches emphasizing the security of additional water, rather than the profitability of once in a time transaction;
- undervaluation of water rights.

Some of the large scale water conflicts of the country seem to confirm the view that contractual solutions (like marketing) do not work entirely well when many parties, large scale water units, and important water-based public services are involved.[275]

In the Maule River clashes between hydro and irrigation have been frequent. Powers companies are not amenable to the authority of the Maule River Vigilance Committee. Priorities between consumptive and non-consumptive water rights are uncertain, as well as it is uncertain what is the exact extent of a non-consumptive water right.

In the Bio-Bio case the water code mechanisms for the coordination of multiple water uses have been found wanting, "These results point to the need to reform the Code laissez-faire approach".[276] Problems include issues of basin diversion, pollution dilution, drinking water supply and sanitation, and irrigation. In this case the DGA (National Water Directorate) pointed out that it had not enough powers to control river pollution. In addition, it could not consider issues of water pollution when deciding the auction of water rights required by the Water Code. The Courts upheld the position of the DGA.

Attempts are still being made to create private organizations with non executive or enforcement powers to solve disagreements through negotiations, but no formal structures have yet been created.[277]

In the case of Lake La-Laja and the canal Laja-Diguillin, the conflicts included water diversions, water pollution, scant hydrological data and subsidized agriculture. A decision was taken on the basis of agreements dated back to the 50's but arguments have been made that no all basin issues were adequately "trashed".[278]

In the case of Pangue the Supreme Court reversed a previous decisions of the Appellate Court of Conception, that had ruled against a hydroelectric development, on the basis that it would alter the flows of the river causing sudden water surges. The decision, which would have affected hydroelectric developments throughout the country if maintained by de Supreme Court, was reverted by the latter. The Court argued that future damages, if any could be compensated at a future time.[279]

In none of the cases quoted above water markets played a role. To some extent the system of unlimited-unconditioned water rights, within a weak regulatory and administrative framework, is faulted as a main incentive not to negotiate. Solutions, or better-removal of constraints- have either resulted from general agreements, dating back before the enactment of the present code, or from courts decisions. In some cases disputes have been left simmering. According to the DGA the system of water rights is a major obstacle in searching for integrated solutions. Technical plans to optimize different water sources, to the benefits of all

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[275] Findley Roger, et al. "Environmental Law". West Publishing Co., USA, 1992, pp. 88 and 89.

[276] See Bauer, *op. cit.* p. 135.

[277] Bauer, *op. cit.* pp. 145.

[278] Bauer *op. cit.* p. 153.

[279] Bauer, *op. cit.* p. 161.

involved parties, have been consistently impaired by water rights holders. Not having any kind of public interest constraint in their system of water rights they are not interested in negotiations, since there is always a legally possible alternative to win it all.

The assessment indicates that market mechanisms within the research area may have not been fully operational due to difficulties in assigning a value to water rights and also to constraints in the institutional environment.

Water transactions other than those involved in large scale conflict-solving have also been limited. The lack of effective operation of market mechanisms has been attributed to constraints or transaction costs. In addition, the market and the legal system do not have penalties for inefficient, inadequate, or non-effective use of water rights: water rights are free of charges and there are no sanctions for lack of use (In the Western United States there is a requirement for effective and beneficial use of water. The requirement is the cornerstone of the system).

Accordingly, market incentives for water transactions may not have in fact encouraged efficiency in the use of water. The investments that have taken place may have been prompted by expected gains resulting from the yields of water use. It has been noted that increased investments in irrigation might be due to the creation of subsidies for irrigation development thorough law 18. 450/1985. The law authorized subsidies for up to 75 percent of investments, for a period of eight (8) years (art.l). There have also been considerations on the equity aspects of the system. It has been found that the impact might have been negative, since small and medium size farmers did not have adequate information or enough resources to fully take advantage of the system. Low income farmers did not in fact benefit from the system: if they had rights many times they lost them, because they did not know what to do to protect them; if they did not have water rights they did not obtain new rights because they did not know what to do to obtain them.[280] The issue of distribution has been also considered by the World Bank, whose First Annual Report on the Environment states, referring to land, that excessive scale and maldistribution are more causes of environmental deterioration than misallocation.[281]

CONCLUSIONS

1. Water markets are a valid alternative for increasing the efficiency of water use and reallocation;

2. Systems where water markets do not exist evidence structural rigidities that negatively affect the efficiency of water allocation, and also the allocation of resources other than water;

3. The areas with a strong tradition and experience in water marketing have established conditionalities aimed at preventing monopolies and protecting public and private interest;

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[280] See Bauer, *op. cit.* p. 3.

[281] The World Bank "The World Bank and the Environment. First Annual Report. 1990. Washington DC. pp. 42-44.

4. In relative tenns, these areas do have strong systems of water administration where public authorities do actively intervene in water use and assessment of water transactions, through either administrative, judicial or legislative approvals;

5. The experience of areas where the public interest element is missing, there is no requirement of effective and beneficial use, and regulation and planning are disregarded and discouraged is that the role of markets has not been as relevant as assumed by the theoretical justification of the model;

6. These areas are already showing problems of monopolization of water rights and related public services, and conflicts that markets have not been able to solve while the water administration is relatively impaired to address. However, the manner in which the rights were granted may make legal change extremely laborious. Proposals to tax water rights in order to promote their more efficient and equitable use by holders, have been attacked on Constitutional grounds. The now-private electrical utilities argue that since original water rights were not conditioned to effective and beneficial use, the use of taxes to induce behavior other than the one unilaterally fitting the company would be an infringement of its property rights, which are constitutionally protected as granted.[282]

7. Water legislation should include water marketing principles, within a balanced structure where public interest elements, including the rule of effective and beneficial use, are accommodated to property protected water rights.

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[282] At least three cases decided by Chilean Courts and Anti-monopoly organs have acknowledged the relationship between water rights and monopolization: *Comision Preventiva Central* Res. 992/636; from 25/11/96; *Comision Resolutiva* Res. 480, 7/1/97; Court of Appeals of Puerto Montt, "Endesa Vs. Direccion General de Aguas", 7 January 1997.

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