

US EXPERIENCE WITH TRANSFERABLE WATER PERMITS

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INTRODUCTION

This report describes the theory and practice of transferable water permits, mainly for the south-western part of the United States. The information and observations reported here were collected during a study tour to the United States, with some funding support from the New Zealand Hydrological Society.

BACKGROUND

Water, because of its scarcity, has historically been treated as a valuable property right in the states of Colorado, New Mexico, Arizona and California. In these states, water rights - equivalent to water permits in New Zealand - can legally be transferred in several ways:

- (i) water rights may be transferred from a property owner to a subsequent owner;
- (ii) a right may be granted to physically transport water from one point to another;
- (iii) a right may be granted to change from one point of take to another point of take.

The purpose of my visits was to find out what administrative systems exist for licensing site-to-site transfers of water (iii), and to see how successfully such systems operate.

ADMINISTRATIVE SYSTEMS

Water law in the southwest appears to be a conglomeration of *ad hoc* responses to problems as they have arisen. Many agencies are involved in water management and conservation, and there is certainly no equivalent to New Zealand's integrated resource management legislation.

Each state has its own water law. Colorado requires adjudication through its water courts of any water right issue. New Mexico and Arizona administer water rights through their State Engineer's offices, and have a more active planning approach to water management, as we do in New Zealand.

In some states, like California and Arizona, surface waters and groundwaters are managed separately. This has led to expensive court cases to define when groundwater pumpage ceases to affect river flows ("when is groundwater actually surface water?"), and it has led to complex arrangements for buying reservoir water to release into rivers to compensate for groundwater extractions downstream.

Water rights have been granted in the southwest under the *Prior Appropriations* system, where the most junior rights (the most recent) are the first to be

switched off during a drought. Rights are still being granted in some areas - including for instream protection. Instream and Indian water rights are current political issues in the U.S. southwest.

Although water law differs in each state, applicants usually need to prove beneficial use of the water, and there is the associated requirement 'use it or lose it', generally within any ten year period. Recent rights are generally so junior that they are of little value, hence, new users wanting water generally look to buy senior rights through a transfer process.

BARRIERS TO TRANSFERS

Transfers of water rights are far less common than would have been expected. The main reasons are:

- (i) Complex legal requirements and processes constrain transfers. Every water right transfer in Colorado, for instance, must be approved by a court. There are more water lawyers in Colorado than any other type.
- (ii) High transaction costs, including the time it takes to approve the transfer, prevent all but the most valuable rights being transferred. Cost has similarly hindered leases of water rights. Transfers have therefore tended to become limited to growing cities buying agricultural water rights for future urban and industrial water supply, although farm-to-farm exchanges of water allocations are also common. Large blocks of water rights have also tended to be transferred from one area, rather than small allocations from many areas, because of the lower costs. The result is often a localised socio-economic decline because of the loss of income from irrigated agriculture in that area. These impacts cannot currently legally be taken into account when the transfer is approved.
- (iii) A user must legally establish their historic level of water use. The right must be fully defined before it can be transferred. This involves determining actual *consumptive* water use, which is only a proportion of the water actually taken. The remainder, called *return flow* is the water which returns to the channel or recharges the aquifer for others 'downstream' to use. Protection of the resource for users relying on return flows is a major issue in arid areas, which we in New Zealand have not yet worried about. Usually only past average consumptive usage is allowed to be transferred. Consumptive usage is determined using standard water balance techniques and the Blaney-Criddle or Penman methods for calculating crop evapotranspiration. In New Mexico, consumptive use of surface water is about 50% of the quantity diverted.
- (iv) Many water management agencies still favour structural solutions to water shortage, in spite of costs being higher than water transfers. This is partly because building a dam or canal is seen by engineers as easier to plan and manage, and partly because of draconian legislative barriers preventing transfers, which are intended to protect existing users and existing sector groups.

ASSESSING TRANSFER APPLICATIONS

Applications for transfers of water rights are assessed by the State Engineer's Office or the courts on the basis of their likely effects on other consumptive water users. Environmental effects cannot currently be legally considered. This

is in part because instream values in lowland streams are minimal anyway; in fact, State Engineer's officials commented several times that their reservoir construction activities had created or enhanced instream values. Where instream values are important, residual flows are based on trout habitat requirements. In some states, like Oregon, 25% of the water transferred reverts to the state for improving instream values, however this is an added disincentive to transfer a right.

LEASES OF WATER RIGHTS

It is common for buyers such as cities to buy water rights 30 years in advance of needing the water, then lease back the rights to the irrigators until there is sufficient demand for the urban use. Some water rights holders (mainly cities) offer contingent leases to irrigators: water is taken by the holder only during a severe drought, otherwise the irrigator gets it. For annual crops, loss of a crop one year in ten may be considered worth the risk to the irrigator. In Arizona, leases of water rights - as opposed to permanent transfers - do not require an assessment of effects of the transfer on other users; the comment was made that this is unsatisfactory as even short-term effects can be significant for other users.

COSTS OF TRANSFERS

Prices paid for transferred water rights in the Denver area are around US\$5000/acre-foot, equivalent in New Zealand units to a one-off cost of NZ\$7/m³/yr, or in irrigation terms around NZ\$45,000 per hectare. In Arizona transferred water rights cost up to NZ \$3/m³/yr. It is obvious why only urban areas can pay these prices for water. In Utah, annual leases of irrigation water have cost NZ1-10 cents/m³, or around NZ\$60-600 per hectare. In Pima County, Arizona, treated sewage effluent is sold to irrigators at a nominal price of NZ1.5 cents/m³, while Tucson sells it to commercial water users for NZ50 cents/m³.

In Colorado, the transaction costs (payments for lawyers, hydrological assessments, administration) can be as high as 20% of the purchase price, i.e. NZ\$1.40/m³/yr or NZ\$8,800/hectare. In Arizona, transaction costs are 6-12% of the purchase price. Prices paid for water right transfers have generally increased since transfers were first allowed, reflecting scarcity and security of supply. Prices decline when new water supply projects start up, and when agricultural returns decline.

ENCOURAGING WATER USE EFFICIENCY

In New Zealand, one of the anticipated benefits of allowing water permits to transfer from site to site is to provide an incentive to increase water-use efficiency, so that the unused portion of a permit can then be sold for someone else to use. In the U.S. southwest, this has not happened because of the high transaction costs for transfers, and because of the technical difficulty of proving you have actually reduced consumptive water use rather than reducing return flows.

For groundwater resources, such as the Ogallala Aquifer, the increasing pumping cost as the water table declines is a greater incentive to use water more efficiently than the sale of part of a water right. The comment was made that regulation is a good tool for forcing improvements in water-use efficiency. In

Colorado, every city of over 2000 people must have a water conservation plan. New developments in Phoenix, Arizona must prove they have an 'assured water supply' equivalent to 1.6 m³/day/house before approval is given.

STATE WATER BANKS

Equitable sharing of limited water resources during droughts is an issue partly addressed by allowing transfers of water rights. In the recent six-year California drought, the concept was extended through the creation of a State Water Bank which acted as coordinator for transfers of water rights. The Department of Water Resources bought water from willing sellers at NZ17 cents/m³ through:

- paying farmers not to plant irrigated crops;
- buying surplus water in reservoirs;
- paying farmers to plant low water-use crops;
- buying farmers' surface water rights and allowing them to take groundwater instead.

The State Water Bank sold banked water to buyers such as urban areas, industry and high-value irrigated agriculture at NZ24 cents/m³. Having a regional council in New Zealand acting as broker for water transfers is a related concept, although the Council would simply be facilitating transfers rather than buying and selling itself.

IRRIGATION SCHEMES

Much of the irrigation water in the southwest is delivered by federal projects managed by the US Bureau of Reclamation (USBR). The USBR can dictate water application methods but offers few incentives to improve water-use efficiency. Legal barriers prevent transfers of water rights within these schemes, although the law is now changing to allow this, especially in California. In Colorado, a USBR irrigation scheme was sold to users for the first time this year. The US seems to be following New Zealand trends, rather than leading in this area. Federal schemes like the Central Arizona Project (for irrigation and now urban supply) are uneconomic even with subsidies of up to 90% of their cost, but are taking the pressure off over-allocated groundwater resources.

ENFORCEMENT

Enforcement of water rights is carried out by water commissioners employed by State Engineer's offices. Their main role is managing control gates on supply canals for the large irrigation schemes. For groundwater rights, users must supply records of water meter readings, and water commissioners also read water meters on wells. In New Mexico, meter readings must be filed monthly, quarterly or annually depending on which groundwater basin is being used. "Domestic" users can take up to 10m³/day without a water right.

GROUNDWATER MANAGEMENT

Groundwaters in the southwest are managed either as stream-related aquifers or mined aquifers. Stream-related groundwaters are generally managed with the adjacent stream, so that if you want to take groundwater, you have to buy a surface water right for an equivalent quantity of water. Mined aquifers are those with minimal recharge. In New Mexico, some mined basins are managed with

a goal of 40 year exhaustion, while in Arizona the aim is to claw back allocations to the sustainable yield in some basins by 2025. This is possible only where an alternative supply such as Colorado River water from the Central Arizona Project is available.

In the Phoenix (Arizona) groundwater basin, the Department of Water Resources operates 'flexibility accounts' for groundwater extractions, whereby up to 50% of the water allocated under your water right but not extracted this year can be banked as a credit for withdrawal next year. Credits can be transferred to other water right holders. The flexibility of this system is a disincentive for water conservation.

Academics comment on the greater difficulty of managing transfers of groundwater rights than of surface water rights. This is because of the complexity of groundwater resource dynamics. The commonly advocated approach is to allocate via groundwater rights a portion of the storage in the aquifer (the stock resource) and a portion of the annual recharge (the flow resource), and allow transfers of these amounts separately.

Transfers of groundwater rights for mined basins in Tucson, Arizona are allowed, but 25% of the allocation is then forfeited. Tucson groundwater users are charged a 'pump tax' equivalent to NZ0.4 cents/m³, which covers 50% of groundwater management costs. All groundwater takes exceeding 200 m³/day are metered, with 70% having flow meters and the remainder using electricity or hour meters calibrated four times per year. Flow meter readings are sent to the Department of Water Resources annually.

CONCLUSIONS

The amount of useful information gained on US experience with transferable water permits was disappointing. I learnt more from academics than practitioners. In my view, the simple philosophy of our Resource Management Act allows considerable opportunity for regional councils to develop their own flexible approaches to transfer of water permits, unhindered by the legalistic, bureaucratic constraints which deter all but the most valuable transfers in the US.

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