

# LICENCE PURCHASE

## Introduction

The Licence Purchase Project was delivered by the Office of Environment and Heritage (OEH) and involved purchasing unregulated river licence entitlements from willing sellers across the Hawkesbury–Nepean catchment. Water from the purchased entitlements will be protected within the river system and not available for extraction. The project involved developing and implementing communication and purchasing strategies and evaluating an embryonic water market within the Hawkesbury–Nepean catchment. There was no well-established water market at the commencement of the project with few recorded sales.

The project was funded by the Australian Government under the Water for the Future initiative and received \$4.4 million of the total \$77.4 million allocated to the overarching Hawkesbury–Nepean River Recovery Program.

## Objectives

The objective of the Licence Purchase Project was to increase the water available for environmental flows within the Hawkesbury–Nepean catchment by purchasing an estimated 3000 million litres of unregulated river licence entitlements which would reduce existing extractions from the river by approximately 1680 million litres per year. In turn, this was expected to achieve nutrient reductions of 0.3 tonnes per year of total nitrogen.

Environmental flows can be achieved through various methods. For example, releasing water from dams or making water available for environmental benefit through water-use efficiency and licence purchases. For the purpose of this project, water savings that will contribute to additional environmental flows are generically referred to as environmental water.

In addition to achieving the water and nutrient saving objectives, the project was expected to benefit the broader water market by:

- stimulating the use of water trading following the gazettal of the Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources (2011) (water sharing plan) – *The Water Management Act 2000* and the commencement of the water sharing plan have increased the opportunities to trade water as it can now be traded separately from land. This allows for the immature water market to develop as water trades increase
- gauging the market value of water – In recognition of this immature water market, it was expected that project valuation and purchase activities would provide an indication of the market value of water including the environment as a participant in the market
- deepening the market over time – It is expected that the initial stimulation of trade provided by the Hawkesbury–Nepean River Recovery Program could lead to increased levels of trading activity between water users in the future, deepening the market over time.

The initial stimulation of trade provided by the Hawkesbury–Nepean River Recovery Program could lead to increased levels of trading activity between water users in the future, deepening the market over time





## Methods

### Project governance

OEH delivered the Licence Purchase Project under the guidance of the existing NSW Environmental Trust RiverBank subcommittee. The RiverBank Program is a subprogram of the NSW Government-funded City and Country Environment Restoration Program (2005–11). RiverBank contributes to the rehabilitation and protection of stressed rivers and iconic wetlands across NSW via the purchase and management of water for improved environmental and cultural benefits.

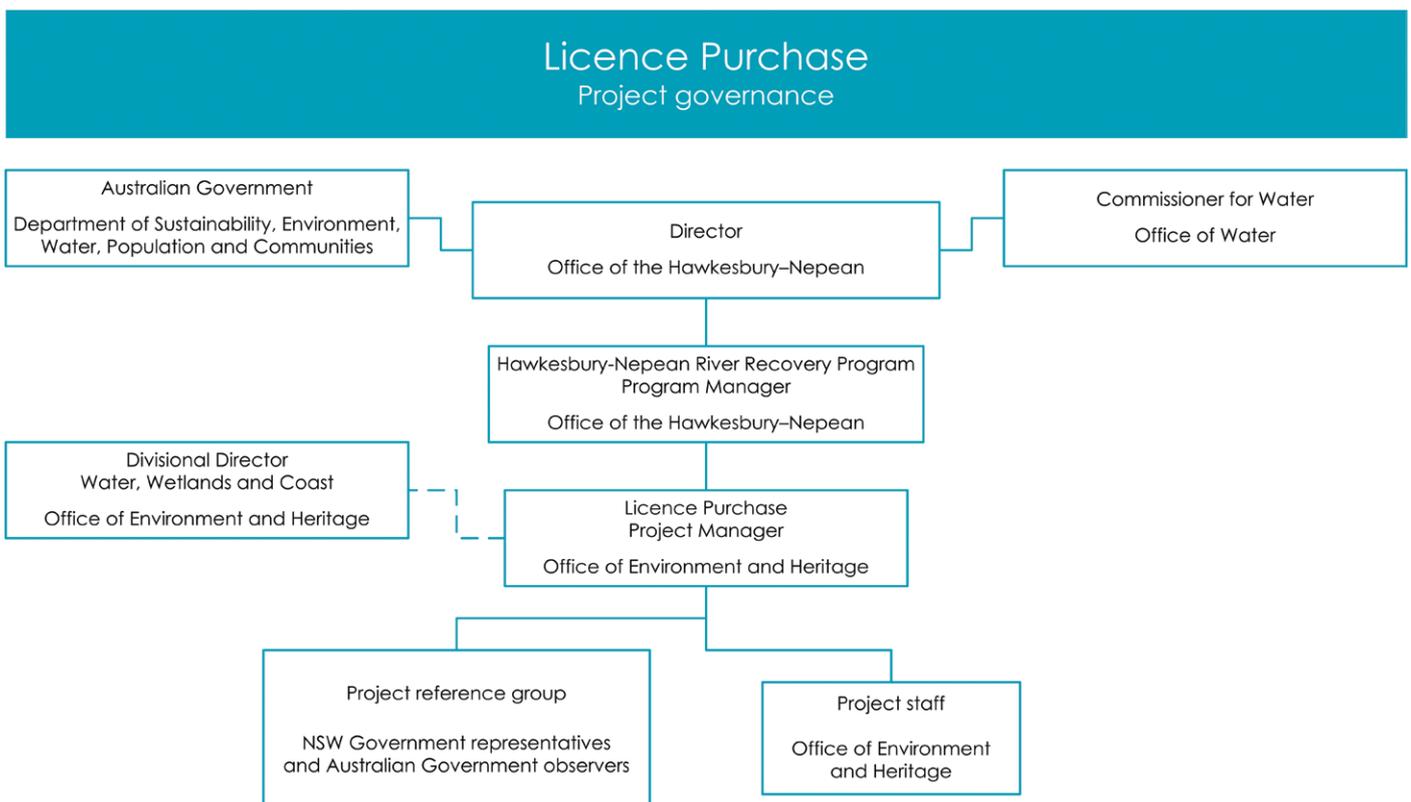
The RiverBank subcommittee had previously been formed to advise the NSW Government on its water licence purchase programs, and had agreed to provide expert oversight of the Licence Purchase Project as a matter of governance efficiency. This approach was formally adopted into the OEH RiverBank business plan which allowed the RiverBank licence purchasing model to be applied to Hawkesbury–Nepean licence purchases.

The project was managed and administered by the Waters, Wetlands and Coast division of OEH. The project manager (manager RiverBank) was responsible for the overall operation and performance of the project, consistent with the Hawkesbury–Nepean River Recovery Program funding agreement and the RiverBank Business Plan. Figure 19 illustrates the project governance.



The Licence Purchase Project was expected to benefit the broader water market by gauging the market value of water

Figure 19. Licence Purchase Project governance





As there were important differences between the Hawkesbury–Nepean catchments (administered under the *Water Act 1912*) and other water markets administered under the *Water Management Act 2000*, a Licence Purchase Reference Group was also established to advise on local market characteristics and assist with project communications and strategy development. Specific characteristics of the Hawkesbury–Nepean catchment included:

- a coastal climate
- unregulated licences (where water is not held in water supply dams for subsequent use and is extracted from flows when available according to water sharing plan rules)
- a large number of small licences with varied use characteristics across a diverse range of land uses
- licences attached to land titles under the *Water Act 1912* and historically high land values relative to water licence values due to a large degree of fringe urbanisation
- inconsistent communication – some licence holders had well-formed communication networks (typically within industry types) whilst others were not connected to licence holder networks
- some licence holders were from culturally and linguistically diverse communities
- a relatively undeveloped market – a small number of previous sales meant market prices were not well established, and for large areas of the catchment there had not been any documented sales of water licences prior to project commencement.

The reference group met as required (four times in total) and included representatives from the Hawkesbury–Nepean River Recovery Program partners and the Australian Government.

During the delivery of the project, OEH formed a partnership with the NSW Department of Primary Industries (DPI) to purchase additional unregulated river licence entitlements for the Water Smart Farms Project. This was documented under a memorandum of understanding between the agencies. The principles and objectives of the memorandum were overseen by the Licence Purchase and Water Smart Farms project managers and the Office of the Hawkesbury–Nepean and were delivered by OEH and DPI project staff.

## Implementation process

Activities carried out by OEH to implement the project included:

- establishing a suitable purchase process within the project/funding timeframe
- developing and implementing communication and purchase strategies
- contracting and conveyancing licence purchases
- registering and auditing environmental water savings
- evaluating the project.

At project commencement, river water entitlements were held by licence holders in the Hawkesbury–Nepean catchment under the *Water Act 1912*. The water sharing plan was expected to be gazetted under the *Water Management Act 2000* in 2009, giving licence holders a statutory entitlement, access rules and an increased opportunity to trade water separately from land. The water sharing plan was initially seen as a precursor to OEH delivering the Licence Purchase Project.

Due to the water sharing plan commencing in 2011 rather than 2009, an alternative process for purchasing entitlements as they existed (as *Water Act 1912* licences) was established in collaboration with the NSW Office of Water, DPI and the NSW Crown Solicitor. This allowed the project to proceed within the intended timeframe with commencement of actual licence purchases delayed until December 2010.

Project activities considered geographic areas defined in the water sharing plan and their associated pre-set rules (e.g. rules regarding trading and annual and daily access to water).

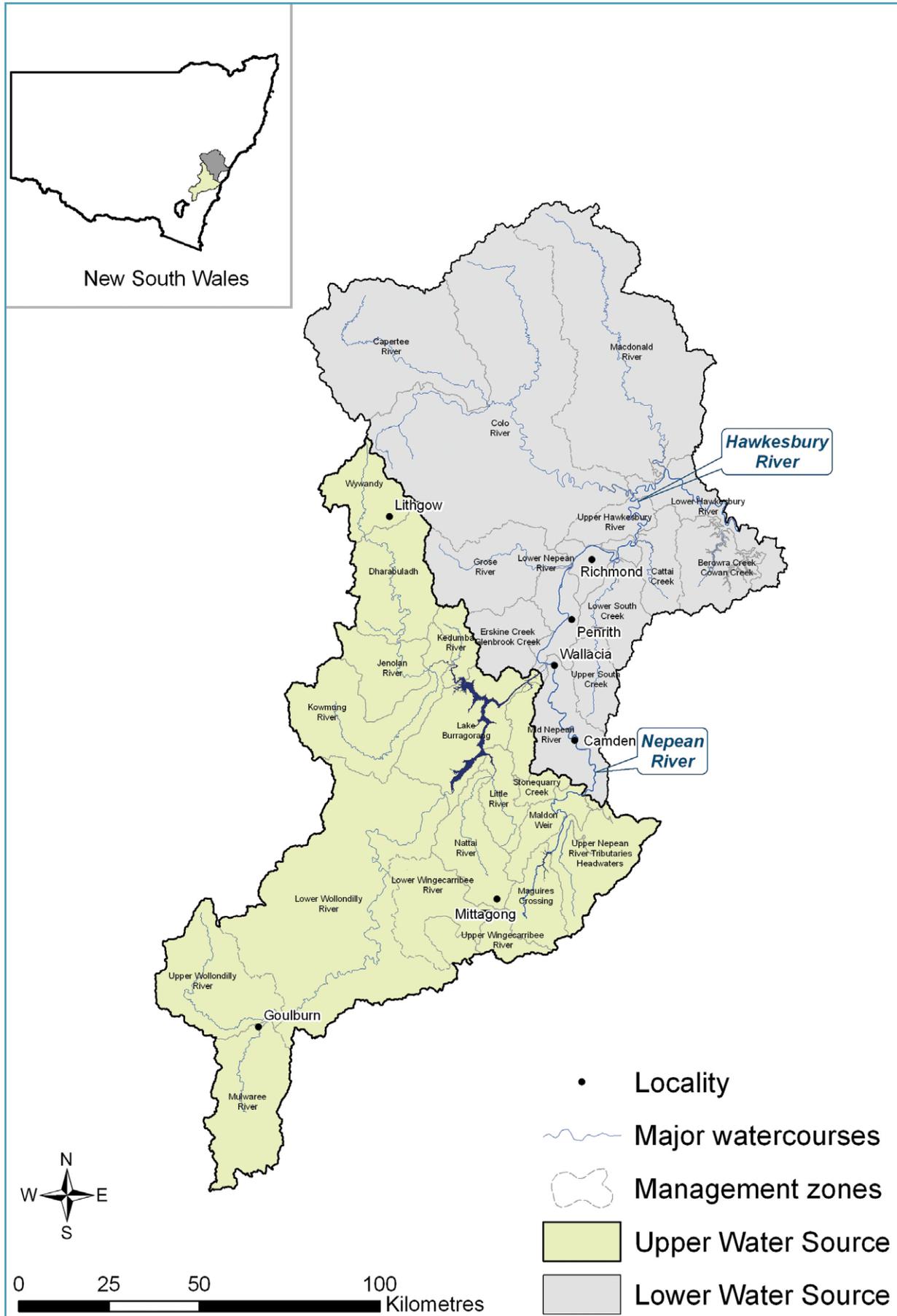
Extraction management units are used for managing long-term average annual extractions. The Hawkesbury–Nepean catchment has two extraction management units:

- the Upper Nepean and Upstream Warragamba Management Unit (Upper Water Source)
- the Hawkesbury and Lower Nepean Rivers Management Unit (Lower Water Source).

The units are split into management zones and are used to define local water sharing plan rules. Figure 20 shows the Hawkesbury–Nepean catchment extraction management units (the upper and lower water sources) and associated management zones.



Figure 20. Hawkesbury–Nepean catchment extraction management units (the upper and lower water sources) and management zones





## Communications strategy

A communications strategy was developed in consultation with the Licence Purchase Reference Group to identify resources, stakeholders, timeframes and information requirements for the communication aspects of the project, and to utilise Hawkesbury–Nepean River Recovery Program partner networks. The communications strategy was an integral part of implementing and refining the purchase strategy.

To increase awareness and build momentum for the project, OEH invited licence holders to pre-register their interest in selling all or part of their entitlements before the formal expression of interest process began. This was done via a voluntary pre-registration and survey pack that was mailed to all licence holders with entitlements of 10 million litres or greater. The pack was distributed on 6 September 2010 and gave background information on the project, invited licence holders to pre-register their interest, and requested responses to survey questions. The pack was sent to water user associations and a number of user group representatives were contacted by telephone prior to the mail-out to licence holders. The pre-registration submission period closed on 20 September 2010.

The pre-registration pack contained:

- a cover letter with multilingual introduction to the project
- a fact sheet
- a pre-registration and survey form
- questions and answers about the licence purchase process.

A database of pre-registration submissions and survey results from potential water sellers was established and maintained for the project.

The Licence Purchase Reference Group helped to identify potential requirements for multilingual communication throughout the expression of interest process. The pre-registration cover letter was multilingual and advertised a telephone translation service with options for Khmer, Arabic, Vietnamese and Chinese (traditional/Cantonese) for enquiries from the identified linguistic groups.

Promotional telephone calls to licence holders were facilitated by Improving Hawkesbury–Nepean Water Balance Accounting Project staff from the Office of Water, using lists of both active and inactive licence holders. Pre-registration information was also made available on the OEH website.

In addition, DPI and OEH developed a Licence Purchase Project fact sheet and map to accompany a Water Smart Farms Project area

mail-out (delivered in April 2011), which included an expression of interest form.

Communication to licence holders was also achieved through coordination with Hawkesbury–Nepean River Recovery Program partners, stakeholders and other agencies. This was facilitated by:

- project steering committee communication
- providing Licence Purchase Project communications products to other projects of the Hawkesbury–Nepean River Recovery Program for distribution
- updating other projects about Licence Purchase Project progress
- obtaining feedback from other projects through informal discussions.

## Purchase strategy

A purchase strategy which included an expression of interest process for the Hawkesbury–Nepean catchment was developed and implemented within the framework of the RiverBank Business Plan and in consultation with the Licence Purchase Reference Group. Consideration for the market characteristics and advice from the Licence Purchase Reference Group led to increased emphasis on program promotion and direct communication with licence holders.

Implementation of the purchase strategy involved:

- developing risk assessments detailing environmental, economic and legal risks to project delivery or outcomes
- developing water licence value characteristics for the Hawkesbury–Nepean catchment to inform the purchase strategy and communication material
- developing a framework for assessing offers relative to market values and purchase priorities for environmental benefit
- developing a streamlined legal conveyancing process for water transfers under the *Water Act 1912* in consultation with the Office of Water, OEH, the Crown Solicitor's Office and DPI.

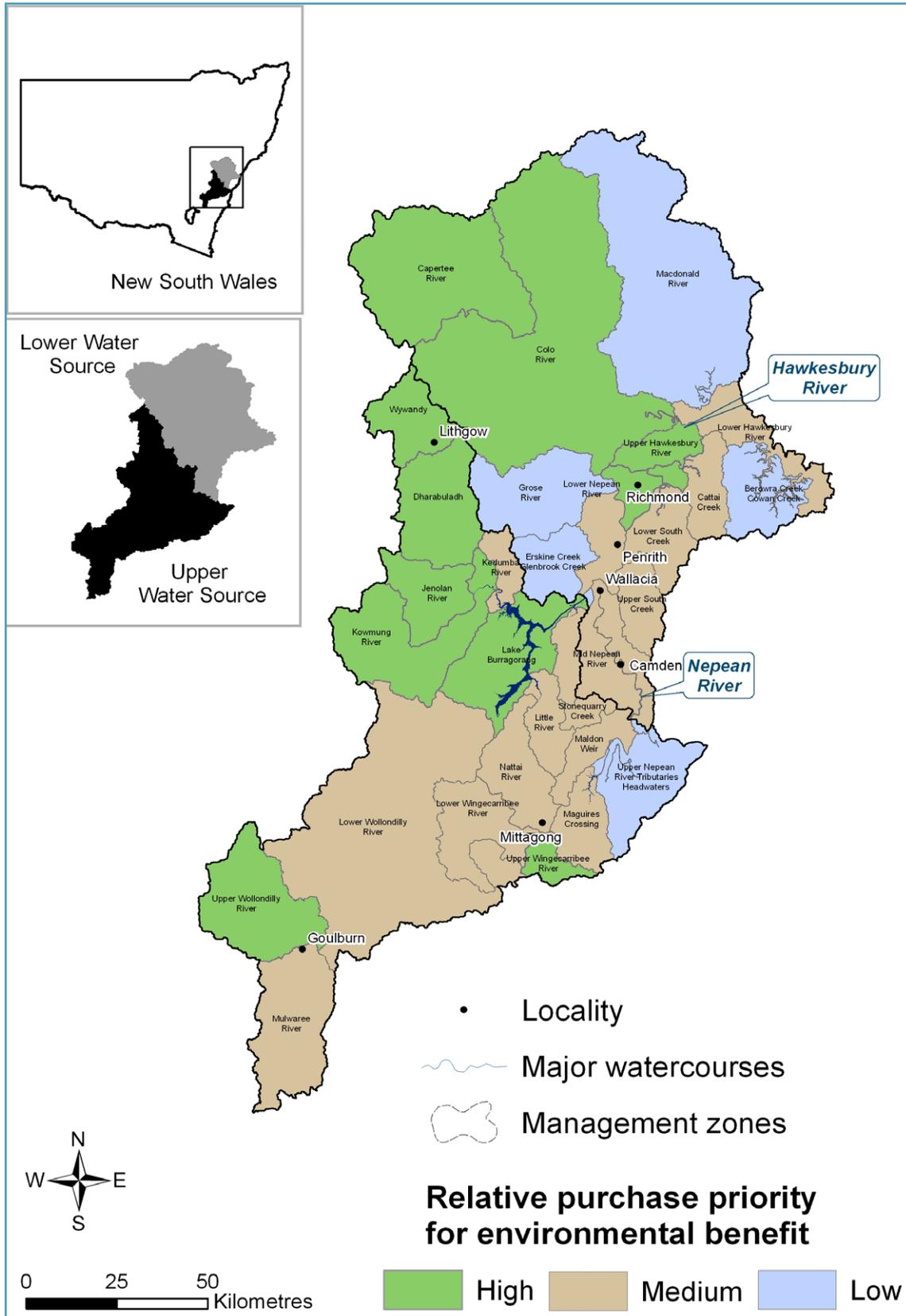
## Market values and purchase priorities

After seeking independent advice from GHD Hassall, OEH invested significant effort in developing water licence value characteristics for the Hawkesbury–Nepean catchment. This process involved reviewing existing data and licence information, including intended licence management under the draft water sharing plan (2010) and the final water sharing plan (2011).



Purchase priorities were set for each area by considering the environmental benefits of purchasing water from that area relative to other areas of the catchment, as shown in Figure 21. The environmental benefits were determined by considering the in-stream environmental values that were identified during the water sharing plan development, the risk to those values from the extraction that is allowed under the pre-set rules in the water sharing plan, and the level of protection afforded to purchased water under the plan.

Figure 21. Purchase priorities based on environmental benefits





The market values and purchase priorities enabled the project team to develop a framework for assessing offers. The framework was designed to complement the expected treatment of licences under the draft and final water sharing plans.

Standard contracts and processes have been established for licence purchases under the *Water Act 1912* and are applicable to areas of NSW that are still operating under the Act, or could be easily adjusted to *Water Management Act 2000* licensed areas.

## Expressions of interest and licence purchases

In November 2010, the formal expression of interest invitation was mailed to all licence holders who had pre-registered their interest and who had an annual entitlement greater than 10 million litres. This minimum size threshold was set as a fair value point relative to the cost of conveyancing. The invitation was also advertised in local newspapers, in the Hawkesbury–Nepean River Recovery Program electronic newsletter (HNRRP e-news) and on the OEH website.

A rolling expression of interest process was used (with successive expression of interest periods) where commercial-in-confidence offers were made to OEH by interested sellers via the expression of interest form.

Project staff then contacted potential sellers individually to discuss:

- the voluntary nature of participation in the project
- water market information
- general water sharing plan information (as an independent planning and implementation process)
- the project's relationship with other Hawkesbury–Nepean River Recovery Program initiatives.

The expression of interest pack contained:

- a cover letter
- an expression of interest form
- an information sheet regarding factors to consider when valuing water licences
- questions and answers about the licence purchase process.

Newspaper advertisements were placed in the ten prominent newspapers across the Hawkesbury–Nepean catchment including the Sydney Morning Herald and the Daily Telegraph.

A register of expressions of interest from potential water sellers was established and maintained.

Once expressions of interest were received from licence holders, the following processes took place:

- Submissions were assessed for market value and environmental benefit using the OEH assessment framework. After initial purchases, project officers were able to identify indicator cases whereby licence holders' market value perceptions were used to further develop and refine the framework.
- OEH negotiated with willing sellers for acceptance of offers within the value range and priorities.
- OEH carried out pre-purchase due diligence processes in consultation with the Crown Solicitor's Office and the Office of Water.
- Entitlement purchases were completed as individual contracts with conveyancing and transfer to the Water Administration Ministerial Corporation carried out under service from the Crown Solicitor's Office and the Office of Water.

OEH also purchased licences using this method for the Water Smart Farms Project on behalf of DPI according to an agreed memorandum of understanding between the agencies.

Water market outcomes for the overall Hawkesbury–Nepean River Recovery Program are summarised in Table C3.

## Registering and auditing environmental water savings

The purchased entitlements were transferred to the Water Administration Ministerial Corporation as *Water Act 1912* licences that were legally attached to land. This required OEH to nominate parcels of land within its control to which the purchased water could be attributed. When the water sharing plan came into affect, the entitlements were converted to access licences with environmental conditions under the *Water Management Act 2000*.

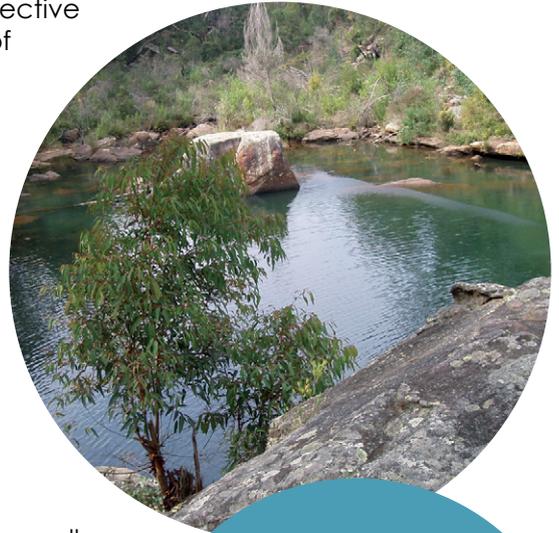
As required under the National Water Initiative, the Office of Water has established an environmental water register of all water purchases to provide accessible information for water users and the general public. The register holds reports on water committed to the environment.



## Results

The Licence Purchase Project has exceeded its water savings objective of 1680 million litres per year and its nutrient reduction objective of 0.3 tonnes of nitrogen per year. It has also achieved its expected outcomes of:

- stimulating the use of water trading for environmental benefit by increasing the volume and number of water trades that have been made across the catchment
- gauging the market value of water by providing an indication of the market value of water in different locations, including the environment as a participant in the market
- deepening the market over time by stimulating trade which is expected to increase levels of trading between water users in the future.



## Communications

OEH developed close connections with the other projects in the overall Hawkesbury–Nepean River Recovery Program and through this achieved effective engagement with relevant state agencies.

Pre-registration packs were sent to the 1300 licence holders in the Hawkesbury–Nepean catchment with entitlements of more than 10 million litres. As a result, 90 licence holders expressed interest in receiving more information and were subsequently sent an expression of interest pack. These packs provided easy-to-understand information about the project's processes and benefits.

During the expression of interest period, the project team focused on one-on-one communication (by way of telephone and face-to-face meetings) with the prospective sellers. These activities resulted in 77 expressions of interest with a combined volume of approximately 7000 million litres of water offered for purchase. The one-on-one communications approach enabled the project team to build strong relationships and successfully negotiate purchases.

On completion of the project, a survey was mailed to the project's 114 participants (which included all landholders and licence holders who expressed interest during the life of the project) with a 17 per cent response rate. Eighty-four per cent of respondents were over 50 years of age and comprised business owners and professionals or retiring/retired persons, most of whom obtained their main income from off-farm sources. While it has been acknowledged that the sample size was small, the results provide valuable insight and are reported here.

Most respondents received project information directly from the project and not from other sources. However, a high proportion of the remainder received information from the Office of Water and a small number from partner agencies or word of mouth.

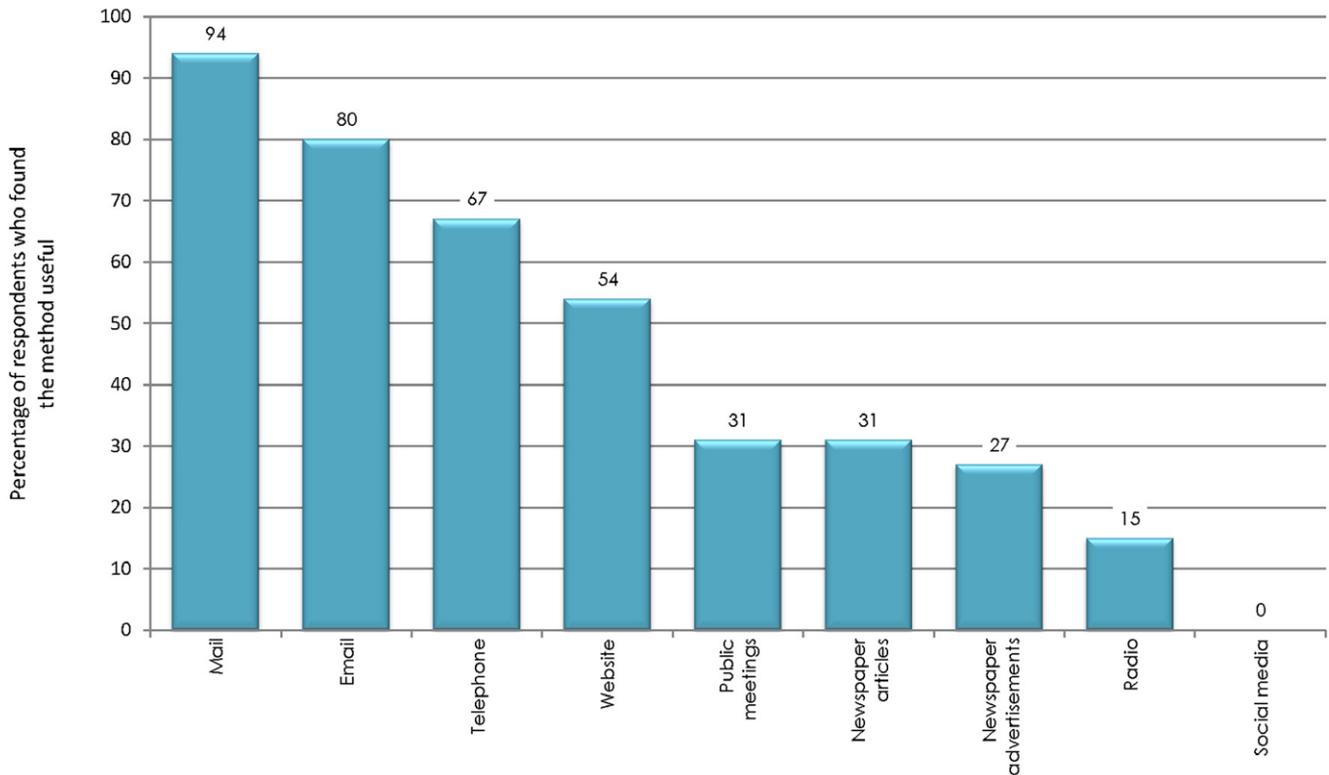
Eighty-four per cent of responses for the communications and purchase processes were satisfactory or higher, including receipt and usefulness of information, communication with OEH staff and the contracting process.

Respondents identified their preferred communication methods as mail and email followed by telephone and website, as shown in Figure 22. Communication methods reported as being of limited use were public meetings, newspaper articles and advertisements, radio and social media (e.g. Facebook) which may be related to the age of respondents.

The Licence Purchase Project stimulated the use of water trading for environmental benefit by increasing the volume and number of water trades that have been made across the catchment



Figure 22. Licence Purchase Project survey respondents' preferred communication methods



Half of the survey respondents showed an awareness of basic market characteristics for their location and the majority had an awareness and interest in trading in the future but may not have understood leasing opportunities.

Seventy-four per cent of survey respondents placed high importance on river health with 26 per cent saying it was of medium importance. Fifty per cent said river health was important because of its intrinsic value (value in its own right) while the remainder said it was important because of water extraction (28 per cent) and its benefit to the community (22 per cent).

## Licence purchases

For the Licence Purchase Project, OEH purchased 3658 million litres of unregulated river licence entitlement from 28 willing sellers across the Hawkesbury–Nepean catchment in both the upper and lower water sources. Tables C1 and C2 show the locations, purchase priorities, sizes and prices paid for the licences purchased.

The Licence Purchase Project team purchased 3658 million litres of unregulated river licence entitlement from 28 willing sellers across the catchment





Table C1  
Licence Purchase – entitlement purchased in the Upper Water Source

Management zone	Relative purchase priority for environmental benefit	Total purchased (million litres)	Price paid (average \$ per million litres)
Dharabuladh (Mid Cox's River)	High	400	1200*
Maguires Crossing	Medium	131	700
Maldon Weir (Upper Nepean)	Medium	150	1250*
Mulwaree River	Medium	200	700
Wollondilly River (upper)	High	129	680
Wywandy (Upper Cox's River)	High	25	1100
<b>Total</b>		<b>1035</b>	

\*The average price paid is influenced by large purchases and is not a representative average.

Table C2  
Licence Purchase – entitlement purchased in the Lower Water Source

Management zone	Relative purchase priority for environmental benefit	Total purchased (million litres)	Price paid (average \$ per million litres)
Cattai Creek	Medium	20	1050
Lower Hawkesbury River	Medium	154	1160
Lower Nepean River	Medium	319	960
MacDonald River	Low	35	660
Mid Nepean River (Menangle to Wallacia) <sup>2</sup>	Medium	656	1250 <sup>1</sup>
South Creek (lower)	Medium	832	1240 <sup>1</sup>
Upper Hawkesbury River (Grose to Colo) <sup>3</sup>	High	607	1250 <sup>1,4</sup>
<b>Total</b>		<b>2623</b>	

<sup>1</sup> The average price paid is influenced by large purchases and is not a representative average.

<sup>2</sup> The Mid Nepean River management zones are grouped together as the water sharing plan intends that trade between them will be allowable. However, there are also trade restrictions within this group.

<sup>3</sup> The Upper Hawkesbury River management zones are grouped together as the water sharing plan intends that trade between them will be allowable.

<sup>4</sup> The average price paid includes an additional 1254 million litres purchased by OEH on behalf of DPI for the Water Smart Farms Project.

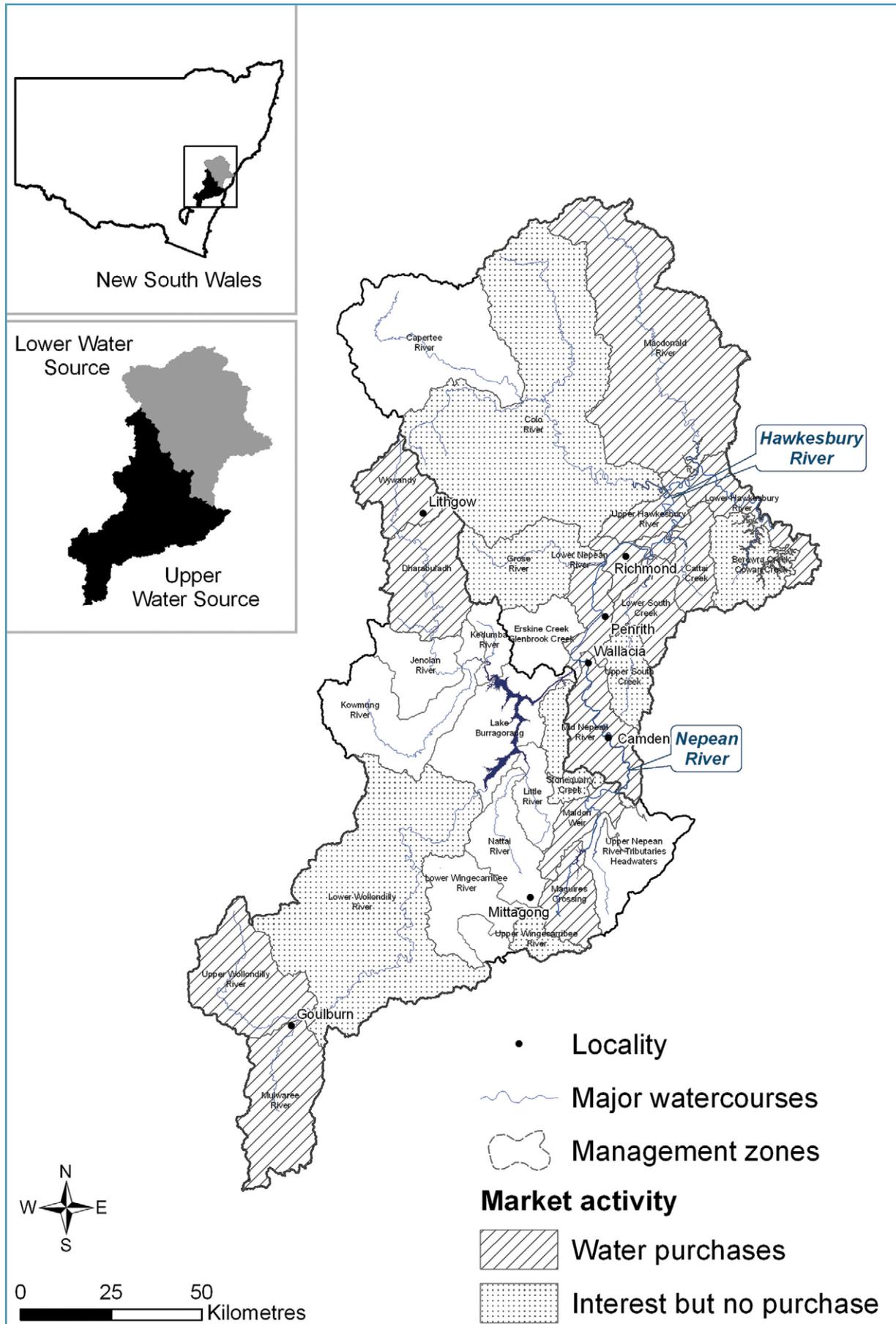
## Water market benefits

There was no established water market at the commencement of the project and many parts of the catchment had few or no recorded previous sales. The project purchase process has identified interest in water trading amongst licence holders across the catchment and has stimulated water trading by increasing the volume and number of water trades made.

The project has also provided an indication of the market value of water by making purchases and reporting them publicly. Figure 23 shows market activity during the project, highlighting areas of the catchment where purchases were made and where licence holders showed interest in selling but no sale was made.



Figure 23. Market activity during the Licence Purchase Project





Before the commencement of the water sharing plan, water licences were legally attached to land titles under the *Water Act 1912* and little water trading occurred. Commencement of the water sharing plan on 1 July 2011 under the *Water Management Act 2000* presented a new way of managing water licences for Hawkesbury–Nepean licence holders by applying extraction and trading rules and providing greater opportunities to trade water as it can be traded separately from land.

OEH determined that during the Licence Purchase Project implementation period, there was a low level of knowledge amongst licence holders of the effects of the water sharing plan on licence management, water values, and water trading opportunities.

Through its successful communications, the project increased awareness of the implications of the impending water sharing plan on licence use, trading opportunities and values. This was evidenced by successful negotiation for the purchase of the licensed shares and verbal feedback from participants during negotiations. In addition, half of the respondents who were sent the survey at the completion of the project showed an awareness of basic market characteristics for their location and the majority had an awareness and interest in trading in the future. Further promotion of market outcomes from the project will enhance these benefits for licence holders.

There is also a need for market information for use by water brokers, property valuers and financiers. These market intermediaries were not directly addressed by this project as, in the absence of a transparent water market, they had no established presence. However, the project outcomes are also available to the public via a brochure, the OEH and Office of Water websites and the OEH, Hawkesbury–Nepean Catchment Management Authority and Hawkesbury–Nepean River Recovery Program newsletters. These resources will form the basis for further development of market information amongst these stakeholders. OEH has also presented project outcomes at relevant conferences, workshops and forums.

The reported outcomes of the Licence Purchase Project are expected to inform the water market and the initial stimulation of trade provided by the overall program is expected to increase levels of trading between water users in the future, deepening the market over time.

Market values develop and change over time in response to demand and supply. Table C3 shows water market information for a range of management zones in the Hawkesbury–Nepean catchment. Indicative prices have been compiled from data obtained through the Licence Purchase Project and the licence purchase component of the Water Smart Farms Project and may assist licence holders when considering licence values. Table C3 is also included in the project brochure on the OEH website.

Through its successful communications, the project increased awareness of the implications of the impending water sharing plan on licence use, trading opportunities and values





Table C3 shows the following three groups of indicators:

1. Statistics for the total number and volume of unregulated river access licences in each management zone (excluding Sydney Catchment Authority shares).
2. Indicative reliability of water access for irrigators, relative to other management zones. Reliability of water access refers to the frequency of periods where water extraction is not permitted due to the environmental flow protection rules in the water sharing plan. These periods reduce the reliability of water access for irrigators. Note: management zones with relatively high access reliability are shaded.
3. Water price information from the project (indicative only).

The information in Table C3 is derived from the project. It includes possible matters of consideration, is not comprehensive, is not intended as a guide to value-setting and does not constitute advice. Water market participants should obtain all the necessary information they require to support any decisions they may make regarding the valuation of water licences.

Table C3 Licence Purchase – indicative water information for management zones in the Hawkesbury–Nepean catchment			
Management zone	Number of unregulated licences	Unregulated licence shares (million litres)	Indicative prices from the project (\$ per million litres)
Cattai Creek	58	1700	1050
Colo River	62	2000	N/A
Dharabuladh (Mid Cox's River)	14	900	N/A
Grose River	33	1300	N/A
Lower Hawkesbury River	28	1400	1160
Lower Nepean River	88	7300	960
MacDonald River	9	300	660
Maguires Crossing	19	1000	700
Mid Nepean River (Menangle to Wallacia) <sup>1</sup>	246	24,600	1180
Mulwaree River	16	1300	700
South Creek (lower)	101	5500	1050
South Creek (upper)	88	2800	N/A
Upper Hawkesbury River (Grose to Colo) <sup>2</sup>	415	39,800	1210
Wollondilly River (lower)	74	3900	N/A
Wollondilly River (upper)	34	1400	680
Wywandy (Upper Cox's River)	5	100	1100

Note: Management zones with relatively high access reliability are shaded.

<sup>1</sup> The Mid Nepean River management zones are grouped together as the water sharing plan intends that trade between them will be allowable. However, there are also trade restrictions within this group.

<sup>2</sup> The Upper Hawkesbury River management zones are grouped together as the water sharing plan intends that trade between them will be allowable.



## Water savings and nutrient reductions

The Licence Purchase Project exceeded its objectives for water savings and nutrient reductions, as shown in Table C4. A breakdown of the water and nutrient savings for the upper and lower water sources of the Hawkesbury–Nepean catchment is shown in Table C5.

The following analysis discusses the water savings and nutrient reductions associated with the licences purchased under the Licence Purchase Project. The analysis for the licences purchased by OEH on behalf of DPI for the Water Smart Farms Project is discussed separately in the Water Smart Farms Project section of this report.

Table C4 Licence Purchase objectives and outcomes		
Licence purchases	Objective	Outcome
Entitlement (million litres)	3000	3658
Water savings (million litres per year)	1680	2755
Nutrient reductions (total nitrogen, tonnes per year)	0.3	0.46

Table C5 Licence Purchase water savings and nutrient reductions by water source			
Licence purchases	Entitlement purchased (million litres)	Contribution to environmental water (million litres per year)	Nutrient reductions (total nitrogen, tonnes per year)
Upper Water Source	1035	735	0.12
Lower Water Source	2623	2020	0.34
<b>Total Hawkesbury–Nepean catchment</b>	<b>3658</b>	<b>2755</b>	<b>0.46</b>

The objective of the Licence Purchase Project was to purchase 3000 million litres of entitlement for the environment and reduce estimated existing extractions from the river by 1680 million litres per year. The project has exceeded these objectives by securing 3658 million litres of entitlement and reducing existing extractions which contribute an average of 2755 million litres of water per year to additional environmental water.

The amount of environmental water created is less than the total entitlement secured because the entitlements purchased are generally not fully activated, meaning licence holders do not take their full entitlement volume every year. This is because the level of activation is dependent on farm development and cropping practices, climatic and soil moisture conditions and availability of flows, including those coming from the dams, downstream tributaries and sewage treatment plants. Therefore, the real reduction estimates associated with the purchased entitlements are based on the historical level of activation of the unregulated river access licences.

Estimating this level of activation is a complex exercise. Prior to this project and before the implementation of broad-scale meters for licensed river users, historical activation levels were based on a broad-scale surveying process undertaken as part of converting the land-based entitlements to volumetric entitlements. The water sharing plan, introduced during the project, used the information from the volumetric conversion process to establish long-term average annual extraction limits which prevent water use from exceeding current entitlement levels.



Therefore, the formula to convert the purchased entitlements to environmental water savings involved applying a ratio of the long-term average annual extraction limit divided by the sum of the unregulated river licence entitlements.

For this project, 3658 million litres of the purchased water have been secured and transferred under licence while an average of 2755 million litres of this water will contribute to additional environmental water. Protection of the water savings will ensure that they will remain in the river system and not be available for consumptive use. An adaptive environmental water plan is currently under development for the management of the river water savings that will contribute to environmental water.

The Licence Purchase Project aimed to reduce nutrient exports to the Hawkesbury–Nepean river system by 0.3 tonnes of nitrogen per year. Lower nutrient export rates are expected over the long term as the market responds to reduced water availability (resulting from licence purchases) through a long-term change in land use from irrigated agricultural cropping to a less intensive (non-irrigated) form of rural or peri-urban land use.

An estimate of long-term land use changes resulting from licence purchases has been made assuming that all other influences on land use are constant. Conversion of irrigated pasture/lucerne to dryland pasture following licence purchase is conservatively expected to reduce nitrogen by 0.001 tonne per hectare per year. The project's secured water saving of 2755 million litres per year therefore equates to the conversion of approximately 460 hectares of irrigated pasture/lucerne to dryland pasture, assuming an average annual water use of 6 million litres per hectare. A conservative estimated nitrogen export reduction of 0.001 tonne per hectare per year leads to an estimated 0.46 tonnes per year of reduced nitrogen exports from these licence purchases over the long term.



Participating licence holders placed a high importance on river health with the most common reason being that river health has intrinsic value

## Learnings

Learnings resulting from the Licence Purchase Project are:

- A clear communication strategy and periodic publication of information for stakeholders is essential to establishing an accepted and resilient context for water licence purchase.
- Direct dialogue is often the most effective way to build relationships with stakeholders who have limited prior knowledge or understanding of the complexity of an emerging water market.
- The purchase of water licences from willing sellers is recognised as a cost-effective mechanism for improving river health.
- Future licence purchase projects in NSW should recognise the importance of creating effective reference and steering groups and ensuring strong partnerships with appropriate government agencies.
- Mail and email, followed by telephone and websites are the preferred methods of communication to licence holders, especially amongst those over 50 years of age. Radio, public meetings, newspaper advertisements, articles and social media (e.g. Facebook) are not as popular with this age group.
- Participating licence holders placed a high importance on river health with the most common reason being that river health has intrinsic value (value in its own right). Community benefits and water extraction were also considered important by-products of good river health.

