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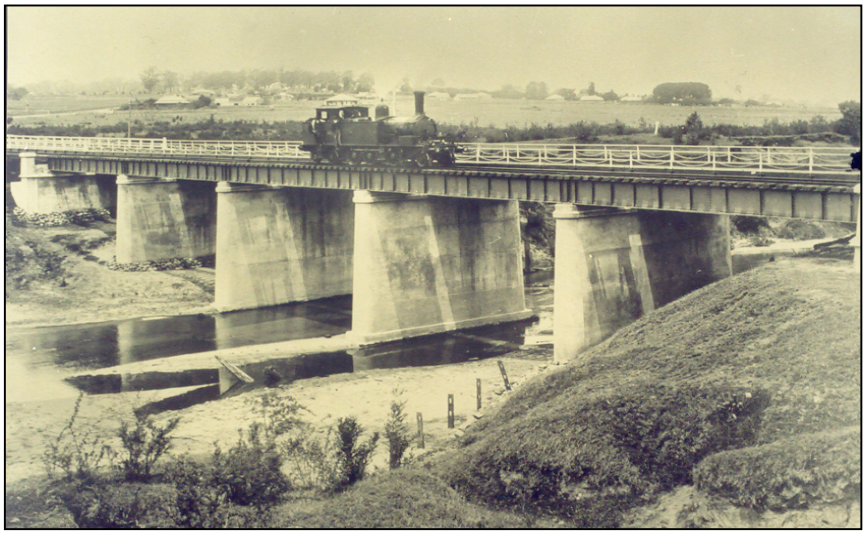
Local perspectives on weirs in the Upper Nepean



Prepared by

Institute for Sustainable Futures

For

Hawkesbury–Nepean Expert Panel

UNIVERSITY OF TECHNOLOGY SYDNEY

Cover Photographs

Brownlow Hill Weir from the air (top). Photograph by Matt Collins, used with permission.

The Camden ‘tram’ crossing the Nepean River at Camden circa 1910 (bottom). Courtesy of the Camden Historical Society. Photographer unknown.

Local perspectives on weirs in the Upper Nepean

Final Report

For The Hawkesbury–Nepean Independent Expert Panel

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Institute for Sustainable Futures
UTS April 2003

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Read the comments of the primary Reviewer(s) (**Yes** (**No**

Read the comments of the secondary Reviewer(s) (**Yes** (**No**

I agree that this report reaches the standard set by the Institute for Sustainable Futures, University of Technology, Sydney.

Signed

_____

Project Director

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Hawkesbury–Nepean Expert Panel
Hawkesbury–Nepean River Management Forum

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Wollondilly Shire Council

EXECUTIVE SUMMARY

The Independent Expert Panel of the Hawkesbury–Nepean River Management Forum commissioned the Institute for Sustainable Futures to conduct research into the values held by river users and community members in relation to the weirs on the Upper Nepean River and concerns they would have with any change to the current situation. The weirs at the centre of this research are Bergins, Thurns, Sharpes and Brownlow Hill.

The research questions guiding the project are:

- What is the nature of the social and economic relationship between people and weirs at a local level?

- In what ways would people want to participate in decisions about the weirs and river management?

Local people were asked about how they use the weirs, what value they see the weirs having for their community, culture and industry and what concerns there may be about potential changes. The research aims to help the Expert Panel and the Forum make appropriate decisions about potential retention, modification or removal of the weirs and the fishways associated with them. A further aim is to facilitate public participation in the decision-making process.

Within any community, there are different individuals and groups with diverse interests and experiences. These differences might result in multiple perspectives between and within groups. To differentiate some of these perspectives, the broader community was divided into four sectors: general public, community groups, identifiable water users such as irrigators and recreational users and Indigenous groups.

The general public participants emphasised the aesthetic and leisure value of the river. They appear to identify very strongly with the river, with participants interpreting the existence of the weirs as integral to both the river's survival and the ongoing economic survival of the region. The findings indicate that this group view the weirs as an integral part of the river and the river as an integral part of the Camden community. Questions about the weirs drew a strong response in favour of their retention.

There was a mixed response from participating community groups. The two environmental groups taking part in the research are in favour of removal of the weirs and in support of increased environmental flows in the river. The historical, local action-based and business-based groups argue for the retention and maintenance of the weirs. One local Council was in favour of weir retention, whereas the other chose not to indicate a position at this time.

Economic interdependence was the most significant theme to emerge from groups in favour of retention of the weirs. Groups argued that if irrigators had their livelihood threatened this would have a "knock-on" effect for other businesses in the community. The cultural and heritage value of the weirs was stressed as an important part of people's sense of "place".

Water users were divided into two groups: irrigators and recreational users. Irrigators viewed both a secure and largely reliable source of water as essential and

overwhelmingly regarded weirs as critically important to their enterprises and livelihoods. The majority indicated that removal of weirs and the subsequent loss of water security would result in a reduction in their crops or livestock to such an extent that they would no longer be viable. Many pointed out other negative economic flow-on effects such as loss of employment, increased cost of maintaining the business as a result of having to compensate with external sources of water supply and depreciation in value of their property. Some expressed concern that removal would particularly disadvantage them as a group and that compensation would need to be provided.

Despite being strongly opposed to the removal of weirs, irrigators were open to notions of repair or modification. Generally, little distinction was made between repair and modification, with both seen to be positive because of the restoration of weirs to their original function. A few irrigators were concerned that repairs or modifications should also be extended to fish ladders.

Most irrigators did not think there were viable alternative sources of secure water supply. Options such as bores, dams, or the extended use of town water were largely considered unfeasible owing to cost or impracticality. The benefits of treated effluent as an alternative were recognised by a number of irrigators, but there was concern and mistrust about whether and how such an option would be implemented. In relation to treated effluent, concerns about cost, quality of water, security of supply, regulations and safety were all raised.

Although recreational users were more likely to use the river rather than the weirs, many valued the contribution of weirs to the river environment. They were seen as providing unique social and community recreational benefits and as an area for wildlife, peace and tranquillity. As a group, recreational users had diverse views about the relationship between the weirs and the river, the value of weirs to their activities and the potential economic impacts of their removal. Views also differed on whether weirs were beneficial to water quality, water quantity and hence fish stock and quality, fish migration and river navigability.

Repair or modification was regarded positively by some recreational users, with a few advocating this as desirable for all weirs. Some advocated weir removal. The inadequate maintenance of fish ladders was specifically mentioned as hindering fish passage. Both repair and modification were perceived as restoring the functional characteristics of weirs with generally no distinction being made between the two options.

Preliminary discussions with Indigenous groups have identified a number of issues. The way in which the research team has approached the weirs research is very different to the relationship and understanding Indigenous groups have with the river. This research has focussed specifically on one section of the river, whereas Indigenous people would consider the river in its entirety.

Participants across all groups requested information on a broad range of issues affecting the river. This was typically information relating to studies done on the river system and other research related to the weirs. There was mistrust of the political process and some asked for information about what was “really going on” or information justifying “the ultimate agenda of removal” of weirs.

The findings of this research strongly indicate the need for continuing community consultation between potential decision makers and all stakeholders. A degree of mistrust in decision-making bodies is evident, with some participants expressing

cynicism with regard to river management. The majority feel that people who use the river should be part of the decision-making process and a variety of avenues for their participation were identified. Participants indicated clearly that decision makers should also accord local experiential knowledge equal currency with scientific evidence.

Management of the weirs is part of the overall management of environmental flows, and many of the issues raised, and concerns expressed, during this investigation, are relevant at the catchment level and in relation to other river management issues than weir modification. Therefore, there is a need for an ongoing framework for public participation in decision making on river management, and an associated communication strategy to ensure that the community and stakeholder groups have an opportunity to become informed on the relevant issues, and to assist in making robust decisions.

Deliberative and representative decision making processes, as proposed for the implementation of planFIRST by PlanningNSW[1], allow for appropriate development of informed decision making. The findings of this research suggest that it would be highly desirable for processes such as these to be incorporated into the management of the Hawkesbury Nepean Catchment.

Recommendations

1. That the relevant agencies develop appropriate local mechanisms for involving members of the **general public**, relevant **community groups** and **water users** in decision-making processes concerning the removal or modification of weirs. This should be accompanied by appropriate provision of advice and information on the impacts and benefits of a variety of options that can meet the objectives of the Forum in relation to environmental flows and river health.

2. The Hawkesbury–Nepean River Management Forum and the Expert Panel should specifically address concerns about water security and water levels and ensure that any proposal for change also provides realistic options to address concerns identified by water users.

3. The Hawkesbury–Nepean River Management Forum and the Expert Panel should continue to include **Indigenous people** in their deliberations by:

- Recognising that custodianship of land, which includes the river, is fundamental to Indigenous culture and that Indigenous people's knowledge of culture and land be acknowledged and respected.

- Continuing to develop relationships with Indigenous groups to facilitate the incorporation of Indigenous perspectives and to ensure engagement with different ways of communicating values and knowledge.

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[1] Carson, L. & Gelber, K., (2001) *Ideas for Community Consultation: A discussion on principles and procedures for making consultation work*. Prepared for the NSW Department of Urban Affairs and Planning.

- Remaining open for further contributions to the weir review by Indigenous groups in the foreseeable future.

- Supporting the recommendations of the report *Aboriginal Consultations for Sustaining the Catchments* and furthermore, requesting that Planning NSW publishes this report and implements its recommendations[2].

[2] Kenney, S., & Richardson, R., (2002) *Aboriginal Consultations for Sustaining the Catchments Draft Regional Environmental Plan (Draft Report),* Beyond Consulting for Department of Planning (PlanningNSW), August 2002.

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ABBREVIATIONS

CC	Camden Council
CCC	Camden Chamber of Commerce
CHS	Camden Historical Society
CRAG	Camden Residents Action Group
DLWC	Department of Land and Water Conservation
DNPWS	Department of National Parks and Wildlife Service
EIS	Environmental Impact Statement
FAQ	Frequently Asked Questions
HNCF	Hawkesbury–Nepean Catchment Foundation
HNEP	Hawkesbury–Nepean Expert Panel
HNRMF	Hawkesbury–Nepean River Management Forum
ISF	Institute for Sustainable Futures
LALC	Local Aboriginal Land Council
NLG	Narellan Landcare Group
SCA	Sydney Catchment Authority
SOJI	Statement of Joint Intent
UNWUG	Upper Nepean Water Users Group
UTS	University of Technology, Sydney
WSC	Wollondilly Shire Council

1 INTRODUCTION

The Institute for Sustainable Futures was commissioned by the Hawkesbury–Nepean River Management Forum and Expert Panel to conduct research into the values held by river users and community members in relation to the weirs on the Upper Nepean River and any concerns they would have with change to the current situation[3]. The NSW Government made a commitment[4] to review several weirs on the Upper Nepean following a report by the Healthy Rivers Commission[5].

The weirs at the centre of this research are Bergins, Thurns, Sharpes and Brownlow Hill. Their selection for this 'pilot' research followed the preliminary recommendations of a study conducted by the Department of Land and Water Conservation (DLWC)[6], with the assistance of the Sydney Catchment Authority (SCA), Environmental Protection Authority (EPA) and NSW Fisheries. The study identified these four as "potential weirs to be considered further as priorities for removal", but also recommended that further studies were required in the first instance, to better understand the impacts of removal.

The research is exploratory in nature and primarily a scoping exercise that could be used to inform decision-making concerning these and other weirs in the Hawkesbury–Nepean catchment. The aim of the research has been to identify views and concerns at a local level regarding the possibility of change to the weirs. Within a local community, varied interactions, patterns of communication and economic interdependence are all important factors. This research sought to establish the patterns and the needs of the community in relation to the weirs and the river itself as expressed by community members.

Underlying the work of the Hawkesbury–Nepean River Management Forum as a whole is an understanding of adaptive management. The adaptive management approach as described by Jiggins and Roling[7], is particularly relevant to this research for a number of reasons. It proposes that there is a need to build capacity for living with uncertainty associated with the nature of change in contemporary society. The project has been an opportunity to initiate dialogue with a number of sectors in the community about the possibility of future change and to initiate continuing discussion about the nature of that change.

Adaptive management supports the articulation of science and technology with local knowledge in particular contexts. It is concerned with the relationship between people and the environment and reliant on stakeholder participation in decision-making at a broad level. In keeping with this understanding, the research was designed to both feed the local knowledge that is generated from the project into the

[3] The Institute was assisted by Biosis Research, which has previously carried out a cultural heritage study of the weirs in this area.
[4] NSW Government (2001) *Statement of Joint Intent for the Hawkesbury-Nepean River System,* March 2001.
[5] Healthy Rivers Commission (1998) *Independent Inquiry into the Hawkesbury-Nepean River System – Final Report,* August 1998.
[6] Department of Land & Water Conservation, (2002) *A Proposal for the Removal of Weirs in the Upper Nepean River,* prepared for the Water CEOs, by Department of Land & Water Conservation, Sydney South Coast Region, April 2002.
[7] Jiggins J. and Roling N., (2000) Adaptive Management: Potential and Limitations for Ecological Governance, International Journal of Agricultural Resources, Governance and Ecology, Vol. 1, No. 1, 2000, pp. 28-39.

decision-making process and to assist in the way this knowledge can be understood in relation to other scientific research being carried out for the Forum.

The research questions guiding the project are:

> What is the nature of the social and economic relationship between people and weirs at a local level?
>
> In what ways would people want to participate in decisions about the weirs and river management?

To address these questions local people were asked how they use the weirs, what value they see the weirs having for the local community, culture and industry and what concerns there may be about potential changes. The responses can be used to assist the Expert Panel and the Forum to make informed decisions about potential retention, modification or removal of the weirs and the associated fishways. They may also assist with the facilitation of public participation in the decision-making process.

Within any community, there are different individuals and groups with diverse interests and experiences. Sometimes these differences will result in multiple perspectives between and within groups. In order to differentiate between groups, the community was divided into four sectors: the general public, community groups, irrigators and other water users and Indigenous groups. The researchers sought to maximise the participation of a range of interested parties and adapted their approach as required to facilitate this involvement. The approach taken with each group was different, with a range of methods used to collect and record views.

Issues surrounding the weirs were deeply connected to the community's sense of history, identity, wellbeing and livelihood. This was sufficient to ensure that concerns about removal of the weirs would be controversial and conflictual. Camden Council was the first stakeholder to raise concerns about the highly contentious nature of the project, particularly in relation to decision-making.

The local media drew upon the intensity of views elicited in the community, and highlighted the conflictual and political nature of the situation. The media reported individual comments indicating resentment of government decision-making processes conducted by "bureaucrats in Sydney" isolated from the "real world".

The level of tension associated with the suggestion that removal of the weirs was a *fait accompli*, was heightened by the involvement of elected representatives in the debate. A number of local representatives took a stance against the removal of the weirs. This included an election promise that the current Opposition party would overturn the "decision" to remove the weirs if elected. The Minister for Land and Water Conservation responded by clarifying that no such decision had been made.

The Institute's approach was cognisant of the volatile political environment, and Institute staff took care to establish their independence on the issue. It was also critical to emphasise that no decision had been made about weir removal and that the research was intended to obtain information that would feed into the decision-making process. Moreover, the research did not constitute a social impact assessment associated with a particular proposal, but rather was 'early intervention' preceding the formulation of a proposal to make any changes to the weirs.

2 METHODOLOGY

The Institute's approach was flexible, participatory and targeted to the particular issue being researched. The following section describes the staging of the research, the recruitment of research participants and questions of sampling, issues of consent and communicating concepts, the specific methods involved, the participatory nature of the research and the way in which material was analysed.

The research was initially planned to take place within a three-month period, however, the stages and time requirements of the research were revised early in the project. This resulted in a greater range of people being involved in the research and a deeper exploration of issues. The actual course of events can be summarised as follows:

July–August 2002:	Preparation for fieldwork
September:	Fieldwork at Camden with the general public
October–February:	Meetings with river/water users, community groups, and indigenous groups
November:	Preliminary analysis of results
December:	First feedback newsletter to participants
December 2002–March 2003:	Final analysis and preparation of Report
March:	Research Report submitted to the Hawkesbury–Nepean River Management Forum
March:	Second feedback newsletter to participants
April 2003:	Third feedback newsletter to participants

The research was designed to explore the range of possible issues rather than specific trends or preferences. It was decided to cast the net widely in order to be inclusive of all those who may have an interest in the management of the weirs. In some cases, this resulted in a low response rate, particularly, in the case of community groups and recreational users where large mailing lists were compiled. Nevertheless, in both these cases the results are included, as statistical representativeness was not the intent and the relatively small number of responses provide considerable insight and add value to the study.

Researchers identified samples critical to the population under study. This was a targeted (or purposive) sampling method, which sought out those participants who are information rich because they use and have knowledge of the weirs. Since it was impossible to obtain a complete list of potential participants from which to randomly select a sample, it was necessary to directly approach those individuals and groups made known to the researchers by knowledgeable contacts and, to a lesser extent, rely on self-selection. The sampled groups were:

- All DLWC (Department of Land and Water Conservation) licensed irrigators. It is difficult to determine the extent to which unlicensed irrigators may also have contributed to the study although it is likely that through their membership of the Upper Nepean Water Users Group there could have been representation at local meetings.

- A large selection of recreational clubs and businesses from lists provided by the NSW Fishing Clubs Association.

- Three Indigenous groups identified as representatives for the area under study.

- A large selection of community groups from lists provided by the Council of Camden and Wollondilly Shire Council.

- A snapshot of people during one day on the riverbank near Camden and during another day at the Camden market in town.

- All members of the general public were offered the opportunity to participate in the research through notices in the local paper.

Details of the various recruitment procedures are provided throughout the report. The demographic characteristics of participants are also reported within each section of the report. No screening of participants was conducted and no monetary or other reward was provided in exchange for participation in the research.

The emphasis in a qualitative study such as this one is to describe and analyse a wide range of perspectives rather than on statistical representativeness. The representativeness of the findings is indicated by the fact that clear trends in opinions and concerns emerged across the separate groups of stakeholders.

The research followed procedures for conducting human research defined by the Human Research Ethics Committee at the University of Technology, Sydney. The informed consent of all participants was required. This was obtained either by completion of a consent form, implied through completion of the survey instrument or by the provision of verbal consent. The privacy of participants was respected by using anonymous codes to identify responses. Care was taken to maintain confidentiality by not presenting information in this report that could identify individual participants, except where explicit permission was given to do so.

One of the requirements of the University Ethics Committee is that participants receive adequate information at the beginning of the research that enables them to make accurate responses. Initial information was provided about the purpose and background of the research and care was taken to communicate concepts through multiple avenues. Early in the project the research team developed an Information Sheet, with input from the SCA, DLWC, and members of the Expert Panel (Appendix 1). This provided essential information about the research being undertaken, the reasons why the Government might consider removing these particular weirs and general information about the possible physical impacts of weir removal. The information sheet was distributed to participants along with the relevant survey instrument to introduce the issues involved.

Although the Institute did not have a responsibility to provide further information beyond the information sheet, the researchers considered that multiple avenues of communication were desirable. The information sheet provided the basis for

consistent communications with all participants in the research. Some of the information was reproduced in the initial press release, to increase awareness of the research amongst a wide section of the community. Verbal discussion based on the information sheet occurred at meetings with the community, through individual contacts and in response to queries from the media. Furthermore, newsletters were produced and circulated to participants, containing updates on the progress and preliminary findings of the research.

It should be noted that the provision of information to participants increases the reactivity of research. Reactivity is the extent to which the research process itself affects the views and opinions of participants and is recognised as an inevitable component of social research. Given the lack of information previously available to the community regarding weir management, it was essential to provide a base level understanding of the issues involved. A recurring theme in the responses was the need for more information about the purpose and consequences of weir modification or removal.

A number of methods were used to obtain information from participants on their views and concerns in relation to weir management. The research sought to open multiple avenues for contact with as many interested parties in the community as possible. People were surveyed using a number of different questionnaires, conducting structured on-site interviews, informal communications (email and telephone), group meetings and media analysis of reported community perspectives and other secondary sources. The specific characteristics and procedures utilised in each of these methods are detailed in the relevant sections of this report.

The replicability of all or part of the methodology to other weirs in the Hawkesbury–Nepean Catchment is possible if the fundamental principles of participation and, by extension, flexibility were adopted. This use of the word "replicable" differs from that in the natural sciences, which seek to devise experiments that yield the same results when repeated by different research teams. Applied social research occurs in dynamic contexts. Conducting this kind of research at another time, with different people, in a different place, would not generate exactly the same results as those presented here. Moreover, the details of the research implementation would vary according to the requirements imposed by the characteristics of the local community. It is possible, however, that many of the issues and concerns identified in this project would re-occur, throughout the Hawkesbury–Nepean Catchment.

Securing and maintaining engagement with the community to ensure their continued support and ownership of the research was a central component of the design. Researchers engaged with a large range of different stakeholders connected to the weirs and each group required individualised processes. These processes were designed in consultation with local government, water user groups and other local stakeholders including Indigenous groups. By involving the community, the Institute sought to foster some ownership of the research and tailor the process to the local context. For example, at an initial meeting Camden Council expressed concern that in addition to water resources and recreational amenity, the weirs' role in the community's history, identity and sense of place was critical. This information alerted the research team to the need to broaden the scope of the research significantly.

Community meetings were a critical component of the research, and started at an early stage to build trust with participants and obtain input. By seeking input regarding the structure of the research, researchers sought to devise a research process that would facilitate the provision of information by stakeholders. In this way,

the research process was adaptive to the needs and concerns of participants. For example, the Institute's initial letter to community groups in the area deliberately left open the options for responding. In addition to accepting an invitation to meet with researchers, some groups responded via telephone interview or written submission.

The range of possible issues to be researched was also decided in consultation with stakeholders before the formal research process. The Institute did not presume to know in advance all of the types of concerns that might exist in the community. Questionnaires were reviewed and modified by government agencies and local stakeholders, such as the local council and the local water users group. Indigenous groups were also consulted about how they would like to respond and to identify the key issues for the research project.

A feedback loop between researchers and participants was fostered throughout the process. Following initial consultations, a mailing list was created in December 2002 to keep all participants who had completed consent forms, updated on the status of the project. The mailing list was used to disseminate a series of newsletters that formed a component of the feedback loop between researchers and participants. These contained updates about the project and preliminary findings of the Institute's research (Appendix 2). In addition, a series of frequently asked questions raised by participants during the research were recorded and sent on to representatives of the Hawkesbury–Nepean River Management Forum who were asked to respond. The frequently asked questions and associated answers were attached to the first newsletter (Appendix 3). An information sheet from DLWC explaining environmental flows was also sent with the first newsletter (Appendix 4). Informal contact and meetings with participating groups provided opportunities for ongoing dialogue regarding issues relating to the weirs and the research process itself.

The data collected in the research was both qualitative and quantitative. Most of the survey questions invited written responses and all of the material obtained from written submissions, on-site interviews, local newspapers and electronic correspondence was qualitative in nature. The interview and submission responses were rich in detail and extracts have been used extensively to convey meaning and complexity. These extracts are presented in the text as "quotations" or indented and italicised. There were also some questions designed to elicit quantitative data, for example, estimates of monthly river extraction volumes, which were requested from irrigators.

Responses from the general public and water users questionnaires were also analysed quantitatively. Each response was allocated one or more categories based on the presence of relevant keywords and words or phrases similar in meaning[8]. The responses were coded electronically in a database. The reliability of analysis used to determine categories was reinforced by different researchers cross checking categories.

Some questions permitted a number of different response categories to be provided by the one individual, for example their uses of the weirs, which could be both as a source of water supply and as a site of recreation. However, in other questions each type of response was mutually exclusive, for example where weirs were seen as either a reliable or an unreliable source of water for irrigation. Having categorised all the responses in this way, the relative frequency of different types of response to

[8] The categories and selection of keywords were developed from the patterns and trends emerging within the responses.

each question was calculated. In addition, the percentage of responses that belonged to a particular category was calculated either as a percentage of total participants or as a percentage of responses obtained for that question. The latter percentage excludes participants who did not respond to a question. Non-responses were defined as those where the entry was left blank, or where the response was completely unrelated to the question.

The reporting of the quantitative analysis is both textual and graphical. In the text, the frequency of a particular response category is provided, along with the percentage of responses that belonged to that category. Where the percentage is calculated as a proportion of total participants, the words “of total” are used. Where the percentage is calculated as a proportion of responses to that question, the words “of responses” are used. When referring to proportions of responses, a consistent set of general terms is utilised. The quantitative ranges of these terms is defined below:

Few	Less than 5%
Some	5–30%
Many	31–50%
The majority	51–70%
Most	Over 70%

The graphical reporting of findings utilises column and pie charts. Column charts show frequency or percentages of responses for each category within questions where multiple response categories were permitted from a single individual. Pie charts indicate proportional representation of total participants for questions in which the various response categories were mutually exclusive. The number of non-responses to a question is represented as an unshaded column or slice in the charts. Where a graph shows percentages, the percentage of non-responses is always calculated as a proportion of total participants.

The graphical reporting style was to some extent affected by the number of participants in each component of the research. Graphs in the General Public component show percentages of total responses, because it had a large number of participants. Each category was represented as a percentage of total responses. The Water Users component had a much lower number of participants, so it was more appropriate to graph frequencies of response instead.

3 GENERAL PUBLIC

3.1 Introduction

Before the fieldwork, little was known about the relationship between the general public and the weirs. The approach taken was designed to capture a range of views and concerns. Responses were obtained by a combination of fieldwork in Camden and a questionnaire. At the same time, a basic level of information was provided to facilitate an informed response to the subject under research. A feedback loop was created, allowing participants to register their contact details and receive further information regarding the weirs.

The questionnaire[9] was designed to be administered by a researcher or completed by an individual and returned in a reply-paid envelope. When administered by a researcher it was more like a structured interview, where the researcher had the opportunity to answer any questions that emerged and to record the individual's views using the questions as prompts. Open questions were used, which encouraged individuals to reflect on the values they held in respect to the river and the weirs and to provide responses in their own words.

For the field trip to Camden in September 2002, the research team prepared an information sheet[10]. The information sheet assisted with questions that arose and enabled people to participate in a more informed way. It was then available for people to take away for future reference or to pass on to others. If members of the public asked for additional information or indicated a willingness to be involved further in the process, the research team took their details and passed on the request to the relevant agencies or authorities.

The fieldwork at Camden was conducted over two days. One day was spent at the riverbank and the next at a community market held in the town centre. Researchers set up early at Belgenny Reserve in Camden for the riverbank research. This location was chosen as the result of a conversation between a member of the research team and a local schoolteacher who recommended it as a place to catch runners, dog walkers and students on their way to the high school. Passers-by were asked if they would like to participate in the research. If people were interested but could not stop, they were given a pack containing the information sheet, questionnaire, consent form and reply-paid envelope either to complete later or pass on to friends or family members (Appendix 5). Thirty-four responses were recorded that day. The following day at the Camden market the research team set up a stall with a display to attract attention and chairs for participants. A large number of people passed the stall and the team invited anyone who stopped to participate in the research. Thirty-three forms were completed that day.

Information packs were made available at the Camden Council Offices, the Public Library, Museum, Visitor Information Centre and the Camden Historical Society premises and at each of the fieldwork sites. Care was taken to ensure that the packs were left with representatives who were informed of the purpose of the research and the nature of the process.

[9] Developed with input from Camden Council, the Expert Panel and DLWC

[10] The information sheet was prepared with input from the SCA, DLWC and members of the Expert Panel.

In the period between the September field trip and December 2002, an additional 46 completed questionnaires were received by post, making the total number of participants from this sector 113[11]. It should be noted that the questionnaires received by post often contained considerably more detail than those completed on the field trip.

Demographic data collected indicates that approximately 25% of participants were aged 61 and over and approximately 42% aged between 41 and 60. Young people (under 26) were less than 10% of participants. Participants' geographical proximity to the river was very strong, with 69% either living by the river or within 5–10 minutes walking distance away. The gender ratio of those interviewed was evenly distributed.

3.2 Responses

Responses to the questionnaire have been divided into four sections, namely 1. Use of the river and weirs, 2. Values of the river and weirs to the community, 3. Weir removal, 4. Information needs and participation in decision-making.
Each of these sections will be introduced with an explanation of what information researchers hoped to capture and the questions themselves. An interpretation of the responses will follow, both presented in quantitative and qualitative form.

3.2.1 Use of river and weirs

This section deals with responses to the first two survey questions, which were intended to establish the types and frequency of uses of the river environment and the weirs.

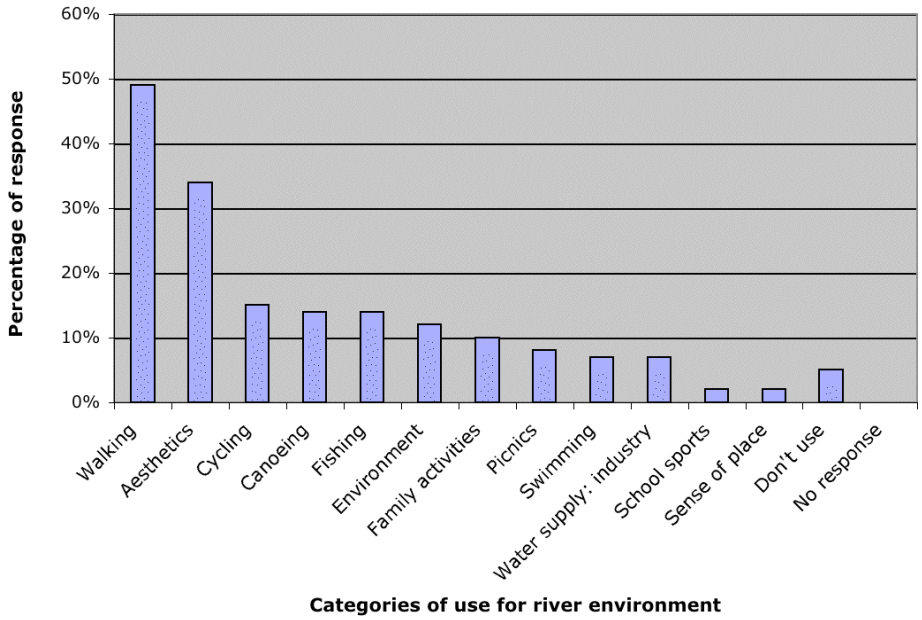
The questions were:

- In what ways do you use the river or area around the river and how often?
- In what ways do you use the weirs or weir areas and how often?

It was found that the river is used by the general public for a range of activities, falling into four main categories: leisure activities, aesthetic appreciation, water supply and appreciation of the environment. Leisure activities, the predominant category, included walking, cycling, canoeing, fishing, family activities, picnics, swimming and school sports (Figure 1). The majority of participants (64; 57% of total) used the river at least once a week, with almost a third using it daily. Many further participants reported using the river environment less than once a week (43; 38% of total). Only a few participants did not use the river at all.

[11] Two responses were received after the research period and were not included in the data analysis,

Figure 1 Uses of river environment



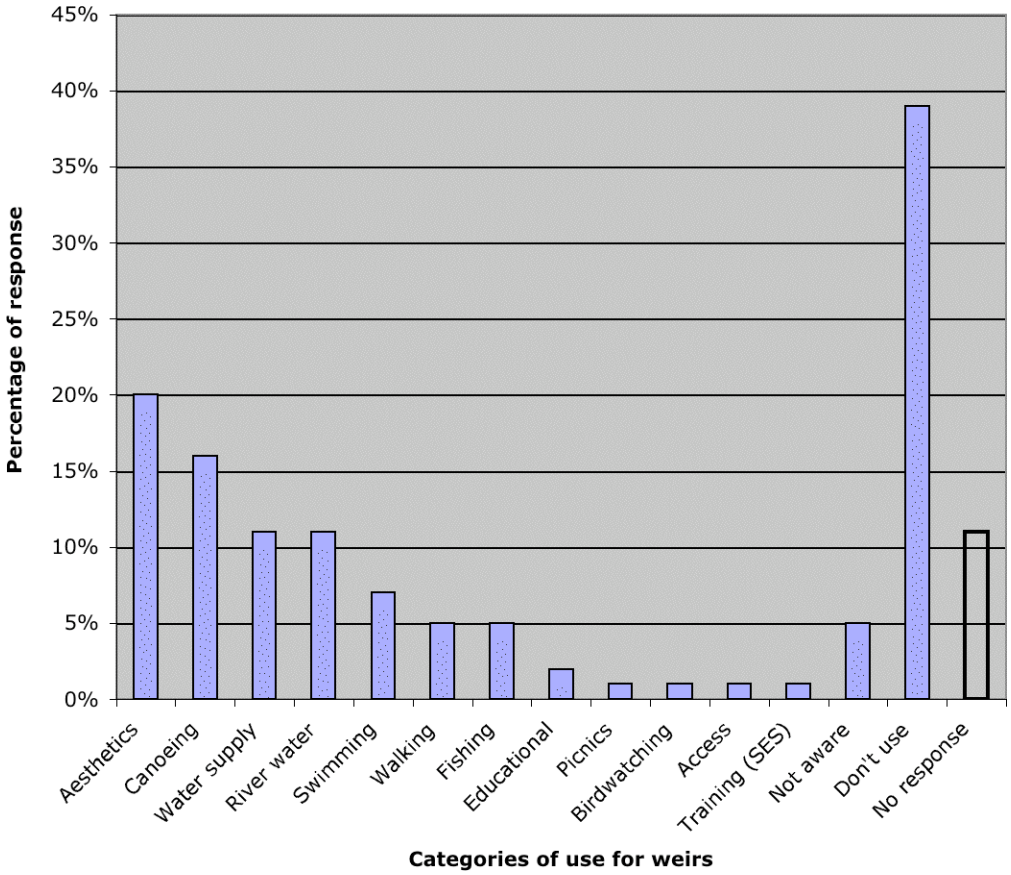
Notes for Figure 1

'Aesthetics' refers to terms used by participants including 'views', 'sitting with', 'open space', 'peaceful', 'enjoyment', 'appreciation', 'beautiful' and 'presence of the water'.
'Environment encompasses all references to flora and fauna, ecosystem, wildlife, nature, wetlands, bird life and bird watching, watching fish, duck feeding and any references to species such as waterfowl, platypus, etc.
'Family activities' includes any reference to recreational uses made of the river environment by families.
'Water supply: industry' encompasses references that were made to sourcing for business, horticulture, viticulture, irrigation and local produce.
'Sense of place' refers to any statements of personal identification with the river landscape or reference to the natural heritage of the area.

In contrast, many participants informed researchers that they did not use the weirs (as distinct from the river) at all (44; 39% of total). Nevertheless, many people do use the weirs specifically (57; 50% of total). The remaining participants did not respond to this question (12; 11% of total). The most popular use of the weirs was aesthetic appreciation, nominated in 20% of the responses to this question. Canoeing was the second most often cited use of the weirs. There was a detailed response from the owners of a canoeing business, which uses the river above Sharpes and Camden weirs frequently throughout the year for schools, community and training programs.

Some of the responses talked about the importance of the weirs to maintain the function and characteristic of water in the river, including level, flow, height or "to make the river what it is". Some also made specific reference to the water supplies from the river for business, domestic use, horticulture, viticulture and local produce. Further uses of the weirs nominated in the responses included swimming, walking, fishing, educational purposes, picnics and bird watching (Figure 2).

Figure 2 Uses of the weirs



Notes for Figure 2

Refer to Figure 1 notes for description of repeated categories.
'River water' describes all references made to the function and characteristics of water in the river including 'level' 'flow' 'height' or 'to make the river what it is'.
'Educational purposes' refers to school programs.
'Access' refers to use made of the weir structures for access across the river between road bridges.
'Not aware' refers to those participants who stated that they did not know that the weirs existed.

3.2.2 Value of river and weirs to the community

The following responses concern the values given to the river environment and to the weirs by the participants. The value of the weirs to the local community is discussed.

The relevant questions were:

- In what ways is the river environment important to you?
- In what ways are the weirs important to you?
- In what ways are the weirs important to the local community/history/economy/environment?

The river environment is primarily valued in aesthetic, environmental and leisure terms (Figure 3). Participants also raised concerns about pollution and to a lesser extent, flooding and flow. The concern about pollution reinforces the environmental value placed on the river.

The term environment was used to mean surroundings and ecosystem, with some degree of overlap occurring between the two meanings. For example, concern about pollution encompasses both the way the river looks and an understanding that the pollution might be affecting the ecosystem.

> *Always been a thing of visual beauty. Stop pollution, sand & soil mining, dredging – that will stop riverbanks collapsing and help the river environment.*
>
> *The river is one of the hallmarks of the Camden area. I would choose change in the direction of a healthier river environment, even at the cost of loss of recreational facilities. The river was here before people / farmers / canoeists.*
>
> *[The river] is not directly important to us but its importance is in the biodiversity and its part in the local ecosystem – the bird and animal life, the natural environment, the beauty and the peace.*
>
> *Council has a plan to restore the environment for platypus by 2025. Unique environment especially in Sydney – very lucky to be here. It's one of the attractions to the area – wouldn't move away.*

Whilst an awareness of the ecology of the river was evident, the highest value given to the river by participants was its aesthetic value (59; 53% of responses). A few responses referred to the identification people made with the river in terms of a sense of place.

> *Love the river in the Camden area and would hate to see any change to it. Good to see people walk along river and see the canoes going along.*

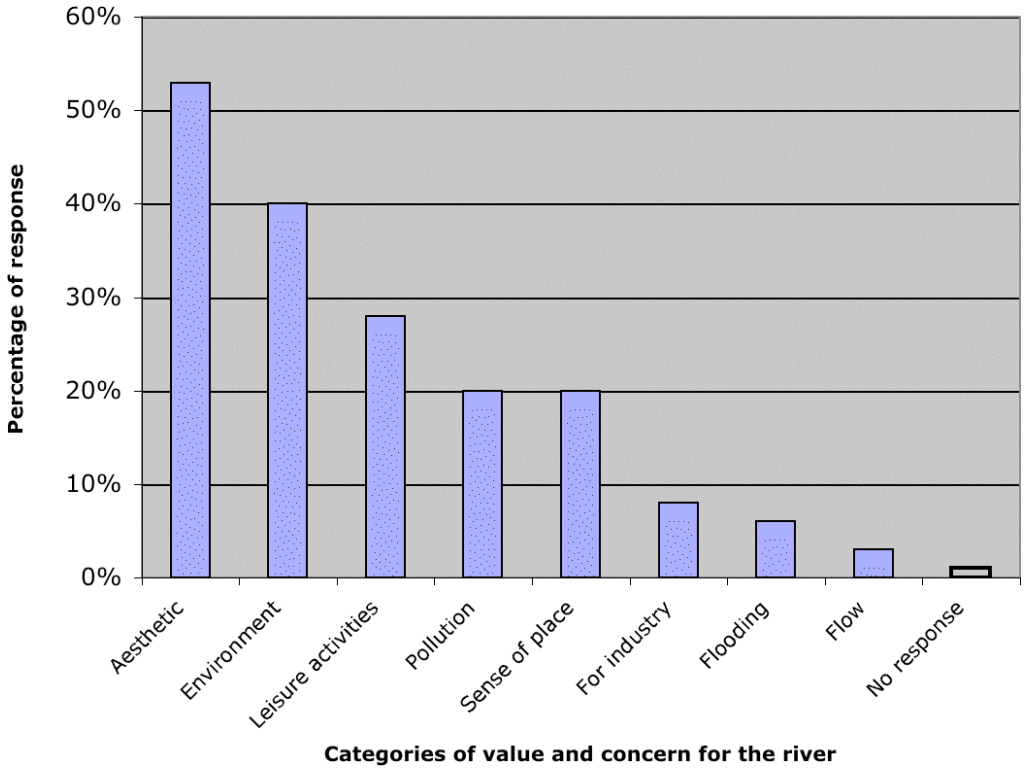
By contrast, the primary importance of the weirs for participants was the role they played in maintaining the level or flow of the river or the supply of water for irrigation (37; 36% of responses). However, almost one third of responses indicated that the weirs are not important to participants as individuals. As seen in Figure 4, these have been grouped under the heading "river water".

It was also stated in some responses that the weirs have an aesthetic value for participants. Some responses stated that the weirs allow access to the river for boats as well as preserving fishing grounds, which was central to leisure and tourism. This is distinct from other values given to the weirs in terms of their history, economy or the environment. However, it is interesting to note that a few participants stated that weirs had a positive effect on the environment.

> *[The weirs are] environmentally essential for the river corridor and for nature.*
>
> *[The weirs are important to the] environment: breeding ground for bass, catfish, eels, native ducks and water birds, frogs.*
>
> *[The weirs] keep the flow of the river regulated. Keeps all parts of river healthy downstream environmentally.*

When asked about the value of the weirs to the local community, the overwhelming view was that the weirs contribute to the economy and local industry of the area (85; 78% of responses). In addition, the weirs were said to support leisure activities, have an important place in local history, and contribute to the environmental value of the river (Figure 5).

Figure 3 Value of the river to individual participants

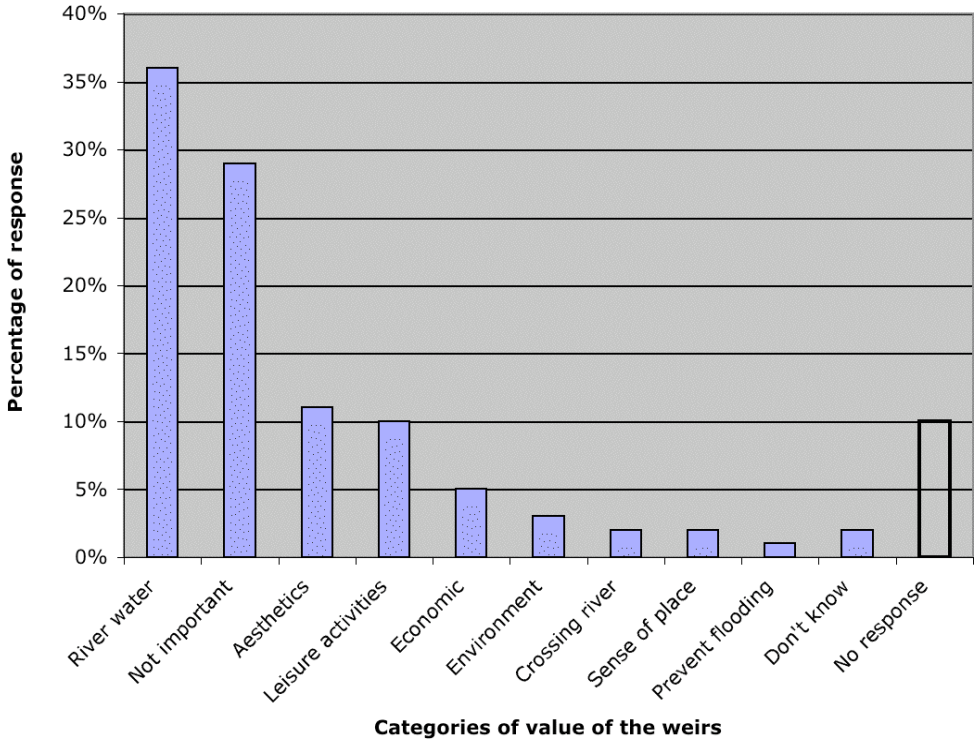


Notes for Figure 3

Refer to earlier notes for description of repeated categories.

'Leisure activities' include walking, cycling, canoeing, swimming and fishing.
'Pollution' refers to concern for the river.
'Flooding' refers to the role of the weirs in flood prevention.
'Industry' includes references to agricultural production and tourism.
'Flow' refers to concerns about the river as a supply of water.

Figure 4 Value of weirs to individual participants

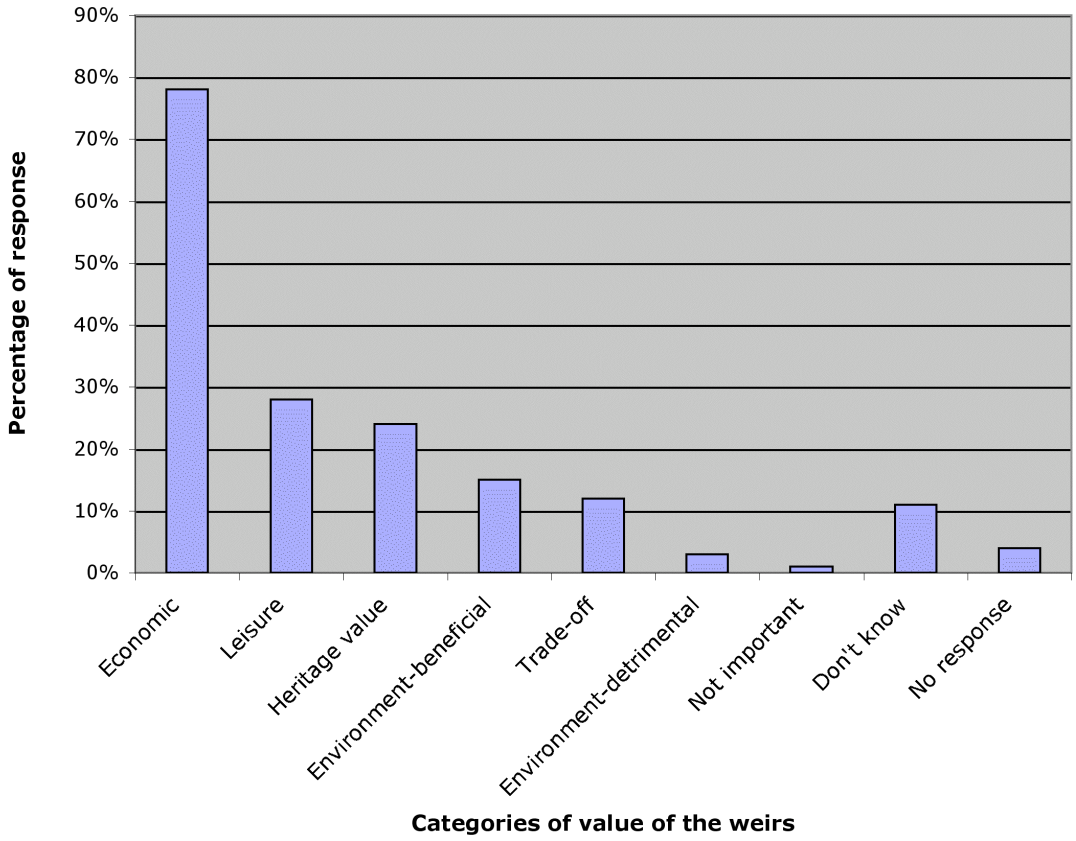


Notes for Figure 4

'River water' includes references to the function of the weirs in maintaining the level or flow of the river or the supply of water.

> *Knocking down the weirs would be like knocking down St John's Church. Before the weirs, there was no water in the river. Coaches crossed where [there is] now 20ft of water. They are the only reason Camden is here – history, for drinking water, part of the character of the area – sense of place.*

Figure 5 Value of the weirs to the community



Notes for Figure 5

'Economy' includes references to local industries.
'Trade-off' refers mainly to statements that presume that decisions about the weirs may involve a trade-off between environmental flows and fish passage and includes environmental and social values.

3.2.3 Weir removal

These responses reflect concerns raised about a potential proposal to remove the weirs. Participants were also invited to consider alternative proposals or courses of action.

The questions were:

- If there were a proposal for the removal of the weirs what, if any, would be your concerns?
- What kind of action, if any, do you think needs to be taken on the weirs?

The majority of the research participants (70; 62% of total) expressed an opinion against removal, and a much smaller number were in favour (14; 12% of total). Some participants expressed uncertainty regarding the issues, and indicated a need for

more research information on impacts, or information on the history and function of the weirs (see Figure 6).

Figure 6 Concerns about any proposal for weir removal

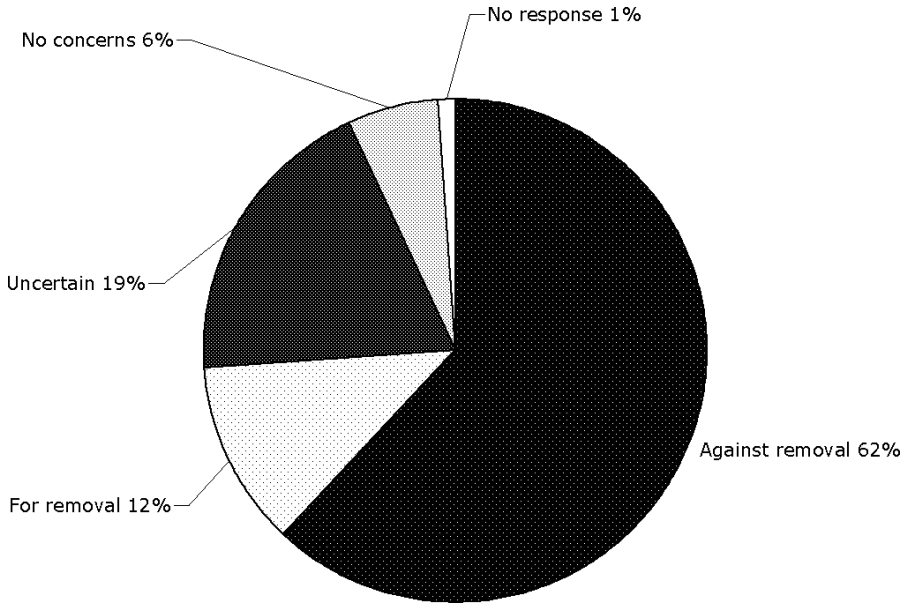
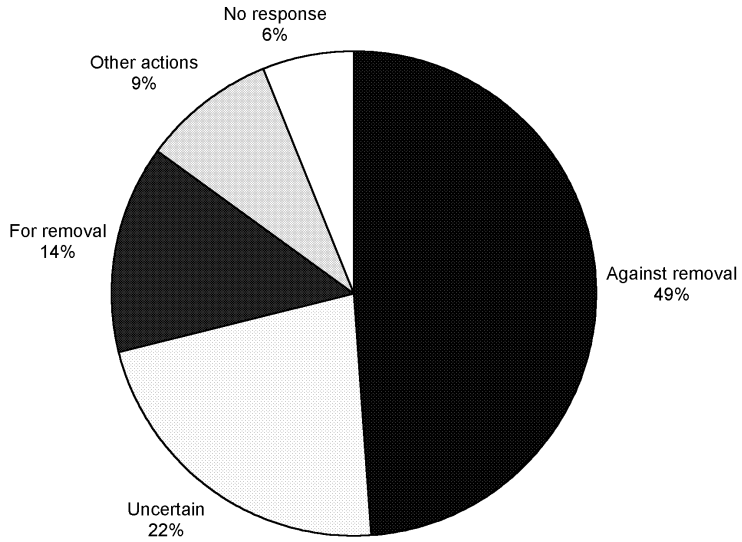


Figure 7 Action to be taken on the weirs



Notes for Figure 7

'Other actions' includes action to modify weirs, suggestions for research, action against pollution and management issues.

However, when asked a more general question about action on the weirs (Figure 7), fewer participants were clear that the weirs should be retained (52; 49% of total). This difference in results might be explained by the fact that these two figures represent responses to two separate questions: one which asks directly about the possibility of removing the weirs and the second which invites a broader range of ideas and options to be expressed. This implies that if alternative actions such as modification were specifically provided, opposition to weir removal may be less marked. However, the number in favour of weir removal remained almost constant for the second question (16; 14% of total), as did the number of participants who were undecided between removal and retention of the weirs, or required more information in order to make a decision.

Of those opposed to weir removal, the majority stated a reason for their view. The most commonly stated reason was a concern that removal of the weirs would have a detrimental effect on the character, aesthetic value and heritage value of the river. Other reasons concerned maintaining the volume or level of water in the river, which was thought to be dependent on the existence of the weirs. Participants who supported weir removal did so on the understanding that river flows and the general environment of the river would be improved without weirs.

Throughout the survey, participants were concerned about the level of water in the river and the impact on water supply, aesthetics or leisure activities. The term 'level' was used repeatedly in response to questions about the value of the weirs to participants, to the community and to concerns about weir removal. The term 'height' was also used in the same context. A small number used the term 'conservation of water', especially in relation to drought. Water supply and storage were also terms used frequently. The use of such terms indicates that the weirs were generally thought to be responsible for keeping the river at the same level.

> *[Without the weirs] the water level in the river would drop. A bad thing for agriculture. Weirs were put in place to maintain water levels.*
>
> *Weirs ensure the water level. When one of the weirs collapsed the water disappeared and there was a dry riverbed. [It would be] disastrous should the river lose its water.*

Participants expressed concern about the effects that removal of any or some of the weirs would have on the water supply to the area and the water level in the river. It was stated that a reduced water supply might affect leisure and tourist activities, farming, river ecology, wildlife, and the very existence of the river. Related to these concerns were suggestions that the weirs be "enlarged to hold more water" or that the "height of the weir walls be increased to store additional water".

Suggested action on the weirs included raising the height of the weirs and installing gates to regulate flow. Participants noted a lack of maintenance of fish ladders, also referred to as fishways, with some arguing for more fish ladders to be installed and properly maintained and some arguing for their removal. In relation to river pollution, several stated that the river needed to be cleaned while others felt that the weirs helped keep the river clean by trapping debris. Other suggestions were that dredging should stop, there should be a ban on freeing goldfish into the river and general statements on the importance of the 'health' of the river. Suggestions for further research topics included water quality in the river, river erosion, protection against flooding and a cost-benefit analysis to improve the weirs rather than to remove them. Improved public access to the river was requested, as was a restriction on boat speed on the river to five knots. A few participants stated that weirs impeded

canoeing and would be best removed. This contradicts responses to survey question two, which indicated canoeing to be the second most frequent use of the weirs (Figure 2).

Some contradictory responses regarding the impact of weir removal on river water and the environment and the conflicting ways in which these terms are applied, implies the need for ongoing dialogue and clarification of meanings attributed to key terms and concepts. Several terms recurred frequently in responses. These related to river water and sometimes to the river environment with variations in meaning and context. This also relates to responses shown in Figure 5 where weirs were said to be positive for the environment by some and negative by others.

The term 'flow' was used more often in the context of the available volume of river water and sometimes in the context of environmental flows. Many participants referred to water level and water flow together. The concept of flow was directly related to the availability of water in the sense that "all water should be conserved and not allowed to run to waste" or in concerns for "water just flowing away". Water should be "put to valuable use for farming, the environment etc".

> *I am not sure of the effects on the river with the water flowing. There wouldn't be the amount of water for kayaking or canoeing or people to draw from but it would be cleaner. What is likely to happen with water flow? How much would there be naturally? How is that likely to affect drawing out water?*
>
> *The river and weirs stop water flowing out to sea. Weirs protect against swift wash outs when the river is in flood.*
>
> *Weirs could be raised and have gates installed which could be opened and closed to regulate river flow.*

There were also contradictory concerns about flooding. For example, some were concerned that removal of the weirs would exacerbate flooding. Others were concerned that the weirs themselves increased the danger of flooding in times of heavy rainfall. Others appreciated the environmental effects of flooding which produced alluvial flood plains. One participant stated that, by controlling flooding, the weirs "hold the water back for farming".

> *In heavy rain [the weirs] control flows. Thirty-five years ago [there were] five floods between Wallacia and Bents Basin because someone opened the dams.*
>
> *Something that protects against flooding needs to be looked after.*
>
> *To what degree are the weirs a check on flood mitigation?*

Concerns and suggestions not directly related to weir removal have been grouped together under the heading 'other actions' (Figure 7). They generally relate to views about the way the river and the weirs are managed.

3.2.4 Information and decision making

The following responses relate to information that participants indicate they would require in the event of a proposal to remove the weirs and the level and type of participation in the decision-making process favoured. Responses indicate a strong

demand for information and a high level of interest in participation in the decision-making processes.

The questions were:

- If there were a proposal for the removal of the weirs, what information do you think you would need or like to have (if any)?

- If there were a proposal for the removal of the weirs, in what way would you like to be part of the decision-making process (if at all)?

Participants overwhelmingly indicated that should a proposal to remove the weirs go ahead they would like access to relevant information. Almost all participants (102, 90% of total) specified some kind of information requirement (Figure 8). About half the participants requested information from impact studies and wanted ongoing research regarding the removal or retention of any of the weirs. Some participants sought information about the purpose of the weirs, and the history behind them. Some wanted to know what the impact of weir removal would be on the environment, river flow and water supply for irrigation. There were several requests for a mutually informative process between all stakeholders through community debates. Other information sought was the cost of removal or maintenance of the weirs, effects on flooding and erosion, social impacts, access, effects on water quality and studies assessing the trade-off between water supply, heritage value, the environment and social impact.

Most participants (95; 84% of total) felt that local people who use the river should be part of the decision-making process and varied avenues for that participation were identified (Figure 9). Participants expressed a willingness to take part in further community consultations, community meetings and to have issues debated in the local newspapers. Suggestions grouped in the 'other' category, included information being disseminated via letter-boxing, local radio and information stalls at libraries, on the riverbank or in shopping centres. The Internet and e-mail were also noted as ways of transmitting information.

Mechanisms of direct involvement included surveys, submissions, a public vote, public viewing of the weirs in question and the formation of a bush care group. Several participants stated that the decision was the responsibility of the local Council, and wanted information distributed to the community through a newsletter. Others perceived responsibility to lie with the Chamber of Commerce or farmers and water users.

A degree of mistrust toward decision-making bodies is evident, with some participants expressing cynicism with regard to river management. The majority of the detailed responses were negative in tone and related to previously poor maintenance or management of the weirs, complaints of pollution, the condition of the fish ladders or accusations of failure of responsibility.

> *The two broken weirs, Thurns & Bergins, should be replaced.*
>
> *[The weirs should be] repaired and maintained properly. Shame on Council's departments for not doing this or having it done.*
>
> *[This is a] cynical proposal by authorities who have neglected their duty to maintain weirs – now it will be expensive. [If the weirs are removed] the river*

and the water will disappear, every living thing will also disappear – [and there will be] no ecosystem.

Would destroy the river as we know it – perhaps to point of no possible restoration. Perhaps council should take more care of their backyard.

Government should maintain policy to keep weirs secure – as compensation for effects of large upstream dams [Cataract, Nepean, Avon, Cordeaux].

All the community should be advised at all times, not just a few bureaucrats that have no idea making these decisions.

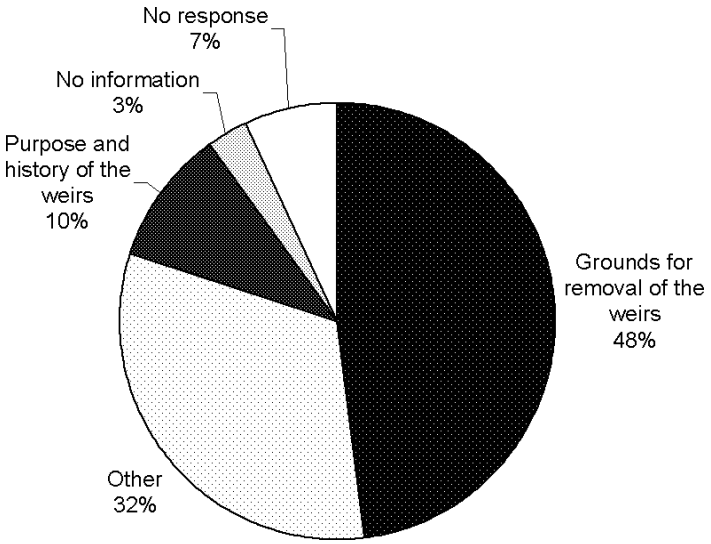
Many identified the effects of the weirs on environmental flows or implied requests for information on the same.

Weirs don't stop river flow in dry times but I don't know if it kills the river or not.

[Request for] accurate info on flow rates and projection for farming requirements. Will water simply be allowed to flow to the sea?

The process of [weir] removal should be slow and focus on environmental preservation and regeneration. [It should] monitor process and effects.

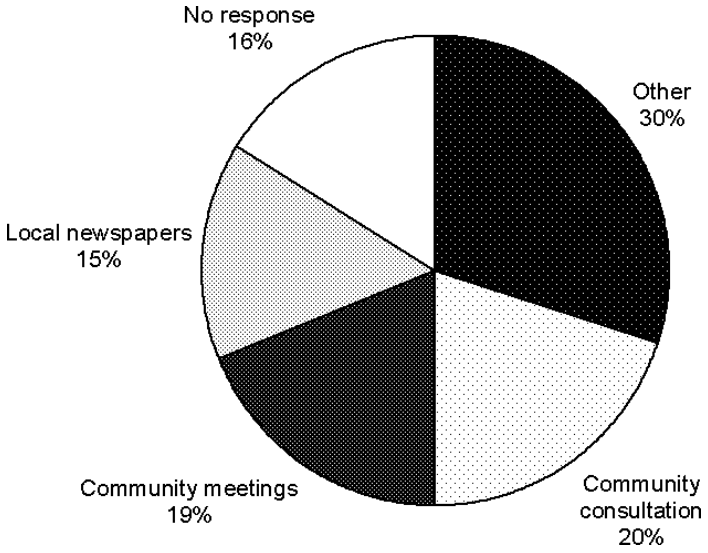
Figure 8 Information needs



Notes for Figure 8

'Grounds for removal of the weirs' included both requests for reasons to explain why weir removal is a possibility as well as requests for information which might support those reasons.
'Purpose and history of the weirs' refers to information about the history and installation of the weirs and the reasons for their existence.
'No information' includes those who stated that their stance against removal of the weirs required no further information. Others simply did not require information.
'Other' included information on the history of the river and the cost of removal or maintenance of the weirs, effects on flooding and erosion, social impacts, access, effects on water quality and studies assessing the trade-off between water supply, heritage value, the environment and social impact.

Figure 9 Desired involvement in the decision-making process



Notes for Figure 9

'Other' includes various suggestions for methods of communication, references to responsible bodies and varied suggestions for public participation.

3.2.5 Conclusion

The aim of this research was to identify the local community's views and concerns regarding the possibility of change to Bergins, Thurns, Sharpes and Brownlow Hill weirs. Specifically, the research team looked at the nature of the social and economic relationship between people and weirs at a local level and at the ways in which the local community might want to participate in decision-making about the weirs and river management.

The overwhelming response to questions about the river environment emphasised the aesthetic and leisure value of the river. The local community appears to identify very strongly with the river, with participants interpreting the existence of the weirs as integral to the river's survival as well as to the ongoing economic survival of the region. Questions about the weirs drew a strong response in favour of their retention. The findings show that members of the public participating in this research view the weirs as an integral part of the river and the river as an integral part of the Camden community.

Responses indicate some contradictions in terms used to describe river water and meanings conveyed by those terms. These contradictions, along with direct requests by participants for information, indicate a need for information to be made available to the community.

The information sheet provided to participants focused the survey on the four nominated weirs, but the questionnaire itself did not indicate that answers should be confined only to these weirs. It is important to note that most of the participants referred to weirs in general. In addition, whilst conducting interviews, researchers observed that many participants were not previously aware of either the existence of the weirs, the number of weirs or their function.

Issues of trust and the need for public participation in relation to decision-making were dominant. Overall, it was found that there is a significant relationship between the general public, the river and the weirs.

3.3 Recommendations

That the relevant agencies develop appropriate local mechanisms for involving members of the general public in decision-making processes concerning the removal or modification of weirs. This should be accompanied by appropriate provision of advice and information on the impacts and benefits of a variety of options that can meet the objectives of the Forum in relation to environmental flows and river health.

4 COMMUNITY GROUPS

4.1 Introduction

The approach taken for the community group research was built on an open invitation to groups to submit their views in a way that was appropriate and relevant to them. The Institute also conducted analysis of local print media to complement the formal submissions made by groups. Newspaper reports provide further understanding of the way in which these issues are presented and discussed at a local level. This section examines the submissions made by community groups and the local print media coverage generated during the research period.

A list of community groups was obtained from both Camden and Wollondilly Councils**.** All community groups with a postal address within an approximate 10km radius of Camden were included. This geographical area has Theresa Park in its north western corner and Menangle at its south eastern corner. The area included Mount Annan and Mount Hunter, but not Campbelltown. A small number of groups were included with postal addresses outside this radius (e.g. Leppington, Tahmoor), if they represented business, environmental, local action, heritage or horticultural interests. One hundred and sixty five (165) organisations were represented.

A covering letter encouraging a submission in whatever form was appropriate and convenient for them was sent with an information sheet to all the identified organizations (see Appendix 6). The research team also offered to attend meetings where appropriate. A press release and public notice issued at the end of September and information sheets available at the Council offices and the Camden Museum were designed to draw attention to the research and invite responses. Direct contact was also made with the local Councils. Fourteen of the 165 organisations were selected to be followed up with a phone call. These groups were business groups (2), environmental groups (2), local action groups (4), heritage groups (5) or horticultural groups (1).

Three groups provided a response by means of a telephone interview; three by means of a formal written submission and one group discussed the issues at a meeting attended by researchers. After attending this meeting, researchers summarised the main themes that had emerged and sent this document to the group for review. Telephone contact was made and a submission received from a group that was not on the original list but had been made aware of the research through the local press. Submissions were also received from the State Member of Parliament and the two local Councils.

Participating groups appeared to vary in their structure and organisational capacity. Some groups, e.g. Camden Historical Society (CHS) and both Chambers of Commerce, appear to be large, well organised with regular meetings. Others (e.g. Wollondilly Heritage Centre (WHC), and the Society for Growing Australian Plants (SGAP)) are smaller with a more fluid, loosely structured organisational style. These groups were harder to make contact with and to involve in the research. It appeared that participation in the research was more likely for groups with a strong, already established interest in the weirs and the river or a key individual in the group with a strong interest. Other groups might have been encouraged to participate had the time and resources available for this project been more extensive.

All fourteen key groups' representatives who were directly contacted asked questions about the process and the issues involved. The majority of the groups were interested in the issues, whether they wanted to make a formal submission or not. It is likely that groups which declined to respond with a formal submission in this instance might like to become more involved in future river management.

There were four main reasons given by groups that stated they would not make a submission. Four groups did not believe that the issue was relevant for them and three groups advised that individual members would prefer to respond**.** One group is currently restructuring and cannot commit to a new process at present and the remaining group had strong views about the issue but declined to make a formal submission. This group's reason for not participating was strategic and can be summarised as mistrust of the process and unwillingness to contribute information to the debate that could be used by the decision makers in a way that would be against their interests. The research team had contact with a representative from this group on several occasions between October and December. On each occasion the representative was clear that the group would oppose any change to the weirs and that any information submitted to the Forum via the community research undertaken by the Institute, might limit their ability to protest in an effective way. The representative was cynical about the purpose of the research, suggesting that it was being used as a buffer between the community and the decision makers. An invitation to submit anonymously was declined.

The research team maintained contact with participating groups throughout the project by telephone, information sheet and newsletters.

4.2 Responses

Results for the community group research are presented in three sections. The first section is an analysis of the formal submissions. The second section details the results of the meeting held 13th November 2002 at the Camden Historical Society where a discussion of the issues surrounding weir removal took place with researchers taking questions and recording views. Finally, an analysis of local newspaper coverage during the project period will be presented.

4.2.1 Formal submissions

Of the nine submissions received from community groups, five were opposed to removal of the weirs. These included Camden Historical Society (CHS), Wollondilly Shire Council (WSC) and Dr Liz Kernohan; two were in favour of weir removal, Narellan Landcare Group (NLG) and Hawkesbury–Nepean Catchment Foundation (HNCF), and Camden Council (CC) resolved to formulate a policy position on the issue only on the release of an Environmental Impact Statement (EIS). The Camden Residents' Action Group (CRAG) favoured removal of the two collapsed weirs, Thurns and Bergins and retention and maintenance of the other two working weirs, Brownlow Hill and Sharpes.

The reasons given by groups in favour of retaining the weirs can be grouped into three main areas: 1. Local economic. 2. Heritage and landscape. 3. Recreation and tourism. Other issues raised were some technical considerations and concerns about the research process.

Weirs are seen as important to the local economy including farming and other businesses in the region. Concern was expressed for the viability of local agriculture should the weirs be removed. This included the fear that without weirs there would be no sustainable industry in the area. It was argued that local commerce depends

on trade provided by farmers so other businesses would suffer if farmers businesses experienced a downturn. The maintenance of the weirs is seen as important to the economy of the whole district. One group stated, “If the weirs were removed it would cripple the Camden community”. According to another group, if the weirs were removed the food chain supplying Sydney would be seriously affected.

The weirs were seen to have historical and contemporary value. It was considered “sacrilege” by one of the submissions to remove the Brownlow Hill weir, as it was heritage listed only eighteen months ago. The CHS argued that the weirs are an important part of both the current image and historical story of Camden. According to the Society, local residents increasingly appreciate the “sense of place” that the weirs and the river provide. The Society also states that when the “compensation” weirs were constructed, the government of the day made a commitment to provide for river users. They argue that this commitment should be honoured.

Weirs were seen to provide a recreational environment, which by extension was also related to tourism. The Camden Chamber of Commerce (CCC) is concerned that if weirs were removed, water levels in the river might fall and this might have an effect on tourism. Two others echoed this sentiment when they asserted that water levels need to be managed and that weirs should be maintained to provide scope for sports and other recreational activities for local people. It was stated that the failure of the Camden weir in the 1980s and the subsequent lack of water in the river, was a serious concern for the local community and that no one wants to see this happening again.

It was claimed that it is a “gross miscalculation” to believe that the river can be kept flowing by removing the weirs and letting out minor volumes from the dams. It is argued that islands will form to block river flow if weirs are removed, as has happened since the failure of Thurns and Bergins. Rather than removing weirs, it was suggested that fish ladders should be installed and maintained for Sharpes and Brownlow Hill weirs.

The CHS stated that it was inappropriate to ask the public their views on the possibility of weir removal in a time of drought. They also contended that there had not been sufficient time for the consultation, given the controversial nature of the issue. Concern was also expressed by CHS at the lack of a definite proposal.

There were two submissions in favour of weir removal, which shared a concern for environmental flows informed by previous river management research and local issues. One submission (CRAG) submitted that only Thurns and Bergins weirs, which have collapsed could be removed.

The NLG would like to see environmental flows in the Hawkesbury–Nepean, with water supplied by “releases from the upstream dams”. They support the principles of total catchment management and feel that weirs are “not appropriate for this river system”. They acknowledge the reliance of local agriculture on irrigation from the river, but suggest that agriculture reliant on irrigation might not be appropriate in these locations. The group considers that natural flows and weir removal in the river might encourage platypus to return to the river. They also believe that a natural river frontage would complement the bush corridor recently created by the group in the Spring Farm area.

It is the view of the HNCF that the removal of weirs would lead to better management of future environmental flows, algal blooms and other aspects of river health. The group supports the NSW Government Weirs Review Policy and the NSW

Government's Statement of Joint Intent. They believe that as many as possible of the seven working weirs in the Upper Nepean should be removed and that the public should be asked about all the weirs in the Upper Nepean not just Sharpes, Brownlow Hill, Thurns and Bergins. They suggest that there is no purpose in asking the public their views about Thurns and Bergins weirs because these weirs are beyond repair and therefore offer "nothing to currently value". In terms of alternative water supplies for irrigators, they argue that the Government should take the lead in investigating the possible utilisation of the flows expected from the upgrade of the West Camden sewerage treatment plant and that this should be done as a matter of urgency.

Camden Council informed researchers that a development committee had considered weir removal in a meeting on 12th August 2002. Both adverse environmental impacts and the beneficial effects of the weirs in question were discussed. The conclusion was that Council would not formulate a policy position until all the relevant facts were presented to the community by way of the release of an EIS. However, it was noted that the Council believes that beneficial effects of the weirs including weir pools for irrigators and agricultural activities, pleasing visual aesthetics and recreational attributes, need to be strongly considered in any assessment.

The HNCF, with a depth of knowledge about the river that could be an important resource, has stated that they would be "happy to provide further input to [the Institute], the Expert Panel, the River Forum and other relevant bodies to progress this further". The CCC would like to be involved at every stage and have "direct input into the process" and CRAG would want to be "fully consulted" in the event of removal of the weirs becoming a proposal. Both local Councils requested that they should be kept informed with regard to the decision-making process. These groups clearly included a request to be involved in their submission, but it is the impression of the researchers that other groups would also be keen to participate further should the opportunity arise.

4.2.2 Camden Historical Society Meeting

This meeting took place 13th November 2002. Approximately fifty people attended, including both Historical Society members and non-members. Thirty-six were male and fourteen female. Those attending included the local Liberal candidate for State Parliament, the local Greens candidate for State Parliament, the President of the Upper Nepean Water Users Group (UNWUG), bass fishermen, an ex-employee of Sydney Water, an academic writing a PhD on historical Camden, members of the Chamber of Commerce, an electrician, a local landowner whose family have farmed in the area for generations, a local grape grower, a committee member of Historical Trust of Australia NSW Branch, a sand dredger and members of the CHS with various interests and businesses.

The research team introduced themselves and made a brief presentation to clarify their role and aims of the research. They explained the process and confirmed that a proposal does not yet exist to remove the weirs. A representative from Biosis Research[12] spoke of that organisation's role with respect to cultural heritage factors. The President of the Society then invited people to speak and have their views recorded. Researchers collected views from participants regarding the value weirs have for them, how they use them and the impact of weir removal and recorded comments on a flip chart in front of the participants.

[12] Biosis Research has previously carried out a cultural heritage study of the weirs in this area.

Participants in the meeting clapped and offered vocal support after each comment was recorded. Many had prepared notes, brought press clippings and photos to demonstrate what the river used to look like, damage that had occurred over time and the impact of the lack of maintenance. Midway through the proceedings, one of the research team intervened to encourage a female perspective as only men had spoken to this point. Three direct responses came from this request. After the meeting, researchers met a number of individuals and three more female responses were added. Before closing the meeting, at the instigation of those present, a show of hands was asked for of those in favour of removing the weirs. Not one hand was raised. In general, participants expressed anger that removal of the weirs was being considered and that others were trying to tell the people of Camden District what to do on such a matter.

There were a number of points to emerge from that meeting:

Without weirs, it was said that the river would be reduced to a trickle of water at the bottom of the riverbed. This would have a negative impact on the local community, for irrigators who use the water for their business, for tourism, for fishing and for aesthetic and historical aspects. Interdependence and solidarity between different sectors of the community was stressed. For example, if irrigators are experiencing difficulties this has an effect on businesses in the town and the whole community.

It was seen to be inappropriate to be discussing the potential removal of the weirs in a time of drought. The rationale behind the emergence of this as an issue was questioned. People believed that using “improved environmental flows” as an argument in favour of removal was misleading and that flows were already adequate. Fishing was said to be better than it has been for decades. It was stated that rather than remove the weirs they should be restored and properly maintained.

If there were a proposal to remove the weirs, those present at the meeting would strongly oppose it. Members of the public attending this meeting wanted the research team to convey, in the strongest possible terms, the importance of weirs to their community.

Finally, it was suggested that the timeframe for the consultation was too short.

4.2.3 Local newspapers

This analysis is limited to the four local newspapers: *The Camden Wollondilly Advertiser*, *The Macarthur Advertiser*, *The Macarthur Chronicle* and *The District Reporter*. The researchers are aware that local radio covered the issue, however, this has not been incorporated. The researchers did not implement a broad media monitoring process, and therefore it is possible items may have been missed from other sources, for example television and the Internet.

Each newspaper published articles dealing with the subject of the weirs, river management in general and the research being undertaken by the Institute. The coverage prompted letters to the editor and it increased significantly once contact between researchers and the local community became more frequent in October. The issue appeared on both the front page and back page of *The District Reporter*, indicating the significance of the story. Photographs often accompanied the articles in all newspapers.

Notice of the meetings organised by the research team were printed before the meetings and reports on those meetings were printed in subsequent issues. Other than the September press release informing the community of the research and asking for views, the Institute did not seek press coverage, but reporters contacted researchers for comment. In these instances, researchers were accurately quoted.

Conflicting reports about the existence or not, of a proposal to remove the weirs appeared. Some refer to a "proposal to remove the weirs" and a "decision to remove the weirs"[13], while others state that this is preliminary research and a proposal to remove the weirs does not exist[14].

The Macarthur Advertiser reported that the Minister for Land and Water Conservation, John Aquilina said he "rejected Opposition claims that the Government planned to remove four Nepean River weirs."[15] These conflicting reports reflect a larger confusion evident among local groups with respect to whether a proposal exists or not. Suggestions of an existing proposal or decision to remove the weirs appeared to sensationalise the story. They might also heighten the perceived urgency of promises to retain the weirs made by the State Opposition: "If a Liberal and National Government were voted in at next year's State election, the proposal to remove the four weirs on the Nepean River would be halted…" Mrs Forsythe, the Shadow Minister for the Environment was reported to have said[16].

Local political candidates (The Greens and Liberal Party) were frequently reported and appeared in photographs, as were local business leaders. The State Opposition Leader appeared in a photograph with the Liberal candidate.

Those opposed to change have gained the largest part of the coverage with a number of different contributors. Views both in favour of change to the weirs and opposed to any change were represented, although alternative views have been represented by fewer voices.

> *Environmental flows in our river are coming, whether we like it or not*[17]

> *Retain our weirs, don't destroy them say Libs*[18]

The headlines in Figure 10 give some sense of the local newspaper coverage. Headlines, however, do not always capture the complexity of debate. In at least two newspapers[19], some of that complexity is demonstrated in a discussion of environmental flows and an argument for the use of treated effluent, with the local Greens candidate taking a stand he acknowledged, "some environmentalists may be surprised by…"[20]

> *Effluent may help to keep district affluent*[21]

The views reflected in the press are similar in proportion to the views presented in formal submissions. Consistent with the earlier analysis issues covered included

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[13] *The District Reporter* 22 November 2002.
[14] *Macarthur Advertiser* 26 November 2002 and 15 November 2002.
[15] *Macarthur Advertiser* 5 November 2002.
[16] *The District Reporter* 22 November 2002.
[17] *Camden Wollondilly Advertiser*, 3 December 2002.
[18] *Macarthur Chronicle*, 3 November 2002.
[19] *Macarthur Chronicle* 26 November 2002 and *Camden Wollondilly Advertiser* 3 December 2002.
[20] *Camden Wollondilly Advertiser* 3 December 2002.
[21] *Macarthur Chronicle* 26 November 2002.

implications for farmers and consequences for businesses in Camden, recreation, fishing, history and culture. The media coverage, however, had the additional element of a pre-election debate. Moreover, there is a demonstrated ability to compromise on issues and explore alternatives beyond a simple for or against position:

> *'At least, the weirs have to be adjusted. If we can make the height of the weirs variable, we can vary the environmental flows', said Dr Tony Ross, an environmentalist and Deputy Chair of the Hawkesbury–Nepean Catchment Management Foundation.*[22]

A back page feature written by John Wrigley, Chair of the Camden Historical Society, gives a detailed historical viewpoint on the river. He describes the river as a "regional treasure" and argues that it has been "treated poorly," chronicling various forms of river management over the past two hundred years.

> *The present survey being undertaken by the State Government to gauge the likely public reaction if the Nepean weirs were removed is a potential political time bomb for the Government. The impact would not be felt until the people noticed that their river had been turned into a series of muddy water holes and that local rural businesses had been decimated. The Nepean River is already much better clothed in riverbank vegetation in recent years. Many trees have been planted by various community groups. Let us hope that the next 200 years are better than the last 200 have been for this regional treasure.*[23]

The issues surrounding environmental flows and alternative water supplies are complex and local press coverage is an important part of the debate. The media coverage might prove useful for future community development and river management, as it is an indication of community interest in the weirs.

[22] *Camden Wollondilly Advertiser* 3 December 2002
[23] *The District Reporter*, 29th November 2002

Figure 10 A selection of local newspaper headlines

4.2.4 Conclusion

The aim of this part of the research has been to identify the views of major community groups and their concerns regarding the possibility of change to Bergins, Thurns, Sharpes and Brownlow Hill weirs.

Groups have different types of knowledge about the weirs and the river. They also provide a different emphasis on social, economic and environmental issues. The two environmental groups taking part in the research are in favour of weir removal and environmental flows in the river. The historical, action and business groups argue for the retention and maintenance of the weirs. The themes that emerge most strongly from the groups opposed to weir removal are community economic interdependence and heritage and cultural issues. Business groups stress the economic interdependence between farmers and businesses in the town. If irrigators feel that their livelihood is threatened then this will have consequences for businesses in the rest of the community. The cultural and heritage value of the weirs has also been stressed as an important part of local people's sense of place.

There was significant coverage of the issues under research by the local press. This coverage was relatively consistent with the views expressed by community groups in formal submissions. Despite the predominance of those opposed to weir removal and the complex nature of issues surrounding environmental flows and alternative water supplies, these viewpoints have also been presented.

It is clear that significant community interest exists in the weirs and management of the river in general. It could be expected that local papers will continue to report on that interest and groups will continue to use local papers as a means of raising awareness of their views.

Two of the groups contacted directly by the Institute expressed concerns about both the purpose and value of participating in the research. One representative questioned the value of spending time preparing a submission for this research. The group's knowledge of environmental issues around the weirs and river flows is extensive and the representative expressed frustration about not having a direct line to decision makers in order to express the group's views. Another group expressed an even higher degree of cynicism about the research process, and chose not to participate in the research.

While some groups questioned the research process and expressed cynicism about the purpose of the research, the majority have made clear that they would like to be further involved in the decision-making process.

It appears that the groups that made submissions have significant knowledge and experience about the river and all issues concerning its management. This constitutes a valuable and important resource that could be drawn on in the future.

4.3 Recommendations

That the relevant agencies develop appropriate local mechanisms for involving relevant community groups in decision-making on the removal or modification of weirs. This should be accompanied by appropriate provision of advice and information on the impacts and benefits of a variety of options that can meet the objectives of the Forum in relation to environmental flows and river health.

5 WATER USERS

5.1 Introduction

Contact details for key individuals in both water user groups (irrigators and recreational users) were obtained from representatives on the Hawkesbury–Nepean Management Forum[24] who then provided contact details of their members. Communication was maintained with key contacts throughout the project.

During initial meetings with water user groups and in particular with irrigators, it was evident that there was a high level of economic and emotional investment in the weirs and water supply. This context significantly influenced the approach of the research team, which aimed to facilitate a high level of involvement and ownership of the project. In the meeting held with irrigators, it was evident that any suggestion of weir removal created a high degree of anxiety, concern and mistrust amongst irrigators.

When researchers met with members of the Upper Nepean Water Users Group (UNWUG), they presented the research aims and the type of information being sought. Members of UNWUG provided input into the research design to encourage participation, ownership of the process and responses from those most likely to be directly affected by any changes. The research team agreed to a second meeting to provide feedback to participants when the responses were collated. A questionnaire was sent to all irrigators licensed by DLWC, for areas between the northern boundaries of Theresa Park to Menangle in the south (see Appendix 7). In November 2002, a meeting was organised with the UNWUG to provide feedback to participants on the survey responses that had been received to date[25] and the initial findings. A notice of the meeting was sent through the mail and Internet to those on the contact list.

Following a meeting with the Vice President of the NSW Fishing Clubs Association at which the research aims were explained, contact details for recreational clubs and businesses were collected. Contact details for additional recreational river users and businesses were found by contacting local canoeing clubs, businesses and Tourist Information Centres. A different questionnaire was developed and administered to recreational users on the contact list (see Appendix 7).

The questionnaire for each water user group contained a series of open-ended questions designed to collect both specific data about water use and observations of the river environment. Both questionnaires specifically asked for information about each of the four nominated weirs (Bergins, Brownlow Hill, Sharpes and Thurns). 176 questionnaires were sent to licensed irrigators and 141 questionnaires to recreational users. In addition to the request to complete the questionnaire, responses by telephone, email or other written responses were encouraged. A total of 54 responses were received: 42 from irrigators and 12 from recreational users.

The response rate shows that those with a direct economic interest in the river were strongly represented in this part of the study, whereas less well organised groups or

[24] The President of the Upper Nepean Water Users Group and Vice-President of the NSW Fishing Club Association.
[25] Twenty-eight irrigator and twelve recreational user responses.

groups without strong economic interests in the river were less frequently represented.

Responses from irrigators and recreational users were analysed separately, except where responses in both groups were similar and so were aggregated into one group. This applies to the sections on information needs and decision-making.

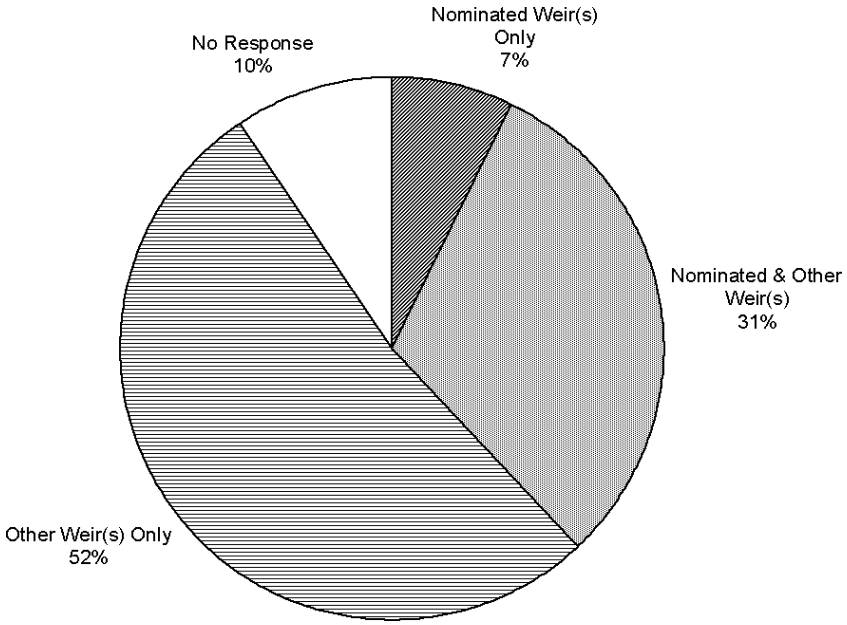
5.2 Responses

5.2.1 Irrigators

The following section examines which weirs are used by irrigators in the region, the ways they are used by irrigators and their importance to irrigators' livelihoods and activities. It also examines other perceived benefits of the weirs. The following sections examine responses in relation to water supply and quality, reactions to potential changes to the weirs, including their removal and irrigators' responses to questions about alternative sources of water. The specific questions asked can be found in the Water Users Survey in Appendix 7.

Over a third of participating irrigators used one or more of the nominated four weirs, either solely or in combination with other weirs (Figure 11). Just over half of the total participants (22; 52% of total) have used weirs other than the four nominated weirs, and these other weirs are located between Theresa Park and Douglas Park. Many irrigators used a combination of weirs, because they have interests[26] in more than one property. A few relied entirely on one or more of the four nominated weirs[27].

Figure 11 Use of weirs



Notes for Figure 11

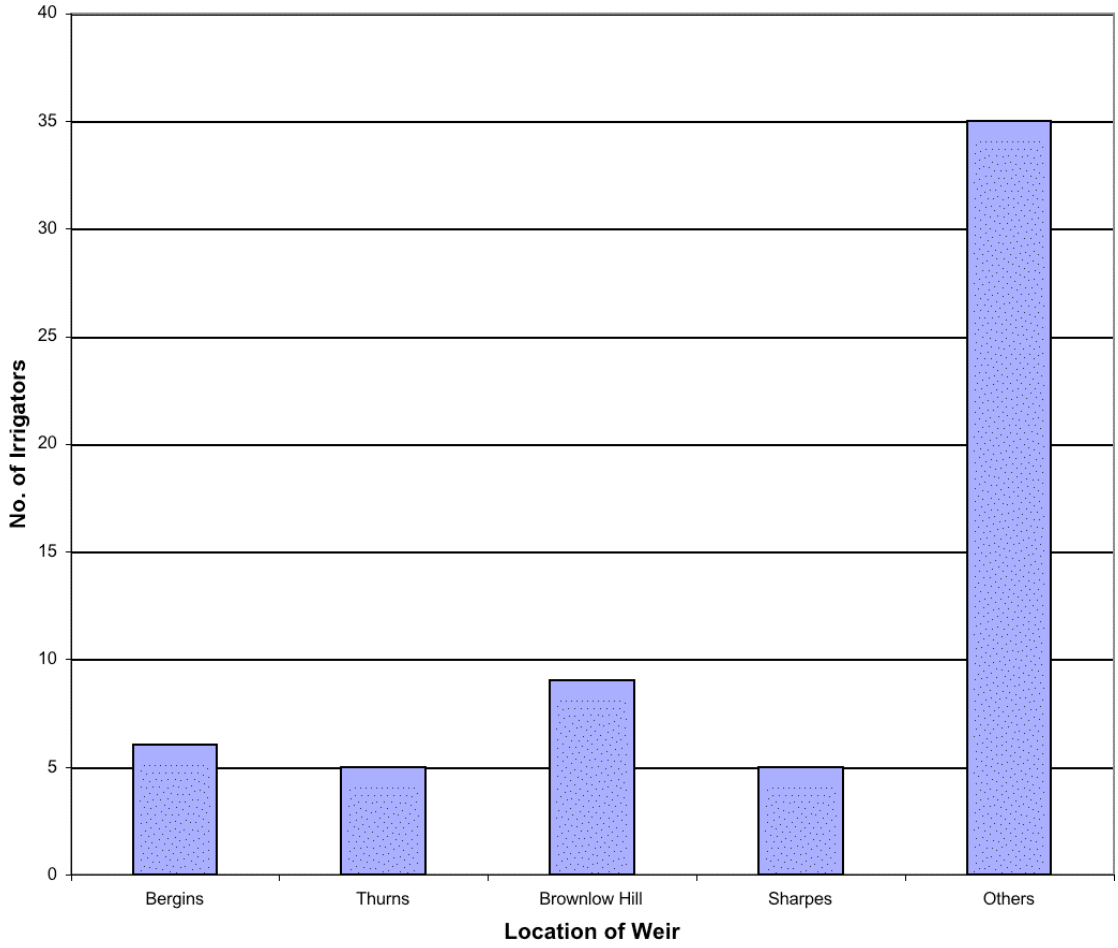
[26] A few irrigators have multiple interests in land holdings, owning more than one property or having significant ties to a 'family farm' in addition to their own property.

[27] Two of these were service providers who relied on all the weirs functioning for the viability of the farmers who require their services.

'Other Weirs' includes any weir, other than the four nominated on the questionnaire. They include: Camden, Menangle, Mt Hunter, Theresa Park, Douglas Park, Cobbitty, Shipton, Georges Basin, Wallacia.
'Nominated Weirs' refers to one or more of the four weirs nominated in the questionnaire (Bergins, Thurns, Brownlow Hill and Sharpes).

As shown in Figure 12, for each of Bergins, Thurns and Sharpes weirs, about five responses indicated use of one of these weirs. Brownlow Hill weir was listed as a source of water in nine responses. Irrigators with licences for either Thurns or Bergins weir indicated their dependence on other weirs nearby, due to the state of disrepair of both these weirs.

Figure 12 Weirs utilised



Importance of weirs

Irrigators were asked to explain the importance of these particular weirs to their livelihood and other activities but most responses were in relation to weirs in general, not only the nominated weirs. The importance of weirs to irrigators' livelihoods was expressed more often than the importance of weirs to any other activity. Most irrigators (93% of total) had something to say about the importance of weirs to their livelihood, compared to 58% indicating the importance of weirs for their other activities.

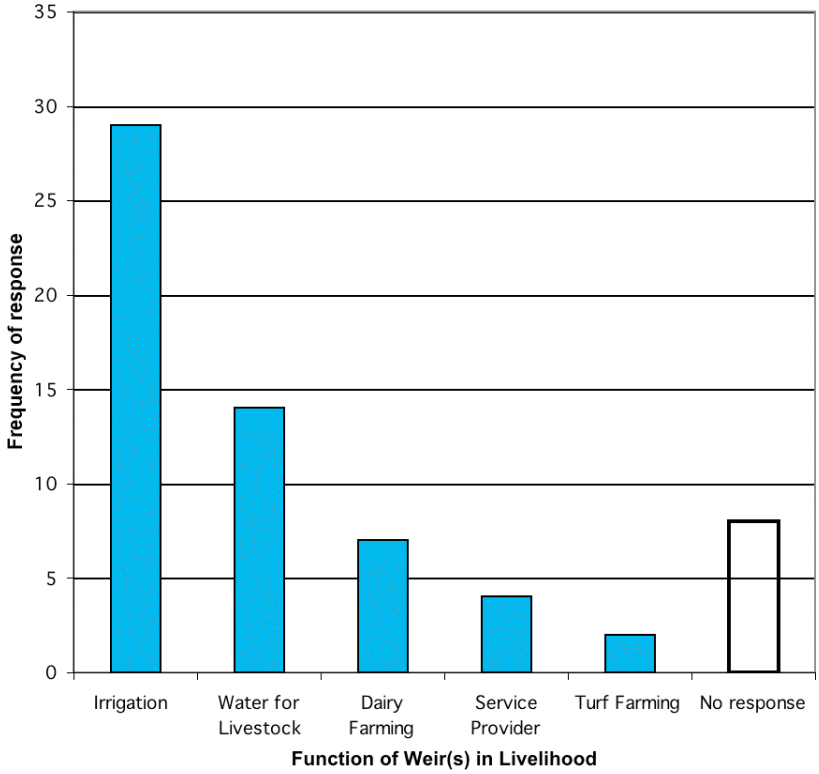
In describing the importance of weirs to their livelihoods, irrigators referred to how vital the water from the weirs was to their crops and livestock, to their specific

business operations and to their occupations in general. Nine irrigators (21% of total) cited the viability of their enterprise as being dependent on weirs:

> *We depend on the river and weir giving us water for our farm and giving us a viable crop. That's our total income [2A].*
>
> *The livelihoods of a number of agriculturalists adjacent to the river is completely dependent on irrigation made possible by the presence of the weirs…If the drought fails to break by autumn, only those dairy farmers with access to the Nepean River (or town water) will survive. Without the weirs, at least four dairy farmers would currently not be able to irrigate from a dry riverbed and would be similarly affected. [26A].*

Irrigators' comments on the importance of weirs to their livelihoods were grouped into five categories of functions. All these functions are water-related (see Figure 13).

Figure 13 Importance of weirs to livelihood



Notes for Figure 13

'Irrigation' includes specific reference to irrigation and general reference to agricultural applications requiring water, such as market gardening, horticulture, hydroponics, garden centres orchards and turf farms. Crops being irrigated include lucerne, vegetables and grapes.
'Livestock' includes any reference to importance of weirs in maintaining livestock such as cattle, dairy cows, poultry or general livestock.
'Dairy Farm' includes direct references to dairy farm(s), including references to water used for cleaning plant and equipment in dairy farms as well as for specific dairy stock needs.
'Service Provider' includes reference to from weirs used for contract services provided to farmers and includes services assisting farm operators to maintain the condition of their stock, properties, plant and equipment.

Irrigators also extended the importance of weirs to their livelihoods in non-agricultural ways. They stated that weirs provided bushfire security and protected land values. A few mentioned the importance of having storage facilities and the ability to replenish dam water while others pointed to the integral relationship between the weirs and a reliable domestic water supply during dry seasons.

Irrigators were less likely to make observations about the importance of weirs to their other activities as only 24 participants (58% of total) gave any response to this question. However, most of those who responded (75% of responses) noted the recreational benefits weirs provided, such as canoeing, camping, swimming and fishing. Often these observations also referred to the social value that these recreational activities hold for families:

> *…I am a father with three children and because we live on the farm we regularly use the river for social picnics with our family and friends. Activities include canoeing, boating, swimming and regular walking along the river's edge together with family picnics. These activities have been treasured by our family and are particularly important values to us. [14A]*

Some responses also referred to the important contribution of weirs to the natural environment that they experience and enjoy as part of their daily lifestyle:

> *The river environment is of great importance to us. The deep stretch of river on our property is one of the main reasons we purchased in the first place. It provides a home for many waterfowl and the banks grow a rich variety of plants, which offer shelter to many types of birds and animals. There is also an abundance of reptiles and amphibians. We see wallabies, wombats, water dragons and kingfishers among the many species in our river paddock. [35A]*

A few responses saw weirs as important to the aesthetics of their surroundings, to teaching and learning opportunities at the universities,[28] and the way in which weirs can provide a pollution or water quality monitoring function:

> *Quality of control of water: sewerage. This weir pool [Sharpes and Theresa Park] would be the first indication of any malfunction at sewerage plant…We are a beef producer and any impurities in the water will show up in our produce [1A].*

When asked to identify other benefits of weirs, other than as a source of water, most of the participants (34; 81% of total) gave a response and observations were uniformly positive about the role of the weirs in the region.

Many responses, however, continued to make the connection between weirs and reliable water supply (11; 32% of responses), pointing to their central role in providing water, water-based recreation and maintaining the viability of their agricultural enterprises. A few were also of the view that weirs were beneficial for containing floods and acting as a firebreak and greenbelt around the populated suburbs of Sydney or that as a supply of water, weirs diluted pollution and odours.

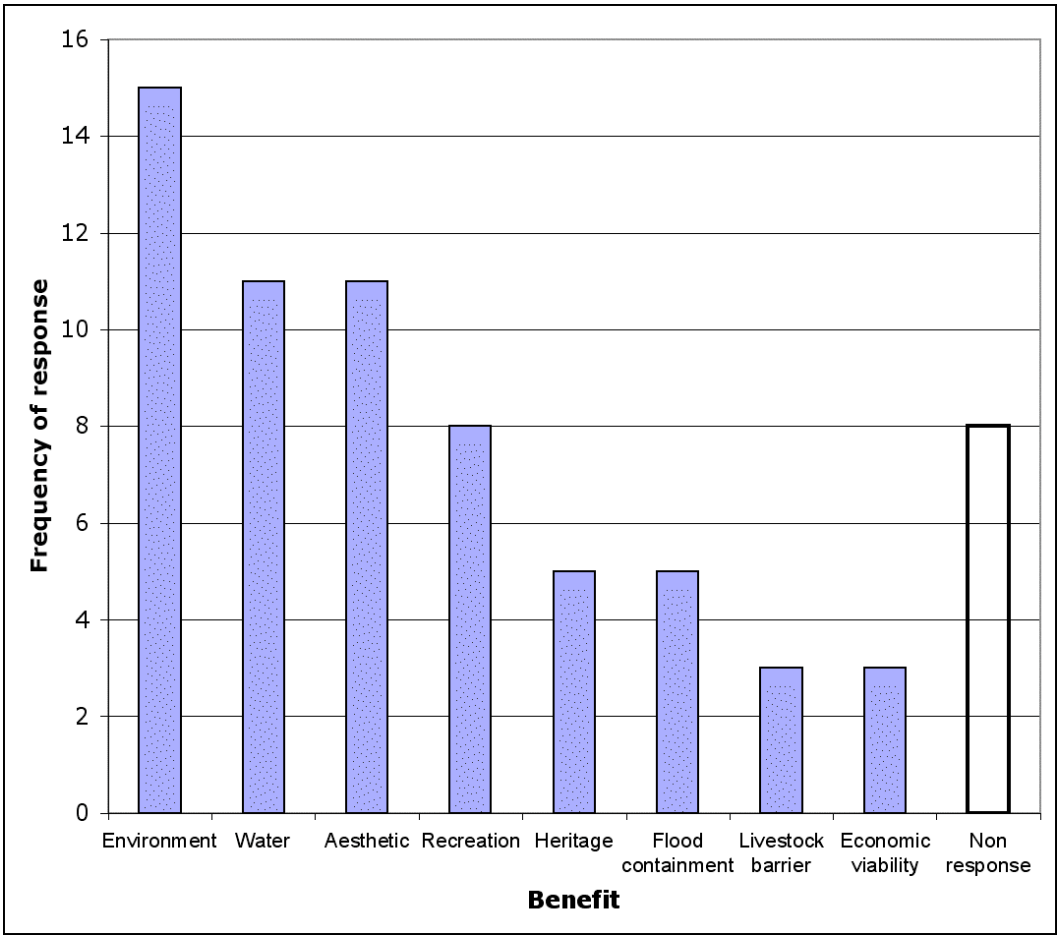
Almost half of the responses to the question about other benefits of weirs, referred to the positive benefits weirs have had in promoting the biodiversity and ecology of the local environment (Figure 14). Associated with this, about a third of responses also

[28] The University of Sydney and the University of Western Sydney both have agricultural research facilities and campuses in the area.

referred to the aesthetic value and sense of place provided by weirs, with some pointing to their important contribution to regional heritage and history:

> *I have benefited from all the weirs in my canoe trips…Camden would lose its special feeling and much of its history without the river. Take away the weirs and you take away the river in key periods [3A].*
>
> *Thurn's Weir: aesthetic views from the Camden Park and Glenlee/Mt Annan districts: cultural landscapes associated with the origins of agriculture at Camden Park: provide a future recreational asset in conjunction with the proposed bush corridors through the Spring Farm area where up to 4000 residential lots are proposed. Brownlow Weir: heritage item which is arguably the best example of a weir along the Nepean River…Enhances the cultural landscape view across the river flats on the adjoining rural countryside [14A].*

Figure 14 Benefits, other than water, of weir(s)



Notes for Figure 14

'Environment' includes all references to biodiversity, ecological value, fauna (including but not exclusive to platypus, wombats, wallabies and echidna), bird life, fish and vegetation. It also includes references to weirs providing riverbank stability or minimising erosion and acting as an environmental filter.

'Water' includes references to simply a source of water, storage supply, weir pools, river or river levels and stagnant ponds or puddles.

'Aesthetic' includes responses that describe the view while driving, visual contexts and phrases like 'aesthetically pleasing'.

'Recreation' includes use of the riverbank by local families, river crossing for vehicles, fishing, bushwalking, canoeing and camping.

'Heritage' includes historical value or heritage listing.

'Flood containment' includes mitigating or slowing floods, stopping flooding damage as they prevent trees growing in the riverbed.

'Livestock barrier' includes weirs acting as barriers to livestock and allowing the deferral of fencing.

'Economic value or viability' includes the security provided by weirs and the importance of weirs to livelihoods.

Water supply and quality

It is important to understand irrigators' use of weirs in terms of water supply and quality. Reliance on weirs in terms of volumes of water extracted, perceptions of reliability of supply from the weirs used and the quality of water extracted were examined. In addition, perceptions of how water quality might have changed over time were also collected.

The following results are based on extraction volumes provided by 15 irrigators (36% of total). A further eight responses discussed water extraction issues but did not give any indication of volumes. However many irrigators did not respond to this question at all (16; 38% of total), and three implied they do not extract water from weir pools.

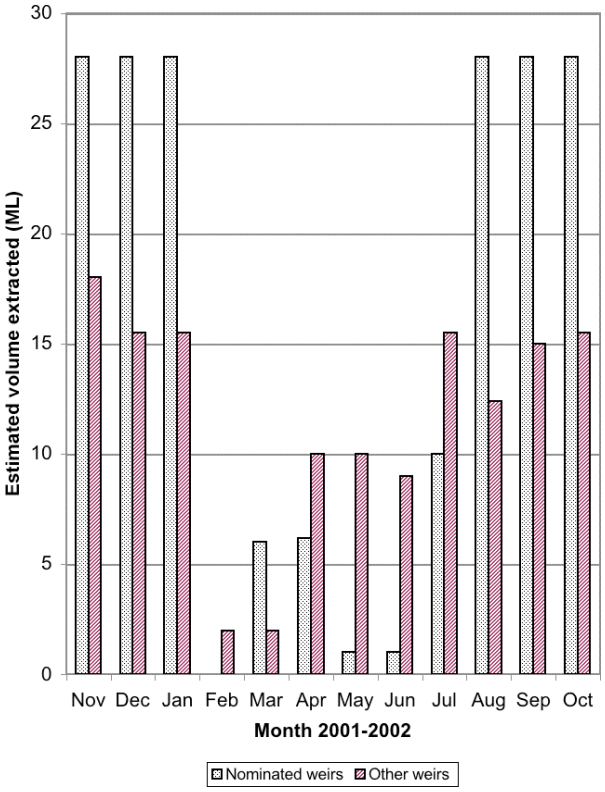
Nine irrigators provided monthly extraction volumes and five of these extracted from Thurns and Brownlow Hill weirs. The remaining four irrigators extracted from other weirs such as Camden, Menangle, Mt Hunter, Cobbitty, Theresa Park, Douglas Park.[29]

Instead of providing monthly volumetric information a further six irrigators provided either the maximum extraction rate over the relevant period, the total extraction volume for the whole year or their volumetric license entitlement[30]. For these irrigators, monthly extraction was derived using respective median values[31] of extraction volumes provided by other irrigators[32].

As can be seen in Figure 15, the pattern of extraction across the year was similar for the four nominated weirs and the other weirs. However, the median volume extracted from the four weirs appears to be higher when compared to the other weirs. This is likely to be a result of drawing from the small sample of irrigators who may not be representative of the larger population and not considering other factors such as size of landholdings.

[29] One user did not specify which weir was used (7A).
[30] Two specified total volume extracted over the last 12 months (one of these simply put the figure "38M" and it is assumed that is what was meant). One user specified the total annual volumetric allocation, rather than actual extraction (7A).
[31] Median values were used because as a measure of central tendency, the median represents the point that divides the distribution in half. Unlike the average, this statistic is unaffected by extreme scores in small samples and so is a conservative estimate of the volumes extracted.
[32] One monthly extraction curve from Sharpes was derived using median values based on five irrigators using Thurns and Brownlow Hill. The monthly extractions for the five irrigators using other weirs were derived from the median extraction values of the four participants using other weirs[32].

Figure 15 median monthly extractions from weirs from November 2001 to October 2002



Irrigators were then asked if the extraction rates they had listed were typical or not, and if not, how do they vary. Ten of the participants who provided extraction volumes (67% of responses) said their levels of extraction vary according a number of factors. Rainfall was the most critical factor, nominated by nine participants. Other contributory and related factors mentioned in fewer responses were seasonality and temperature. Two responses commented that their extraction volumes were atypical due to drought conditions during the relevant year. Only one indicated cost as a factor affecting the amount of water extracted from weirs.

In addition, irrigators were asked about the reliability of the water supply from the weirs, and in particular, whether they had experienced any changes in reliability in the past. Only slightly more than half of the participants (22; 52% of total) gave a response about the reliability of the water supply from the weirs[33].

Of the responses made in relation to reliability, all were positive ranging from very to reasonably reliable. A slight majority of responses (13; 59% of responses) stated weirs were 'very reliable', while some stated they were 'reliable'. Some pointed to one or two isolated occasions where extraction was difficult from a weir pool, due to collapse or drought, but no irrigator stated that a weir was unreliable overall. In relation to the four nominated weirs, a few commented that Thurns lacked water following its collapse, while Sharpes and Brownlow Hill were mentioned as being reliable. No responses commented on the reliability of water supply from Bergins weir.

[33] Twenty participants made no response to this question (including those who indicated that the question was either not applicable to them, or made other statements not specifically addressing the reliability of water supply from weirs.

A few irrigators raised the current drought as an issue for reliability, and a few thought that the system of voluntary water restrictions operated by their water users' association was an effective method for controlling levels of water extraction during periods of low water level.

Irrigators were further asked about changes in water quality over the past 10, 20 or 30 years. Of the 28 irrigators (67% of total) who responded to this question, many observed that water quality had improved over the years (10; 36% of responses). These included a few references to improved numbers of native fish stock. No irrigators indicated that water quality had remained the same or worsened. The remaining responses (18; 64%) of responses) were unrelated to water quality, with some comments pointing to difficulty in getting water. There were five examples of involvement in river management, including programs of fencing and removing stock from riverbanks:

> *Our family has engaged the University of Western Sydney in a ten-year research program to assess the impact on the river of our land use activities. The University caries out practical fieldwork experiments to identify nutrient filtration and sedimentation of the river which may originate from our use of the land… [14A]*

Changes to the weirs

The following section considers the concerns irrigators expressed about changes to weirs. It reports on irrigators' perceptions of how removal or changes in weirs would affect them and what actions, if any, they believe need to be taken in relation to weirs.

Irrigators were asked to comment on what the economic impacts would be to them of removing the weirs, on their crops or livestock, on the employment of their enterprise(s) and other economic impacts.

Most participants (35; 83% of total) made a response in relation to the impact of weir removal on crops or livestock. Of these who responded, most (28; 80% of responses) indicated that removal would have a negative impact on their crops or livestock. In almost all cases, the expected impact is such that their crops or livestock would no longer be viable as a business or livelihood.

> *Dairy relies on lucerne and corn. Without reliable irrigation this would close. Loss of revenue $550,000 pa. Due to Thurns Weir being inoperative, I have already lost one of my two pump sites and am dependent upon the Camden Weir being full in order to use the remaining pump sites. Not repairing Thurns Weir has already jeopardised water security for the farm.* [3A]

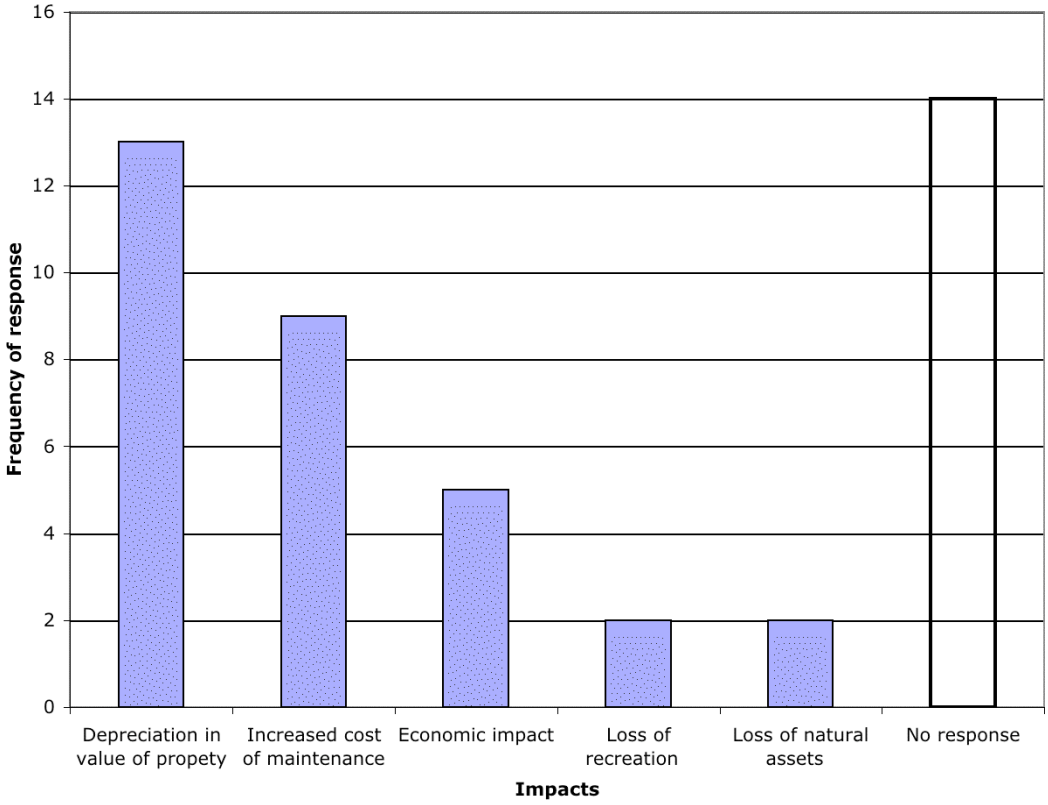
Some responses did not refer to specific impacts on crops or livestock, but tended to indicate a generally negative impact, such as loss of income, a reduction in license entitlements to water or impact on source of food for livestock (7; 20% of responses):

> *In the now deregulated milk market where the wholesale value of milk has dropped by approximately 25% below its value of two years ago, pasture has once again become the most cost effective bulk feed source for the dairy industry. The by-products from the Sydney food processing industries that prior to deregulation we used extensively, have become relatively too expensive to include in our ration. [15A]*

Of the 26 irrigators who responded to the question regarding employment numbers, an overwhelming majority (24; 92% of responses) predicted that a loss of employment would result from the removal of weirs. Most quantified the loss in number of jobs or employees, which ranged from 2 to 20 jobs. A number of these responses indicated that a mix of full-time and casual staff would lose their jobs. A few other participants indicated that they were self-employed and therefore the impact would be the loss of the individual's or family's livelihood[34].

The majority of participants (28; 67% of total) predicted other economic impacts, with all but one being negative, ranging from those specific to their business to more wide-ranging regional consequences. A number of participants noted more than one impact in their response (Figure 16).

Figure 16 Other potential impacts of weir removal



Notes for Figure 16

'Depreciation in value of property' includes the loss or reduction of property values because other non-agricultural uses such as building is not permitted.

'Increased cost of maintenance' includes extra cost of maintaining the business resulting from unreliable water supply, such as additional cost incurred by having to buy rather than grow fodder, buying water for domestic uses and having to find alternative water supply.

'Economic impact on the region' includes the flow on effects to the region of job losses and lower agricultural production levels.

'Loss of recreation in the region' includes loss of recreation to visitors and users of the region.

'Loss of natural assets in the region' includes the effect on wildlife and beauty of the river.

[34] A few more responses indicated that impact on employment was "not applicable" or "minimal if any" (27A), but gave no further information.

Many (13; 46% of responses) referred to the loss or depreciation of value in property, because of being unable to find other non-agricultural uses for the land and a devaluation of the business infrastructure:

> *The viability of the overall [business] would be challenged by the Brownlow Hill removal…[the business] has been established for over 100 years and is a specialist producer…[it currently] employs 50 full time employees. The economic impact on the turf farm and the ensuing capital devaluation of the property and the extensive specialised turf processing and renovation equipment would create a serious financial loss, which would affect the overall business [14A].*
>
> *The Government has seen that it is all right now to charge for irrigation water from this unregulated river…not only would many of these businesses not be viable but they would be greatly devalued. Through many years, the water users of this area have worked voluntarily with each other and the authorities, putting in their own restrictions to survive [41].*
>
> *The flow-on impact from our not spending in Camden. The land would become useless without water, as building on floodplain is not permitted [2A].*

About a third of responses referred to the increased cost of maintaining the business because of having to find alternative sources of water supply or external sources of feed for livestock:

> *Some of our neighbours who do not front the river must pump into a dam on their property before the water goes into their irrigation system. None of the people who front onto the river have this type of dam and to build such a dam would take valuable space and cost of lot of money. The irrigation system may have to be changed as well [24A].*
>
> *Value of property halved, cost of buying in fodder which is normally grown here for property in Southern Tablelands [10A].*
>
> *We would have to buy enormous quantities of water to sustain us even for domestic purposes. The value of our property would be much reduced… [17A].*

Some responses also extended the negative economic impacts to the region:

> *These weirs are the lifeblood of a very prosperous agriculture industry in the Nepean basin and without this water the area will die [25A].*

A few responses also referred to the loss in recreational and natural assets provided by the weirs:

> *The weirs are important to all the local users and to many who come to use the river for recreational purposes between the Cobbitty, Mt Hunter creek and Brownlow Hill weirs…Much wildlife would be driven away and there is no telling if it would be possible to find another habitat in this area [35A].*

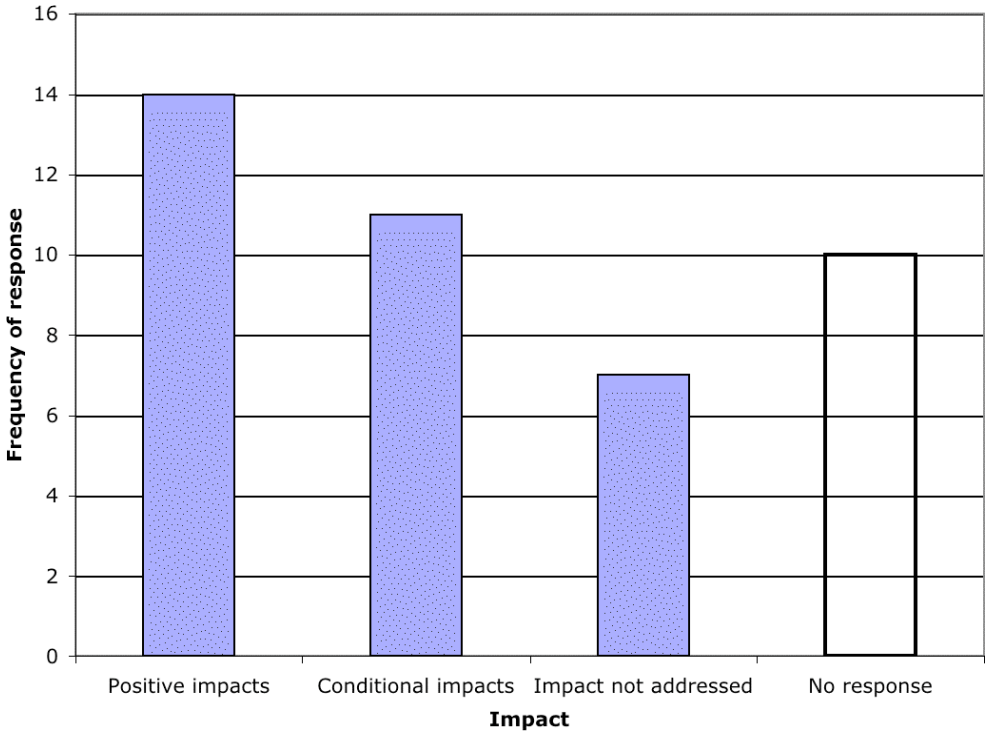
Irrigators were asked to identify the impacts of repair or modification of the weirs. Although the majority of irrigators responded to the question of likely impacts from repairing or modifying weirs (32; 76% of total), they varied in the extent to which impact was considered. Some referred to negative impacts of removal, not

modification. The nature of the responses about likely impacts from repair or modification indicated that irrigators did not distinguish between these terms. Both were used in relation to actions that would restore weirs' functional ability to store or control water flow.

Almost half (14) of the responses referred to the benefits to be gained from repair or modification (see Figure 17). When referring to benefits from repair or modification, the majority of the responses related to water security, but a few pointed to benefits for wildlife and recreation:

> *[I have] had some experience of waterways in Europe, where there has been a recent revival in the use of locks and weirs to restore life to rivers and enable navigation...the provision of extensive water pools has enhanced the growth of flora and fauna within the rivers and along river banks [in Europe]…There has been a consequent increase in recreation use and a general enhancement of the environment. [19A]*
>
> *The weirs provide a refuge for wildlife habitat and for the ever-encroaching population a recreational area. When weirs are repaired, they should have a serviceable fish ladder suitable for native fish. [1A]*

Figure 17 Impact of Repair of Modification



Notes for Figure 17
'Positive impact' includes benefits of repair or modification works.
'Conditional impacts' refers to no impact, provided water level or supply remains constant, or where impact depends on the kinds of modifications made.
'Impact not addressed' includes responses indicating weirs did not need repair or indicating the negative impact of removal, rather than repairing or modifying weirs.

Many (11; 34% of responses) indicated that impacts would be conditional on whether the water level or supply remained constant or that the impacts depended on the type of modifications proposed:

> *Would depend on the following. Extent of work. Access through our site (probably not an issue). Impact on water level on completion of work. Potential to increase flood impact beyond 1/100 years. Availability of water for irrigation purposes if required. Impact on flora and fauna. Water supply for fire fighting and irrigation [27A].*

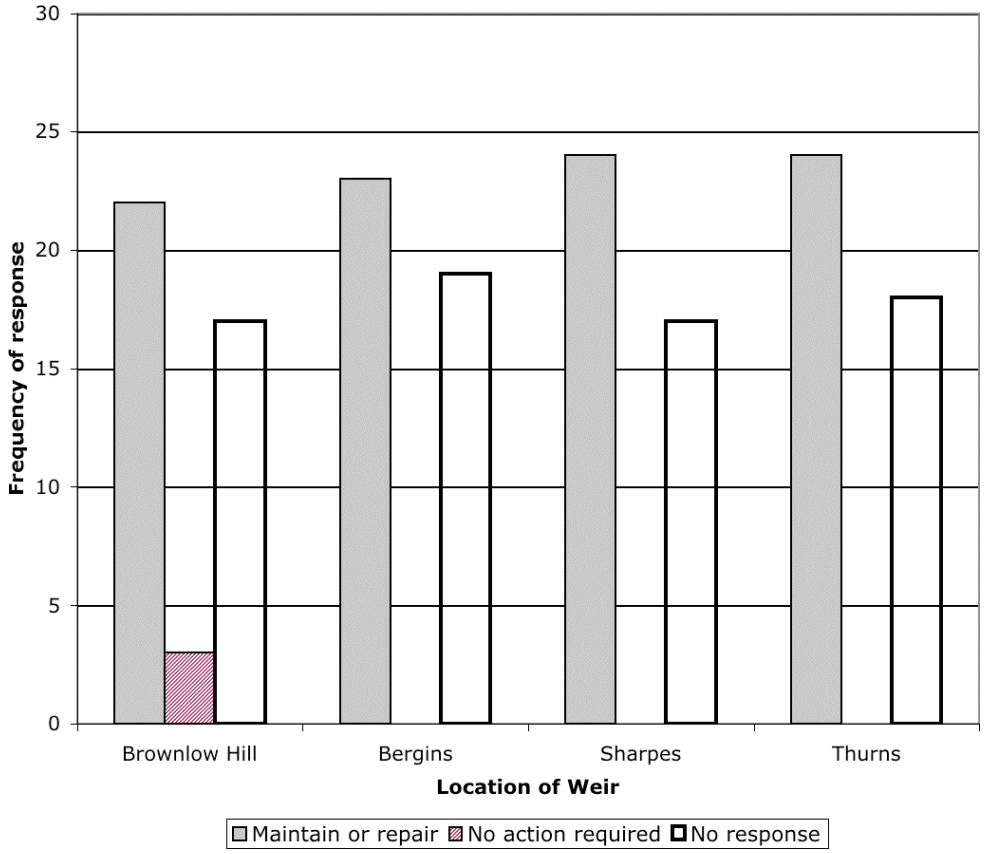
A little over half the responses to the question regarding likely impacts of weir modification expressed concerns about removal. In particular, a few expressed an entitlement to continuing reliable supply of water and were concerned about the fairness of having to pay for this entitlement once weirs are removed:

> *If the weirs are demolished, I don't see why the irrigators along the river should be charged when they will not be supplied with water all the time. In fact the water level will be dropped considerably…back to the 1982 drought (fact not theory) the pumps in the river were lowered 12–18 feet due to the river falling. That was with the weirs and the water they had held backstream. Without them the river levels will fall greatly, even in good seasons let alone bad [41A].*
>
> *If the weirs go down, the river system drops. If the water supplies are sold to a private company, we will have to pay hundreds of thousands of dollars for every so many megalitres. This is what they call economic rationalism – and that means the people will have to pay! [42A]*
>
> *Economically, the removal of the weirs would have a serious impact on the value of each single property on the river. We would find the value of our land diminished by many tens of thousands of dollars. We would feel it necessary to seek compensation for the loss from the Hawkesbury-Nepean River Management Authority… [35A]*

Irrigators were asked what action should be taken on each of the four weirs. Generally for each weir, many participants (between 40-45%) failed to give any response with suggestions for action. Of those participants with suggestions, however, the majority (between 52–57% for each weir) indicated that repair or maintenance was needed (Figure 18).

> *Bergins: Re-instate the weir to enhance development of agriculture upstream. The current condition of the river is a disgrace…The lack of action by the authorities has resulted in the river being unusable for recreational users and potential irrigators have no security of water so there are no users [14A].*

Figure 18 Actions required on weirs



Notes for Figure 18
'Maintain or repair' includes suggestions for maintaining, improving, reconstructing, repairing or upgrading weirs.
'No action required' includes references to the weir being in good working condition or that no work or modification is required.

In the case of Brownlow Hill weir, a few indicated that no repair or modification was needed:

> *Leave well alone. Fish ladder working well. [10A]*

Of those participants advocating for repairs or modifications, some also raised additional considerations to be incorporated into repairs or modifications. These were provisions for fish ladders, environmental flow modifications and use of treated effluent.

For each of the four nominated weirs, a few indicated that a fish ladder should also be built, maintained or repaired to allow fish migration and passage. A few indicated that fish ladders should be built, maintained or repaired for *all* four weirs:

> *The weirs should be restored so that they are in condition to carry out the function for which they were built. The fish runs should be extended to all weirs to ensure the health of fish in the upper river*. [35A]

Only one participant indicated that in addition to maintenance or repair, modifications should also allow for environmental flows in the case of Brownlow Hill, Sharpes and

Thurns weirs. The same participant was also alone in suggesting that repairs at Bergins and Thurns weirs should allow for the provision of treated effluent.

Irrigators were also asked to provide additional information to decision-makers. Of the 28 responses to this question, the majority (18; 64%) provided additional information, emphasising the value of weirs or drawing attention to the disadvantage that would result from removal of weirs. Many (10; 36%) also made suggestions about what should be considered before a decision is made about the weirs.

> *The biodiversity of the area, by now stable for many generations, would be threatened. The original biodiversity in existence before white settlement could never be restored regardless of the existence of the weirs [35A].*

Some (8) responses pointed to the benefit weirs provided to wildlife:

> *Without the weirs, the river depth would drop substantially and the river would become a minor stream, sometimes not flowing at all, with damage to flora, fauna and the environment and amenity of the community, as has been seen with the Snowy River [19A].*

Some (7) referred to the original purpose or reasons for which weirs were built and the fact that these reasons are still operative today:

> *The weirs were provided as compensation for the damming of the Nepean upstream. It was a major factor in the agreement between the government and the owners of the river frontage properties and river users. To remove the weirs would be a breach of faith and an act of arrant disregard for the well being of the community living near the river and the farming community in particular. [35A]*

> *Please note that the weir just above Bents Basin on the Nepean was constructed by the then Water Conservation and Irrigation Commission to their final design and size (fish ladder included). All (or most) potential users contributed substantial funds and got permission to use the weir. The WCIC was so impressed they took over the project, enlarged it and funded the extra cost. A very worthy and constructive thing to do [37A].*

The likely financial loss as a consequence of the removal of weirs and compensation for that loss, was also raised in some responses (7):

> *That in the event of the removal of the weirs the landholders be compensated in full for the resultant fall in value of their land and loss of income. [23A]*

> *The weirs were installed as compensation for the blocking of the river to build/supply Sydney water supply. Until an equitable solution can be made no action should take place. Alternative supply to be on a par with current resource in terms of quality, quantity, availability and cost. [7A]*

Some (5) reiterated the critical importance of weirs to their livelihoods:

> *Removal of these four weirs would have no direct effect on our access, but this does set the precedent for future removals, which could affect us… Pasture has become the most cost effective bulk feed source for the dairy industry. Without adequate water, the farm would become unviable, putting in jeopardy the jobs of seven staff members and the University's ability to*

provide cost effective teaching resources. Being sited on the flood prone alluvial river flats, between Cobbitty and Brownlow Hill, the farm is unsuitable for subdivision. The value of the property is in its irrigation potential and the removal of that potential would seriously reduce its value. [15A]

The weirs help maintain the water level for our source of water for both domestic and business use. Without weirs, many, many (sic) businesses would be restricted or impossible. We would not be able to maintain our business. We would take legal action for compensation, regarding the value of our property [and] destruction of business. [16A]

Alternative sources

Weirs are just one source of water that irrigators can and do use. There are a number of other sources such as groundwater, town water, on-farm dams and treated effluent. This section examines irrigators' views about other sources of water and their viability. Views about a specific alternative source, treated effluent, were also explored.

Many irrigators (18; 43% of total) were of the view that no other secure sources of water existed (Figure 19). Some identified other sources such as bores or town water, but then outlined reasons for why these sources were unlikely to be feasible. Reasons revolved around cost effectiveness, legal issues, whether alternatives could be implemented in reality and whether they would deliver the same quality of water:

Bore water possible (need to check for salts) unlikely to be cost effective. [3A]

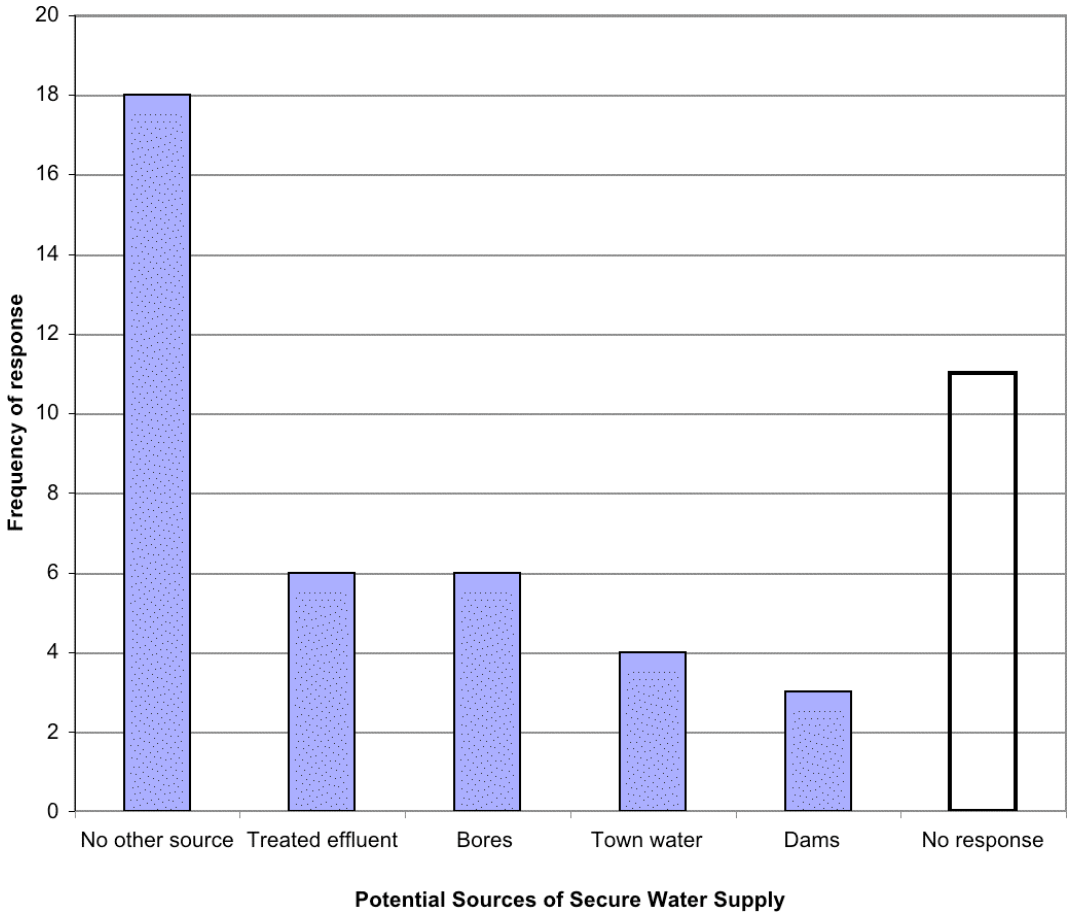
[Bore water]… usually involves double pumping, adding to the cost and bore log data would double the quality and availability of volumes required. [15A]

Town water: not sufficient quality for irrigation, too expensive. [6A]

…we have a perfect site to build a very large dam, but we are only allowed to retain 10% run-off. [1A]

Dam is too small and does not have the catchment area. [31A]

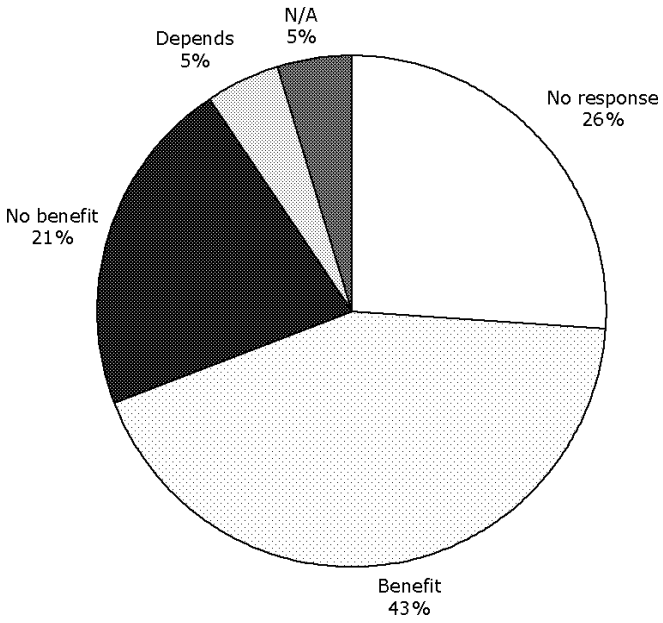
Figure 19 Alternative sources of water



Views on treated effluent were more positive (see Figure 20). If a secure source of treated effluent could be assured, many irrigators (18; 43% of total) could see benefits in its use. Only nine irrigators (21% of total) did not see any benefits from treated effluent as an alternative water supply.

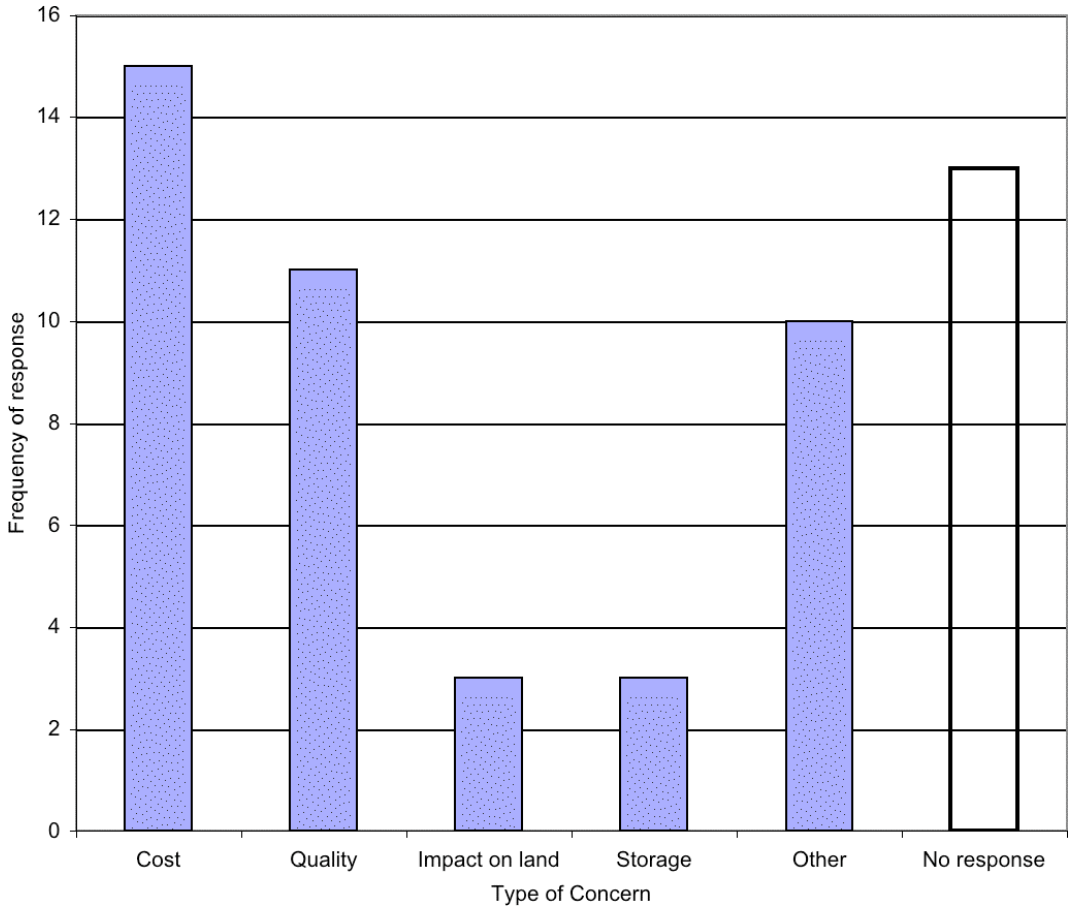
Half of those participants who identified benefits from treated effluent, referred to the positive contribution treated effluent would bring to their agricultural enterprise, such as security of supply and the nutrient loading in the water acting as fertiliser. A few made generally positive statements, including the benefits of using treated effluent for the environment and for the community as a whole. A small number could not assess the extent of benefits without knowing other variables first.

Figure 20 Treated effluent a benefit?



The majority of irrigators cited one or more concerns about the use of treated effluent (29; 69% of total). About half of these responses included concerns about the cost of such a system. Many were also concerned about what treated effluent would mean for the quality and security of their water supply (Figure 21).

Figure 21 Concerns about treated effluent



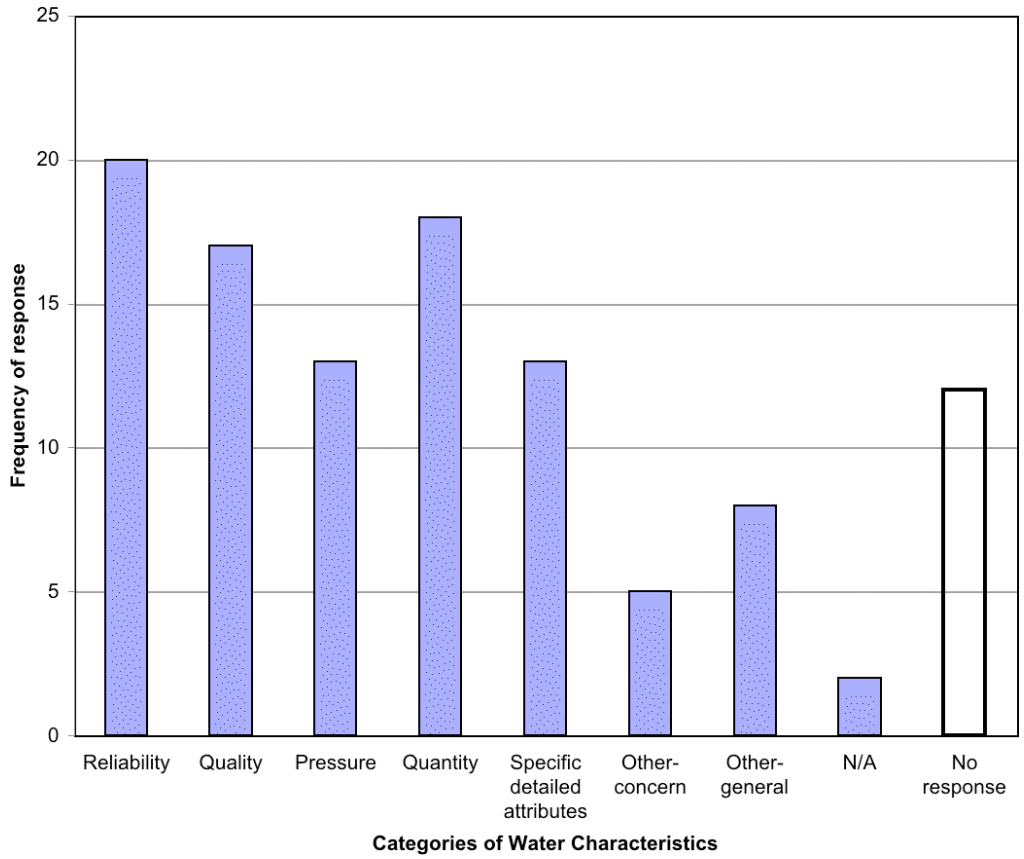
Notes for Figure 21
'Cost' includes concerns about how much such a system would cost and how changes would be distributed.
'Quality' includes concerns about the quality of treated effluent and its suitability for crops and associated health and safety issues.
'Impact on land' includes references to short, medium and long-term impacts on land from using treated effluent for irrigation. Impacts raised include productivity of land, how it would interact with salinity and other potential complications what are unknown and undesirable.
'Storage' includes concerns about how treated effluent would be stored and the infrastructure that would be required to accommodate storage arrangements.
'Other' includes concerns about regulation, safety and smell.

Assuming all their concerns about treated effluent were addressed, irrigators were asked to indicate what they would specifically want from a treated effluent supply in terms of reliability, quality, pressure and quantity (Figure 22). Most provided general responses, which reiterated a concern that supply be reliable, of appropriate quality, pressure and quantity but did not provide specifications. Many (13) however were specific about their requirements for reliability, quality, pressure and quantity:

> *Reliable supply when needed. Quality algae free so as not to block irrigation drip tubes. Pressure: mains pressure or less is OK. Quantity 500,000 litres per week any September, October, November, December, January. [4A]*

Reliability: Yes. Quality: source nutrients (nitrogen, phosphorous etc) would be of benefit to crops. Pressure: around 40psi would be good but not essential. Quantity: 7megs/hectare for 50 hectares. [5A]

Figure 22 Requirements from treated effluent



Notes for Figure 22
'Other concern' includes concerns about how such a system would be implemented in practice.
'Other general' includes comments not specific to implementation of treated effluent system.

Some irrigators expressed concerns about how such a system would actually operate on the ground:

You're asking the farms to restructure their water systems and it would have to be very reliable. Farms would have to have a holding tank or dam to be able to evaluate how much water they can afford to put out daily and if this is subject to break down in supply, strike or other indiscriminate interruption absolutely no use to anyone [21A].

Pricing: must be comparable to other similar river based situations. Not a case of user pays to solve Sydney Water's effluent discharge cost [6A].

Many (8) also used the question as an opportunity to make other points in relation to treated effluent, such as disbelief about how realistic this option would be:

I don't believe in Santa Claus. [1A]

Sorry I don't believe in fairies. What you're suggesting won't happen because it is not viable for the Water Board to supply smallholdings. We would be left high and dry. [31A]

Currently we have unlimited water available, which can even be used for human consumption. The river is beautiful as a result of water retention by our weirs – use of treated effluent is not the problem – changing the present ecology and beauty of our river is. [17A]

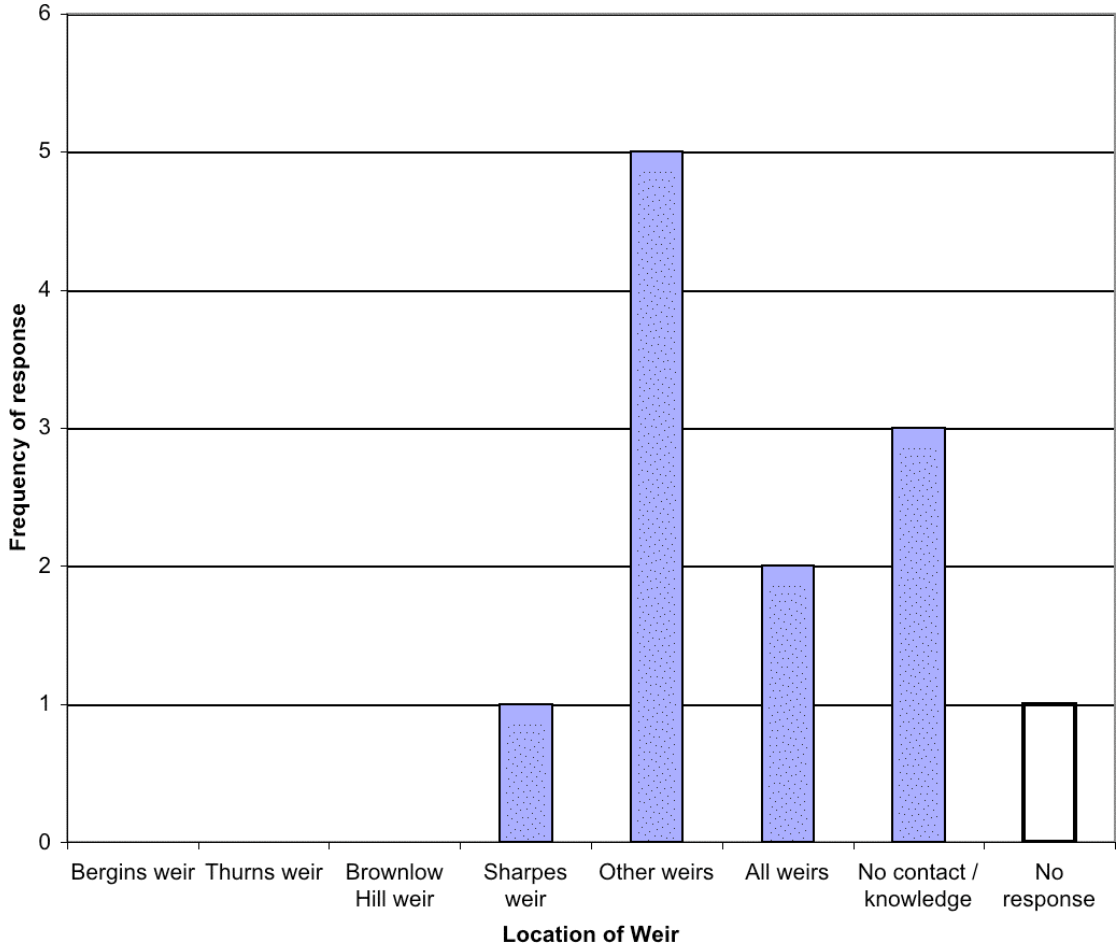
5.2.2 Recreational users

Use of river and weirs

Recreational users were asked about which weirs they came in contact with, how often they used the river and its weirs and the ways in which weirs were important to their livelihood or other activities and benefits provided by the weirs, other than as a source of water.

Most recreational users (9; 75% of total) said they come into contact with weirs. Only a few had no knowledge of or contact with weirs despite having used the river recreationally (Figure 23). In relation to the four nominated weirs, only one participant came into contact with Sharpes weir. Other weirs with which participants have contact are Camden, Penrith, Wallacia and Cobbitty.

Figure 23 Recreational users' contact with weirs



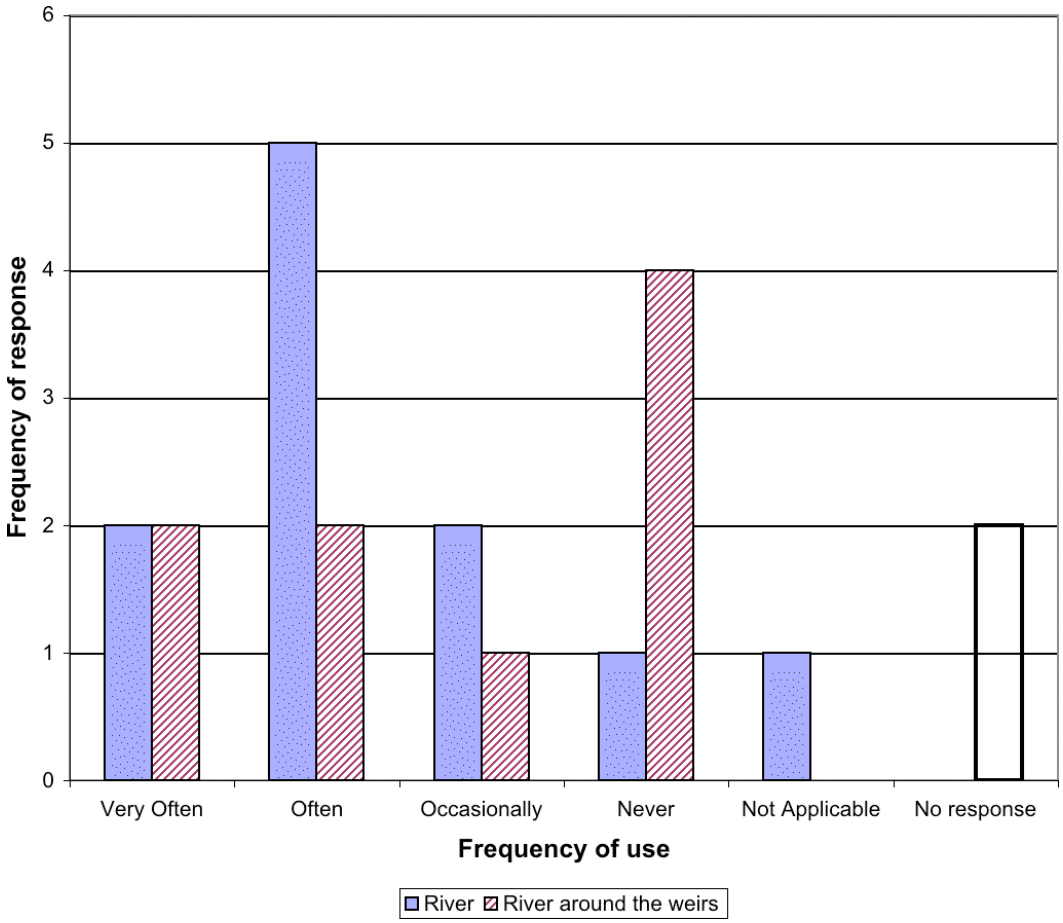
Notes for Figure 23

'Other weirs' means other than the nominated weirs, but not necessarily specified.

'All weirs' means the nominated weirs and other weirs

The river around the weirs was used to a lesser extent than the river itself, for recreational purposes. While most participants used the river (9; 75% of total), a lower number used the river around the weirs (5; 42% of total). The frequency of use of the river and weirs were grouped according to frequency ratings in Figure 24.

Figure 24 Frequency of use by recreational users



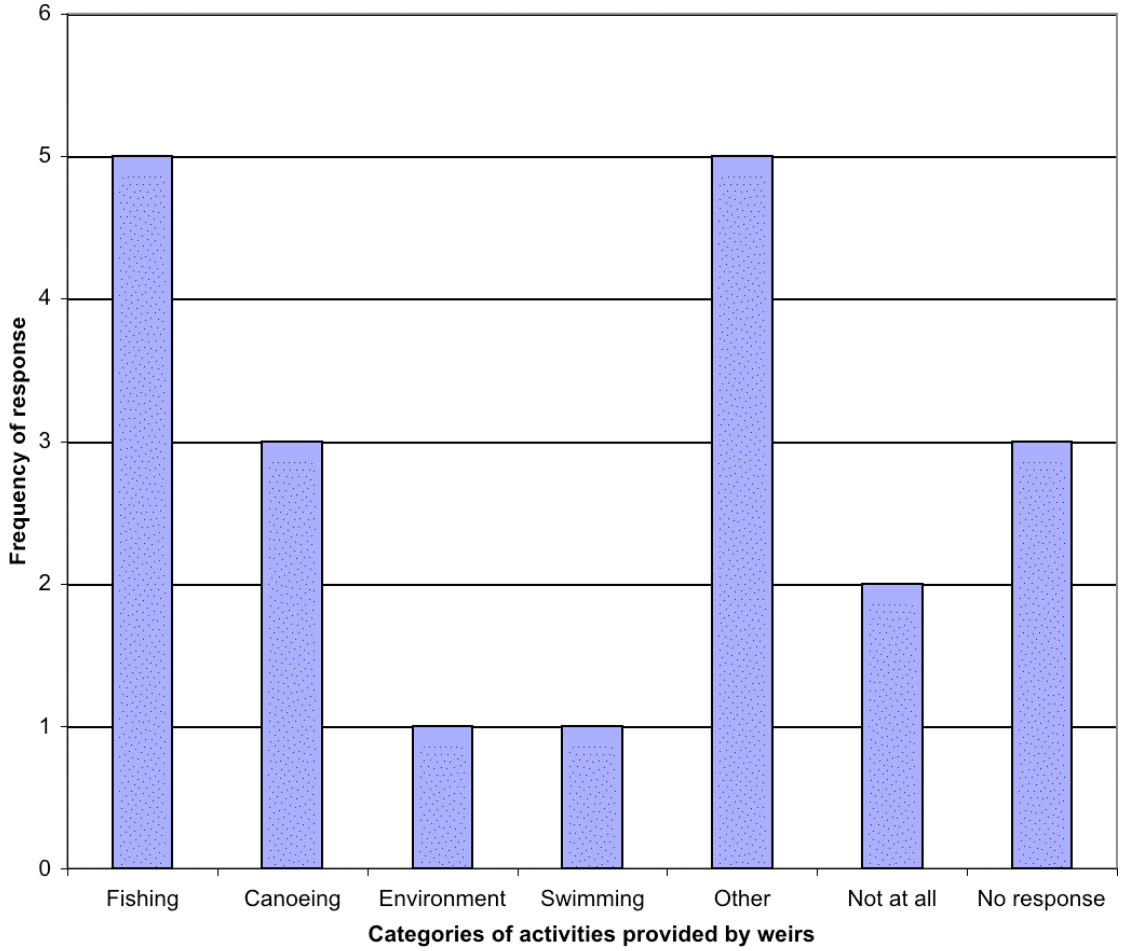
Notes for Figure 24

'Very often' includes daily or 'avid' use.
'Often' includes references to frequent, monthly or weekly use.
'Occasionally' includes once or twice every season or 3–4 times a year.

The most common use of weirs by this group was for fishing activities. Figure 25 illustrates the various ways in which these users considered weirs to be important. People talked about fishing as a social activity, referred to the clubs with which they were involved with and the involvement of their family:

> *Our Club is a family based organisation and the local river is an integral part of our local fishing lifestyle. Many children and new members to the Club experience their first encounter with a native bass and the local river environment while canoeing along the Nepean River. [4B]*

Figure 25 Importance of weirs to recreational users



Notes for Figure 25

'Environment' includes descriptions in terms of pleasure, relaxation, employment and ecosystem such as 'peace and tranquillity'.
'Other' includes recreation, activities and pools, which can be used for a variety of purposes.

Canoeing was the use next identified by participants. Details were also provided about the participation of schools in canoeing activities:

> *Our business has been operating for the past four years. We concentrate on canoeing activities for many local high schools on their sport days. We have canoeing programs for five schools, which have group sizes of up to 20 students each week…We see approximately 200 different students per year. [11B]*

Participants also described the river environment as a place of relaxation and interaction with nature:

> *This water is not just a fishery, but supports a plenitude of ecosystems, which are of great enjoyment to many people. These include but are not limited to the following. (Birds) royal king fishers, finches, numerous parrots, water hens, etc. (Reptiles) Most often seen water dragons, red and yellow black snakes, brown snakes. Tortoise. Mammals. Just downstream from Douglas*

> *Park Weir there is a colony of tiny bats on the southern side of the river. It is also not unusual to see wallabies on sundown. The weirs supply an area of natural interest and relaxation from work and daily life. [5B]*

Weirs were also seen to have a relationship with the river water and the surrounding environment. Participants identified that weirs maintained the height and or level of the water, held back the water, provided pools and were themselves of natural interest in the unique habitat they created:

> *Weirs must stay to retain the present river height or have a system to keep the river at a high level. We don't want a creek! [1B]*

> *In these areas, the weirs I believe are the life-blood of the area for farming and recreational activities. With these weirs strategically throughout the system, there is a reasonable maintenance of water levels during the periods of low rainfall. [2B]*

> *They provide pools which otherwise would not exist because of the dams upriver. [10B]*

Relationship of weirs to recreational activities

In considering the relationship of weirs to their activities, recreational users provided diverse and often contradictory views. Many saw weirs as beneficial to fishing, but others considered them detrimental to fishing. Weirs were seen as detrimental because the fish ladders were inadequate or not cleaned regularly and so blocked fish migration, passage or spawning. Apart from the issue of fish ladders, a few participants identified that the weirs not only hindered the migration of fish but also were detrimental to water quality:

> *The fish ladders are not cleaned regularly enough, blocking fish migration up and down the river. And there are not enough fish ladders as only two weirs have them, forcing the fish to rely on floods to pass the other weirs [5B].*

> *Restrict fish movement/migration and spawning. Restrict river flow. Detrimental to water quality. [7B]*

> *When the flood, assisted by the huge stockpiles of sand mined, took the weirs, the river was in its natural state and it was extraordinarily beautiful. You could see lovely curves around the bends. There were banks of sand that you could jump across, interspersed with pools of different depths. Amazingly there were flocks of finches that we didn't usually see in such numbers on our side of the river. They were on the other side 'cause a young nest robber told me so. I have some photos of my kids and friends at the river then. When the weirs are in place, the river is basically a dam or a big puddle or a canal – it is not a river. [3B]*

A number of people suggested that the weirs needed to be cleaned up or that they were detrimental to water quality.

On the other hand, one stated that weirs were beneficial because they mitigated the impact of pollution:

> *They make large areas of the river navigable for canoes [and] supply a migratory path for fish via their fish ladders. In case of chemical spill into the river, oil, etc they supply a barrier to stop the spread and make clean up easier. They promote vegetation growth on and near their river banks, giving a pleasant environment to canoe in. [5B]*

Weirs were also seen as beneficial to fish because they were perceived to maintain water levels and provide suitable habitats:

> *These weirs also contribute to the continuation of the fish stock, which are during normal weather conditions assured of reasonable water levels in the rivers above the weirs. [2B]*

Recreational users referred to a range of other benefits of weirs, in addition to being a source of water. The range of other benefits and uses suggested were all water-dependent and ranged from water recreation such as fishing, swimming and canoeing, to benefits for the environment and wildlife, and farming:

> *All the weirs provide a healthy environment for outside recreation activities, canoes, rowing, camping, swimming, promote bird and animal life, picnics, much as the beaches do in the eastern and northern suburbs. [5B]*

Some also referred to the social benefits provided by the recreational opportunities made possible by weirs:

> *Our Club provides a forum for local children to learn about sport fishing, the environment and community based values. Our region suffers from the problems associated with adolescents having time on their hands and fishing provides an interest as well as a sense of ownership of the area. We feel there is more at stake than the fishery if the weirs were to be removed. [4B]*

> *Both these areas [Sharpes & Camden weirs] provide a variety of visual, physical and environmental experiences for the students. We also conduct training for The Duke of Edinburgh Award Scheme at these two locations. Approximately 40 to 60 students per year participate in this program for their expedition component of the award scheme. In addition, we provide canoeing activities for other community groups, such as Risky Arts from Campbelltown area. The general public from the local area experience the enjoyment of canoeing on a regular basis, particularly in the summer months…The added bonus of its beauty and recreational use make the retention of all weirs of utmost importance. [11B]*

Some participants indicated that other than being a source of water, weirs were either not important or they did not know of other benefits.

Recreational users were asked about the types of fish they had observed at the weirs. The most frequent observations of fish were bass, including Australian bass, followed by catfish, including the eel tailed catfish. Other observations have been made of carp, herring, mullet, gudgeon and Murray cod. Of those participants who reported observing fish at the weirs (6; 50% of total), three stated their observations of fish were typical of the river system and not just weirs:

> *My comments pertain to all four weirs. Each weir has created its own environment [and] some have better fish habitats than others. But all help to create the total environment, which has allowed these species to survive over*

> *the years since the five main dams were constructed. It is extremely unlikely that these dams will ever be removed. So these weirs maintain the fish population from the Warragamba river upwards and without their existence it is extremely unlikely that this remnant fish population would have survived till now, giving the opportunity to rebuild it by installing more fish ladders and improving the fish habitats for future generations [5B].*

Recreational users also had contradictory observations to make about how the quality and quantity of fish and water had changed with time[35]. Four recreational users observed that fish stocks had been declining over time:

> *The way this river is managed the fish stock will be depleted further. Fish stock has decreased now as compared to 1980 [6B].*

> *I have fished the river for almost 30 years, the last time earlier this year I caught one herring & four turtles. I have not seen a catfish for five years, there seems to be less carp and the bass don't seem to be as big as they used to. [8B]*

In contradiction to this, two users indicated that fish quantity and/or quality had in fact increased:

> *In recent years (past 10 years) fish quality and quantity in other parts of the river (downstream) has improved, as has water quality, except for excess weed growth, which is contributed to by low flow on the river [Penrith weir] [7B].*

> *Less water flow. More large fish about [10B].*

Two responses stated water quality had improved:

> *Algal bloom has decreased since the feedlots were relocated. But may increase again if effluent from the sewage works is not monitored closely. Fish stocks fluctuate… [5B]*

While one indicated that water quantity had declined, another indicated that it had increased:

> *There were only pools of water, no stream, therefore no fish, before the river was deepened and widened. There is no comparison; there is now a whole ecosystem. [12B]*

The four participants who had observed declines in fish stocks over the years indicated the extent of their involvement in river or fish management, including their involvement in the bass program conducted by the Fisheries Department.

> *As a member of Campbelltown City Sportfishing Club, I have taken part with Fisheries Department in the bass catch and release program to monitor fish stocks in the river. As an individual, I was a volunteer river keeper for the Georges River combined Councils Committee until I saw and was disheartened by the politics. [5B]*

[35] A little under half of the respondents did not respond to this question (5, 42%).

> *Where I fish at Wallacia the only changes have been in fish numbers. Floods and cows have been the only cause of riverbank erosion. The floods [are] quite obvious but where the cows feed there are small bays forming where all the grass has been trodden down. I am no longer involved in any management but two of the organisations I belong to do. [8B]*

Recreational users were also asked how the weirs related to the river. Many recreational users thought that the weirs regulated or stabilised river flow, which in the case of one participant was essential to water quality and quantity in order to support fish stocks:

> *Having never seen the river in its pristine state and how it flowed naturally, I can only imagine that before the weirs and taking into account Australia's climate it must have been a very erratic river. Floods one day, bone dry the next. The weirs have at least stabilised it somewhat. [8B]*

For three recreational users, this stabilising effect meant that without the weirs, there would be no river:

> *They are essential to each other. Without the weirs there would be no river left except in times of heavy rain or when water is released from the main catchment dams. This would have a disastrous effect on the eco-systems supported by the water held back by the weirs. [5B]*
>
> *Without the weirs, there would be no river, only a riverbed. [12B]*

Two users indicated that the water level assured by the presence of weirs also meant that the river provided recreational benefits that were unique:

> *With the increasing population in our cities, not only is the conservation of water an absolute necessity for survival but these weirs, properly constructed and set up, become very popular recreational areas, for example Warragamba and Cataract. The development of each and every parcel of land these days is generally carried out at the expense of recreational areas which allow people to experience unique settings which can only be provided by the vicinity of these weirs. [2B]*
>
> *I have paddled the section from Douglas Park causeway to McKee Road, Werombi countless times and together with the students in my care, have enjoyed the scenic beauty of this waterway — all made possible by the weir system on this section of the Nepean River. Remove the weirs (and these four are the thin end of the wedge) and this method of travel [canoeing] is also removed. The river will only be puddles of water with sand bars and logs. [11B]*

Two recreational users indicated that weirs were detrimental because they restricted the movement of fish, particularly where the weirs have poorly designed or non-existent fishways.

Changes to weirs

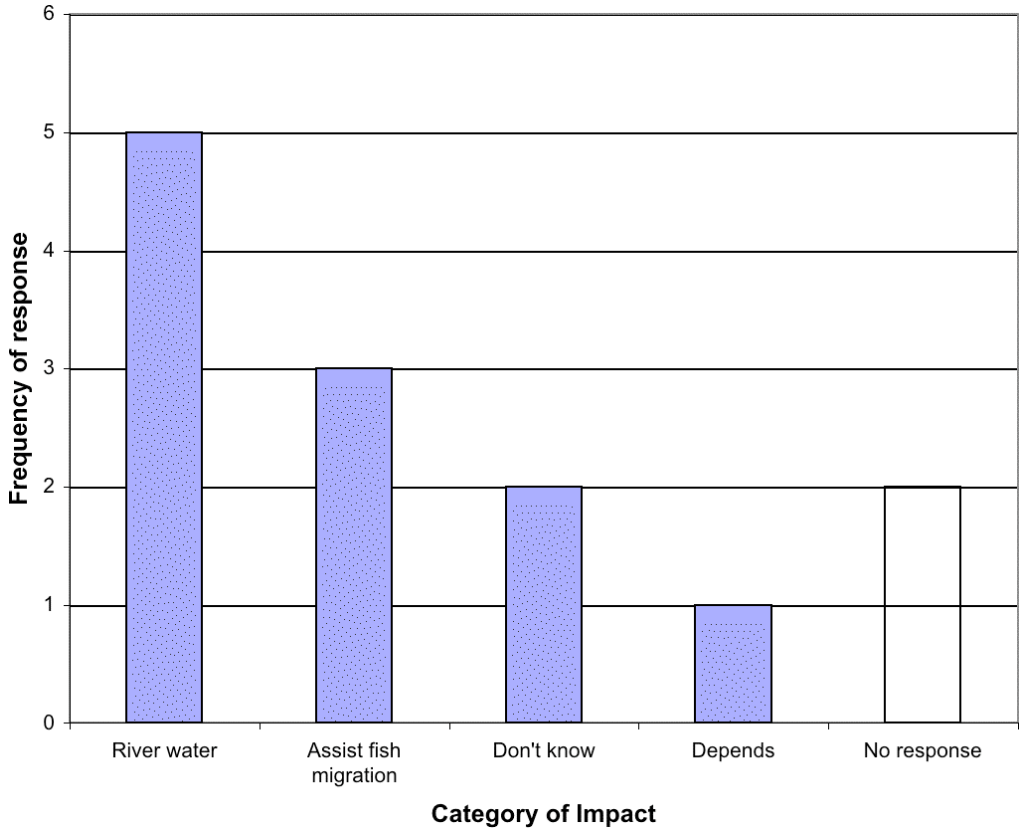
Recreational users were asked to identify the impacts of weir removal and modification or repair of weirs. There were conflicting opinions about what the impacts would be of removing the weirs. The positive impacts of weir removal were

seen by two recreational users to be increased tourism, resulting from increased fishing facilities and improved water quality:

> *Fish stock will improve. Less pollution, cleaner water. Encourage more tourists. Better water facilities for people who use the river. [6B]*

However, removal was also seen to have negative impacts because of loss of livelihood for two people with canoeing businesses and fishing-related businesses. Other economic impacts identified were the unspecified costs associated with travelling to an equivalent site for the recreational opportunities lost at existing spots. Figure 26 below provides the distribution of responses.

Figure 26 Impact of repair or modification



Notes for Figure 26

'River water' includes regulating river flow, maintaining existing levels of water, ensuring navigability of river.
'Assist fish migration' includes constructing or incorporating a fish ladder to assist fish movement and migration.
'Depends' includes responses contingent on the type of modification planned.

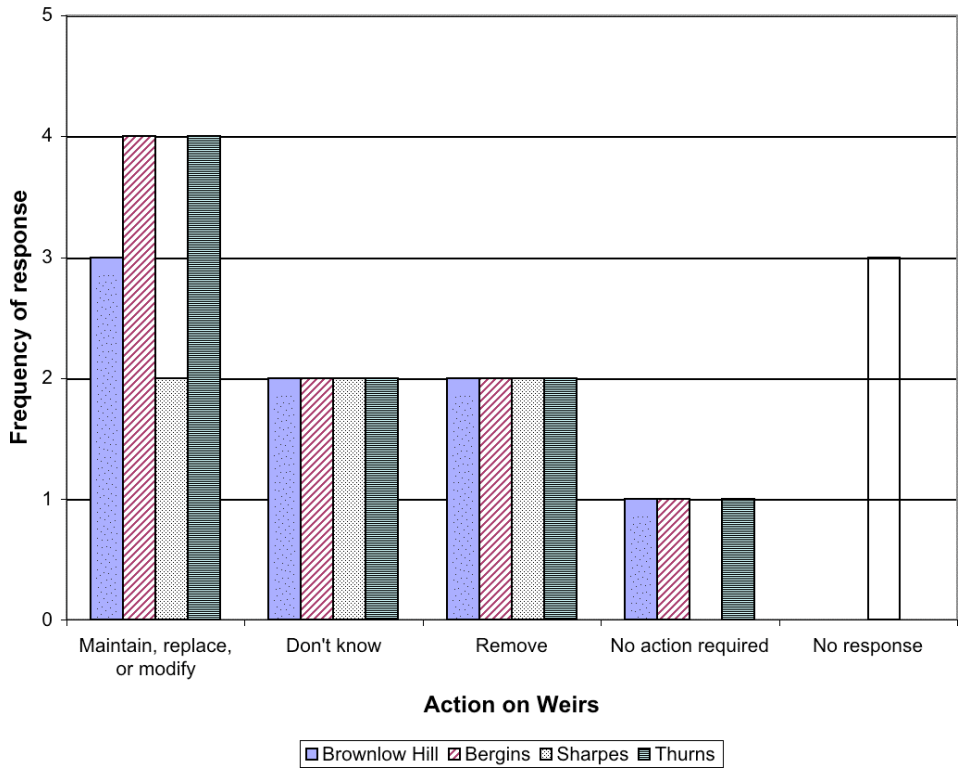
Following the question about impacts of removal, recreational users were asked to state their preferred actions for each weir. A few participants indicated that each weir should be maintained, replaced or modified so that it functions appropriately to regulate water levels (Figure 27). Two recreational users indicated that all four weirs should be removed. Modifications recommended were those to assist fish migration. One user indicated that fish ladders should be built in all weirs and another suggested that all of the four nominated weirs should be raised with gates installed to regulate river flow:

A total programmed maintenance contract for all the weirs on the Hawkesbury–Nepean Water Catchment, including regular water sample analysis and an education program for all interested parties, farmers, scouts, fishing clubs, schools, etc. [5B]

We would like to strongly oppose any action that may affect the water quality and existing levels of the river. We would like to further suggest that the construction of fish ladders be considered to promote the migration of natural fish stocks. [4B]

The weirs could be raised and have gates installed which could be opened and closed to regulate the river flow. When I am on the river, I don't see many using it but plenty looking at the water. [1B]

Figure 27 Actions required on weirs suggested by recreational users



A few recreational users provided additional information, all of which supported the retention or modification of weirs. Most of the information noted the value weirs contribute to local lifestyles and the perceived social benefits through their recreational opportunities:

To sum up my feeling on the matter of the weirs in our river systems I believe that their contribution to any river system cannot be over estimated and [they] are absolutely essential to the support of farming and recreational activities and subsequently our way of life in Australia. [2B]

Also noted was the importance of water storage – and by implication weirs – for urban use, irrigation and livelihood:

> *…What happens in drought time? Don't we need more water storage? The authorities are releasing such a small amount of water into this river system now and they will not release any more after the weirs are removed. The idea of water storage is obviously very important for the people who rely on this water source for their livelihood. The added bonus of its beauty and recreational use make the retention of all weirs of utmost importance. [11B]*

One participant wondered what would happen without weirs, given the likelihood of increased runoff from urbanisation to the region:

> *There has been so much major development in the Nepean catchment, freeways, housing, industrial…who knows what effect that will have, especially increased runoff. There has been no major flood rain since 1980s. Could be interesting. How can there be a 'natural state' when run off is unnatural? [12B]*

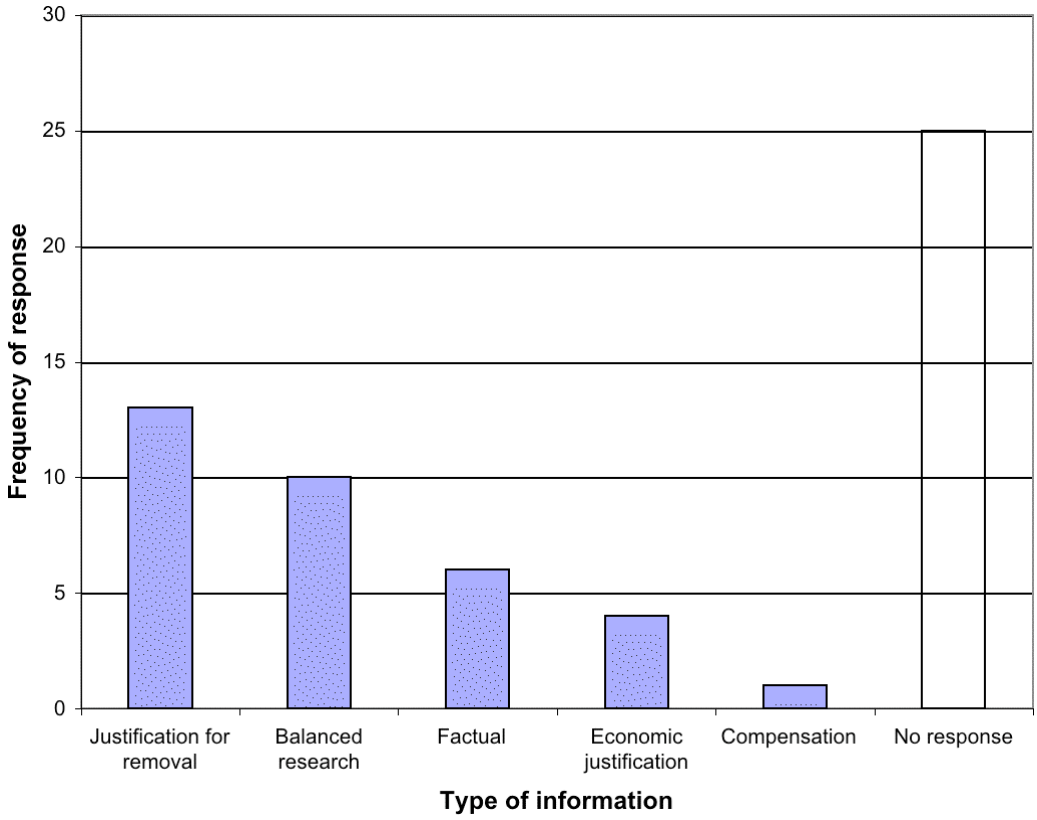
5.2.3 Information needs for water users

All water users were asked what they would like to be informed about from those conducting scientific, environmental and social research into the weirs and asked if there was any other information they needed. Given the similarity of responses by both irrigators and recreational users to these questions, the results have been combined to form a group of 54 water user participants.

The majority (28; 52% of total) indicated a desire for further information[36]. The type of information requested can be seen in Figure 28 below:

[36] Note that 25 respondents (46% of total respondents) did not respond to this question.

Figure 28 Desired research information



Notes for Figure 28

'Justification for removal' includes information about the reasons for why removal would be considered at all or would be a beneficial outcome for communities involved.
'Balanced research' includes comprehensive studies that have examined the range of social, economic and environmental considerations for and against removal of weirs.
'Factual information' includes any information about volume of environmental flows to be released, topics being researched, methodologies to be adopted by research, research findings, recommendations and information on impact on fish by removal of weirs.
'Economic justification' includes economic rationale or financial considerations, for removal of weirs.
'Compensation information' includes information about the kinds of possible compensation to those affected by removal of weirs.

Many water users (13; 45% of responses) wanted reasons justifying the benefits of removing weirs. Underlying this request was a need to understand the rationale that would lead decision makers to consider the option of removing weirs. Some (7) expressed a degree of mistrust, disbelief or doubt about motivations driving such a proposal:

> *1. Who gains? 2. What is the real agenda? 3. How it can possibly be an all-round benefit to reduce the river to a series of water holes. [32A]*
>
> *Why are removal of weirs being discussed? What is the ultimate agenda of removal? What is the economic rationale of removal as against repair? What is the end or bottom line of this study? [2A].*
>
> *Terms of reference (why). Water supply issues to fight bushfires—is this a consideration given move to helicopter water cranes? What actions are*

proposed in terms of an overall water management/supply strategic plan. Environmental consideration [27A].

Honesty – not preconceived answers to suit their case for removal [6A].

Is there a need to remove the weirs beyond giving Sydney Water a way out of their effluent disposal problems? [7A]

Many (10, 34% of responses) requested studies to be done or wanted assurance that the studies being done would consider the full range of options and issues relevant to the communities involved. In particular, a few wanted local knowledge and values of the river to be acknowledged and given equal currency in these studies:

That they have studied and researched the Nepean River and not just applied general theories. That they have estimated the impact on the river in terms of average water levels, duration of visible flows. That they can give assurances that the river won't look like the stretch around Bergins Weir. That they can demonstrate that fish quality and quantity and variety will improve. That they can demonstrate that environmental flows can't (due to cost or whatever reason) be passed through the weirs. That river quality is poor and is still deteriorating rather than my belief that it is improving. [3A]

Justification for the proposal on social, cultural, aesthetic, environmental and economic grounds. Total Catchment Coordinated base to establish the case that water conservation is not necessary? Total Catchment Model to quantify the volume of run-off being lost by the removal of the weirs? [14A]

They need to talk to the people who have lived on and used the river all their life. [22A]

The Expert Panel needs to live on the river for the next 30 years — as I and my family have done for the last 30 years and then make a scientific decision! Then they would see how the weirs have transformed the river. " [31A]

Some (6; 21% of responses) wanted more factual information relating to the volume of environmental flows to be released, the topics being researched, the methods adopted and the recommendations of the research, impacts on fishing and what would happen during drought. A few were also interested in arguments supporting economic benefits of removal and economic alternatives that provide realistic options over existing arrangements:

The weirs have supported the ecosystem for over 100 years. Why not keep them upgraded and in place for the next 100 years and let time and generations quietly keep going. Is there a better way of management at so very little cost? [21A]

Many participants in the water users group (17; 31% of total), requested additional information apart from research information (31% of total water users). This included more specific information supporting the case for removal of weirs:

We would like to know how water can be backed up from the next downstream weir, which is eleven kilometres away? We believe the river upstream of Brownlow Hill Weir will be permanently dry due to the difference in water levels maintained by the weirs. We would welcome reviewing the

> *calculations by the proponents before it is too late and Government cannot change. We would like to review the volume conserved by Theresa Park Weir against the users' extraction licence. [14A]*
>
> *When can it be shown that removal of weirs has resulted in a real benefit and if so demonstrate any relationship to the Nepean area we are concerned for [37A].*

Some requested factual information supporting the feasibility of removal of weirs, such as standards of treated effluent and infrastructure town planning details. A few were interested in the terms of reference this research and the relevant decision-making body. Finally, there was one request for legal information regarding property boundaries when the river dries up.

Some water users (5; 29% of responses) asked about the "real" motivations underlying the rationale for removal of weirs. There was a strong degree of mistrust, cynicism and doubt about the intention or underlying motivation for the potential decision:

> *What Minister of State Government is involved? Who is the motivating body on this study? What are the terms of reference? [2A]*
>
> *Any information available should be provided to those with a legitimate interest in the river. Most particularly, I would like to have a detailed description of the reasons why this step is being considered at all. I would like to know what lies behind the move. I would like to know who would profit from the removal of the weirs and whether there is any pressure from river users downstream to have the weirs removed... [35A]*

Decision-making processes

Water users were also asked how they thought decision-making processes around this issue could be improved. Given the similarity of responses by irrigators and recreational users, responses from both these groups were again combined in the analysis below. A majority of participants in the water users group (31; 57% of total) had suggestions to make about how decision-making processes could be improved. More than half of the responses indicated that a consultative process involving relevant stakeholders was important. In addition, almost a third of responses highlighted the need to include those directly affected by the decision, such as landholders and local water users:

> *Involve the people that are directly affected by the decision that you make. Also, get to know the history of the river from the people that have been using the river to make a living for many years. [8A]*
>
> *Install water users on the Expert Panel. Canvassing information from 100 plus people off the street in Camden and using this information by them is an absolute farce. You should have first made sure they were residents of Camden, with some knowledge of river. [31A]*
>
> *Better regular communication, a series of local meetings. Information on river developments. Explain Government policy on weirs and rivers and economic rationale. [2A]*

A few noted that the body or agency making decisions should be centralised into the one entity, or that a coordinated approach should be adopted:

> *The establishment of one body only to be responsible for the river, not the multitude of Departments that currently are involved. There is no continuity of control. [7A]*

> *The hard evidence available in the public arena at this time indicates the Government has undertaken little or no research, has undertaken no consultation with the affected stakeholders and has not considered the legal implications associated with the construction of the compensation weirs. The regulators have decided to commence this plan of action without obtaining the facts on the matter, which is simply not the correct way to govern. There has been no coordinated approach to the planning issues, which for the last 50 years have promoted sustainable agriculture along the floodplains to ensure the future health of the river. It appears no one other than the Dept. of Land and Water Conservation has even considered it necessary to justify the proposal. This Government proposal is prioritised during the most serious drought in the last 100 years and when every community is focused on water conservation. The reality is that the current drought has heightened the community's awareness of the importance of conservation of water and self-regulation. [14A]*

> *Development of a Strategic Plan for the management of contamination and pollution of the waterway including sewage, run-off, industrial, accidental and disaster management processes. [27A]*

In addition to suggesting processes for decision-making, participants also gave suggestions for what actions decision-makers should take in relation to the weirs. Participants' suggestions included consideration of compensation, communication with water users, and community education. Some example are listed below, along with the frequency of each type of suggestion:

To consider compensation to landholders (10; 32% of responses):

> *That in the event of the removal of the weirs the landholders be compensated in full for the resultant fall in value of their land and loss of income. [23A]*

To communicate with relevant water users and respect local knowledge (3; 10% of responses):

> *Speak to people who have local knowledge and cross check models back to reality. For example, we are currently in a very bad drought yet the river in terms of flow, water height, visual characteristic is holding up remarkably well. Use adaptive management approaches and don't make a quantum change that is unlikely to be reversed [3A].*

> *Communication with the landowners by way of inspection and interviews to consult with affected people should be essential to understand the importance of the weirs. The complete proposal should be tabled – not just the suggestion that four weirs may be removed without indicating the facts associated with the alternative supply. Is it proposed to remove all the weirs? [14A].*

To consider broader issues (3; 10% of responses):

> *Please consider the value of a live river as against economies of Government expenditure [2A].*
>
> *Consideration needs to be given to global warming and the decrease in rain falling and that water is an important commodity. The weirs haven't been looked at. Two of them are in terrible condition. Previously have lived in Murrumbidgee and understands the difficulties of living with no water flow...We need to make the planet greener — conserve water." [18A]*

To change community mindset about the environment and weirs (1; 3% of responses):

> *There are many different levels of understanding, abilities and education levels surrounding the environment and the weirs. Those who have or are near riverbanks should be encouraged to use and care for them. They [riverbanks] should be looked after. You have to change people's thoughts and minds; so many areas around Australia are unsustainable...[42A].*

5.2.4 Conclusion

The study examined the social and economic relationship between water users and weirs, their concerns about potential changes, and the ways in which water users feel information and decision-making about weirs could be improved. Water users comprise a diverse range of river stakeholders. As a group, irrigators were quite different from the recreational users in a number of ways. The former comprised a larger group with 42 participants, while the latter was comprised of twelve participants. Meetings held with irrigators were well attended, and it was evident that this issue aroused a degree of anxiety amongst this group. Irrigators appeared to have views that were more uniformly shared, whereas recreational users held diverse views that were often contradictory.

Irrigators

A third of the irrigators either depended on or came into contact with one or more of Bergins, Thurns, Brownlow Hill or Sharpes weirs, but all commented on weirs in general. Most comments reflected a strong connection with weirs, and expressed concern about the implications of their removal, for their own livelihoods as well as for their local community and wider regional economy.

Weirs were seen as both a secure and largely reliable source of water. Irrigators overwhelmingly regarded weirs as critically important to their enterprise(s) and livelihoods. These livelihoods largely relied on irrigation for agricultural enterprises such as market gardening, turf farming, and growing crops. Other enterprises relied on a reliable supply of water such as dairy farming and raising livestock. In addition, the ability of weirs to ensure water levels was seen as being central to the local community, by creating environments that added social, recreational, and historical value to their community. In these roles, weirs were seen as important in creating a "sense of place" for the community.

Irrigators collectively indicated that removal of weirs would result in loss of water security, with negative impacts on their livelihoods. The majority indicated that removal would see a reduction in their crops or livestock to such an extent that their

enterprises would no longer be viable. Various other negative flow-on effects, such as loss of employment, increased cost of maintaining the business because of having to compensate with external sources of water supply, and depreciation in value of their property, were also expected. Some expressed concern that removal would particularly disadvantage them as a group and that there be a system of compensation.

Irrigators were strongly opposed to the removal of weirs, however they were open to repairs or modifications. Generally little distinction was made between repairs and modifications, with both mostly seen to be positive in restoring weirs to their original function of ensuring much needed water security, and also additionally of benefit to wildlife and recreation. A number of irrigators were concerned that repairs or modifications should also be extended to fish ladders.

Water supply from weirs was considered generally reliable, with quality having improved over time. However, the current drought was considered to compromise this. Most irrigators did not think there were any alternative sources of secure water supply. Alternative options such as bores, town water and dams were largely considered unfeasible owing to cost, regulatory impediments, or impracticality. The benefits of treated effluent as an alternative were recognised by a number of irrigators, but there was concern and mistrust about whether and how such an option would be implemented. Concerns about cost, quality of water supplied, security of supply, regulations, and safety were all raised. Assuming such a system could be implemented the primary concerns were that such an option be reliable, and provide sufficient volume to an appropriate standard of quality.

Recreational users

Although recreational users were more likely to use the river rather than the weirs, many valued the contribution of weirs to a river environment which provided what they saw as unique social and community recreational benefits, and a haven for wildlife, peace and tranquillity. As a group, recreational users had diverse views about the relationship between the weirs and the river, the helpfulness of weirs in their activities, and the potential economic impacts of their removal. Views differed on whether weirs were beneficial to water quality and quantity, and hence fish stock and quality, fish migration, and river navigability.

A variety of fish species in the river system were observed, such as bass, catfish, carp, herring, mullet, gudgeon, and Murray cod. These observations were believed to be typical of the river system and not just particular to the river around the specified weirs. Reported observations of fish species did not differ between the different weirs.

Reports of observed changes in fish and water quantity and quality over time also conflicted. Some indicated that fish stocks had declined alongside reductions in water quantity. A few others however reported that fish stocks and quality improved, as well as water quantity and quality. In the case of two users whose reports of change in fish stocks conflicted, both referred to their voluntary involvement in the Department of Fisheries' Bass catch program as a basis for their observations.

Conflicting views were also held about the economic impacts of removal of weirs. Removal was perceived by a few to improve water quality and fish stocks, hence increasing tourism and improving recreational facilities for the community. However, a few others also thought that removal would result in loss of river navigability and

fish stocks, hence loss of recreational benefits and associated livelihoods depending on them.

Repair or modification was regarded positively by some users, with a few advocating this as a desired action for all weirs. Some also advocated removal of weirs altogether. The inadequate maintenance of fish ladders was specifically mentioned as hindering fish passage. Again, as with irrigators, both repair and modification were mostly perceived to restore the functional characteristics of weirs, with little distinction made between the two.

Many water users requested information on a broad range of issues affecting the river. This was typically information relating to studies done on the river system, and other research related to the weirs. Some demonstrated a mistrust of the political process and asked for information about what was “really going on”, or about information justifying “the ultimate agenda of removal” of weirs. A few wanted reassurances that studies on which decisions would be made were scientifically rigorous and considered the full range of issues involved. In addition, there was concern that decision makers accord local experiential knowledge equal currency alongside scientific evidence. Irrigators in particular pointed out that the “original purpose” for constructing the weirs is just as valid today as it was previously.

Most water users were concerned that decision-making processes be inclusive and respect local users and the affected community. Consultative processes were strongly advocated, with a few also indicating a need for a coordinated strategy, or a single decision making body responsible for the Hawkesbury Nepean catchment.

5.3 Recommendations

That the relevant agencies develop appropriate local mechanisms for involving water users in decision-making processes on the removal or modification of weirs. This should be accompanied by appropriate provision of advice and information on the impacts and benefits of a variety of options that can meet the objectives of the Forum in relation to environmental flows and river health.

The Hawkesbury–Nepean River Management Forum and the Expert Panel should specifically address concerns about water security and water levels and ensure that any proposal for change also provides realistic options to address community concerns about water security.

6 INDIGENOUS GROUPS

6.1 Introduction

The Institute acknowledges the support and shared knowledge provided by Indigenous peoples in the course of this research. Researchers would particularly like to thank the Cubbitch Barta Peoples, Gandangara Local Aboriginal Land Council and Tharawal Aboriginal Land Council as the current custodians of the land with which the research is concerned.

Indigenous people were identified as a distinct stakeholder group. The researchers acknowledge Indigenous peoples as having special status as the initial occupants of the land. In keeping with a commitment to reconciliation, they sought to value Aboriginal heritage, whilst recognising the past injustices of social and political marginalisation[37]. Indigenous Australians often experience exclusion and disempowerment in natural resource management decision-making[38]. To avoid this occurring within this project researchers took into account research protocols established by Indigenous people[39]. This includes respect for Indigenous culture and Indigenous practices, understanding that Indigenous representatives speak only for their own people and country and making a commitment to genuine consultation.

The researchers followed some specific protocols to facilitate Indigenous involvement not just with respect to weirs, but also of river management more generally. The approach adopted acknowledged that trust is a major research issue for Indigenous groups. Distrust is evident due to cross-cultural practices of the past and the abuse of Indigenous knowledge that has been seen to misrepresent Indigenous culture. As such, there is reluctance on the part of Indigenous peoples generally to share further information with researchers.

The Aboriginal and Torres Strait Islander Commission was approached to identify appropriate Indigenous groups in the region under research. Biosis Research[40] provided contacts and a Native Title search. Further contacts were also acquired informally.

6.2 Responses

Preliminary meetings

After establishing a contact person, researchers requested face-to-face meetings at a location chosen by the Indigenous group with representatives of the group's choosing. Information about the research project and the aims of the Institute were provided in advance of meetings. Initial dialogue allowed the researchers to

[37] Adapted from Council for Aboriginal Reconciliation, (1992) *Vision Statement* incorporated into the UTS Reconciliation Statement.
[38] Jennings, S., & Lockie, Dr S., (2002) *Insights on Indigenous Involvement in Coastal Zone Decision-Making,* Waves, vol 9, No 1, Winter, 2002.
[39] Similar to that described by Jennings & Lockie, *ibid*, VicHealth Koori Health Research and Community Development Unit (2001) *Research – Understanding Ethics,* University of Melbourne, Victoria. VicHealth Koori Health Research, Smith, L. T., (1999) *Decolonising Methodologies. Research and Indigenous Peoples,* University of Otago Press, Dunedin, NZ, The Koori Centre, (1993) *Principles and Procedures for the Conduct of Research,* University of Sydney, Sydney.
[40] A consulting firm for the Expert Panel, which has previously undertaken research in the area.

acknowledge the reservations Indigenous peoples have towards research and to build relationships and trust. The researchers described the process of the research up to that time and how submissions from Indigenous groups could be integrated into the report.

One meeting resulted in an oral history interview. The spokesperson for the group interviewed family members before meeting with the researchers. Explicit verbal consent granted permission to make a written record of the meeting. Quotes were reiterated to ensure they were recorded correctly. A review of the resulting submission was offered to the spokesperson before incorporating it in this report.

Meetings took place with two other Indigenous groups. One had two representatives present and the other four present. A combination of general maps and a reference map of Aboriginal Australia was used to show the region under research[41]. After describing the research and process to date, Indigenous representatives agreed to undertake consultation with other members of their group. This was to decide if making a submission would be the appropriate way in which groups would prefer to represent their people. Researchers suggested that groups review their submissions before they were made available to the Hawkesbury–Nepean Management Forum and to the public.

The following discussion is based on the submission received, preliminary meetings with groups and relevant literature.

People at all three meetings questioned the process the research team was undertaking and voiced a number of concerns. The greatest concerns were the potential for misrepresentation, Native Title conflict and ownership of knowledge. The groups advised that if a contribution was made to the research they wished to be recognised as diverse peoples and only speaking for their specific 'country'. It was also made clear that any shared knowledge remained in their ownership and any relationship they had with the river and the weirs could not be transferred to any other groups. One group also did not wish any concerns they held around the river to be used as a "bandwagon" for government departments to jump on.

Further research and dialogue needs to be undertaken in relation to Native Title, as there is still conflict among Indigenous groups around custodianship and boundary claims. Early colonisation of the State and enforced movements of Indigenous peoples have added to the uncertainty over claims. Local Aboriginal Land Councils (LALC) were founded to help address the needs of the highly urbanised Indigenous people who now have little or no access to their ancestral homelands.[42] This was a view strongly vocalised in meetings. These Indigenous people still have very strong ties to their country[43] and as Native Title is defined within a European legal system[44],

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[41] The Australian Institute of Aboriginal and Torres Strait Islander Studies Reference Map, produced by LANDINFO, Sinclair Knight Merz, Edition 3, 2000, NL10536.

[42] Reiterated in the Draft Report, Kenney, S., & Richardson, R., (2002) *Aboriginal Consultations for Sustaining the Catchments Draft Regional Environmental Plan (Draft Report),* Beyond Consulting for Department of Planning (PlanningNSW), August 2002, p. 10.

[43] Kenney, S., (2002) *Overview of Aboriginal Occupancy & Association: Sydney Water Catchment (Draft Report),* Beyond Consulting for PlanningNSW, July 2002, p.5, Australian Heritage Commission, (1997) *Policy in Relation to Aboriginal and Torres Strait Islander Peoples and the National Estate,* Available http://www.environment.gov.au/heritage/policies/Indigenouspolicy.html.

[44] Ivison, D., Patton, P. and Sanders, W., (eds), (2000) On Display for its Aesthetic Beauty: How Western Institutions Fabricate Knowledge about Aboriginal Cultural Heritage, by Smallacombe, S., in *Political theory and the Rights of Indigenous Peoples,* Cambridge University Press, Cambridge, UK.

difficulties have arisen in facilitating claims for those who identify with a particular LALC.

Some of the groups' concerns were alleviated by researchers but it was recognised that negotiation within these groups needed to continue before submissions could be made. It was agreed that the researchers would follow up and see if the groups felt it would be appropriate to make a submission after internal consultation. It was also suggested that submitting their views in ways other than through the Institute would be available and if groups wished this could probably be arranged in the form of addressing the Expert Panel.

Oral history

One submission has been received to date in the form of an oral history. The spokesperson for this Indigenous group relayed information given to her from various family members, who were interviewed before meeting with the research team.

This submission comes from an Indigenous group formally recognised by the Department of National Parks and Wildlife Services (DNPWS). This group has completed an archaeological survey in the area and often assists DNPWS in locating and naming Indigenous sites. The group has submitted a Native Title claim for the area and is concurrently trying to buy back land with access to the river through the Indigenous Land Corporation. This submission details knowledge about specific Indigenous people and their country specifically in relation to the weirs under research. The views expressed are valid only for these Indigenous people in relationship to their land and cannot be applied to other Indigenous groups. It was also provided with the understanding that names or personal information relating to individuals in the group are not used in the report.

The group is the remaining peoples moved to the Upper Nepean River after the 1816 massacre at Appin. Families in this group lived on the Camden Park property from 1816 until 1973 when it was sold. Before the sale, there was easy access to the river and members of the families report they fished daily on the property. They have made observations about both the river and the weirs.

A boat was moored permanently on the river and people would catch eels, gudgeon, perch, catfish, sprats and mullet. During the adult life of one man, now 73 years old, platypus were seen. He maintains that weirs stop fish from travelling up-river. In the 1930s after a ten-year drought, no water was seen behind the weirs. It was said that, "the fish would cook in their own juice". Only in flood time would fish other than eels and gudgeon, be able to travel. A middle-aged woman who fished regularly in her teens believes there has been no "decent flood" since 1978, when her son was born.

> *There are no floods anymore so the fish population is not going up the river. [A member of the family] hasn't fished the river for years.*

While aware that weirs affect fish movement, the group is also concerned about water levels in the river and relate the level of the water to the existence of the weirs. There is a belief that "if there were no weirs, the water would be so shallow". Regarding the damage to Bergins Weir, it was suggested, "the weir should be fixed". It was identified that lack of maintenance is a big problem.

> *The weirs were put there and forgotten about. They haven't been maintained.*

It was contended that if the weirs were removed this would hide the problem of structural degradation resulting from neglect by the authorities. However, the group states that removal of the weirs will not address the issue of water security in the region.

> *If the Sydney Catchment Authority can spend millions on all these other projects, they can spend some money on keeping the water in the river.*

In this submission, a 'dreaming story' was shared. 'Dreaming' is the term given by Indigenous people to mean living culture[45]. Land (including the river) informs dreaming and dreaming informs Indigenous people's lives and everyday cultural practice. There is a place in the river where "you don't swim and don't stop". This was a bad place to be, a "black hole", a "bottomless" part of the river, just above Menangle. You had to travel on a bit of beach on the other side of the river. The full details of this story have been lost.

6.2.1 Conclusion

Preliminary discussions with Indigenous groups have identified a number of issues. The way in which the research team has approached the weirs research is very different to the relationship and understanding Indigenous groups have with the river[46]. This research has focussed specifically on one section of the river, whereas Indigenous people would consider the river in its entirety. If possible, it would be more appropriate for future research to be carried out in conjunction with those involved in consultation with Indigenous people and river management more generally.

In the past, non-Indigenous people have not respected shared knowledge and intellectual property rights of Indigenous people have not been recognised. The researchers have been advised that the two Indigenous groups are deferring a decision to participate in the research until the issues of trust, representation, intellectual property rights, access to country and certainty around Native Title issues are resolved.

The Indigenous communities of the Sydney catchment have been consulted on issues concerning water quality management practices as part of Planning NSW's *Sustaining the Catchments* Draft Regional Environmental Plan[47]*. Sustaining the Catchments* is a regional plan "that aims to support the sustainable development of the drinking water catchments of Sydney and adjacent regional centres, and to provide integrated strategies to protect and improve water quality".[48]

The consultation was undertaken with the understanding that Aboriginal catchment communities wanted the opportunity to provide further feedback, beyond the production of the draft reports. Complementing this intention was the identified goal of the community consultation strategy to include more fully, Indigenous input in the

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[45] Hansen, M., (1995) Human Health and Wellbeing in the Aboriginal Community, in Furnass, B., et al (eds) (1996) *Survival, Health and Wellbeing into the 21st Century: Proceedings of a conference held at the Australian National University: November 30 to December 1, 1995,* Nature and Society Forum, Canberra, p.26.

[46] Yunupingu, G., (1997) From the Bark Petition to Native Title', in Yunupingu, G., (ed) (1997) *Land Rights – Past, Present and Future,* Chapter 1, University of Queensland Press, St Lucia, Queensland, pp. 1-17.

[47] NSW Department of Urban Affairs and Planning, (2000) *Sustaining the catchments: a draft regional plan for the drinking water catchments of Sydney and adjacent regional centres.*

[48] Kenney, S. & Richardson, R., 2002; p4.

planning and implementation of water management practices by the Sydney Catchment Authority.

The project was undertaken with the aim of achieving the following outcomes

- creating more open lines of communication and access between Aboriginal communities and the management of the catchments;
- to liaise with various bodies and groups within the Aboriginal community;
- to inform the Aboriginal community in the catchment area of the objectives and planning process of the Regional Plan; and
- to identify the interests and concerns of the Aboriginal community in respect to water quality and how the catchments are managed.[49]

The recommendations developed from this consultation process relate to working together, government processes, protecting water quality, protection of Aboriginal heritage, cultural awareness, catchment management and participation in planning processes (see Appendix 8). These recommendations are directly relevant to the work of the Forum.

Ongoing communication regarding the weirs may be best carried out in conjunction with the work of government agencies already undertaking research and consultation in the catchment. This would allow Indigenous people to develop relationships with researchers and overcome some of the mistrust.

6.3 Recommendations

The Hawkesbury–Nepean River Management Forum and the Expert Panel should continue to include Indigenous people in their deliberations by:

- Recognising that custodianship of land, which includes the river, is fundamental to Indigenous culture and that Indigenous people's knowledge of culture and land be acknowledged and respected.
- Continuing to develop relationships with Indigenous groups to facilitate the incorporation of Indigenous perspectives and to ensure engagement with different ways of communicating values and knowledge.
- Remaining open for further contributions to the weir review by Indigenous groups in the foreseeable future.
- Supporting the recommendations of the report *Aboriginal Consultations for Sustaining the Catchments* and furthermore, requesting that Planning NSW publishes this report and implements its recommendations.

[49] Kenney, S. & Richardson, R., 2002; p4-5.

7 CONCLUSION

Local research suggests that there is a range of values influencing the relationship between people and weirs. Any proposal to change the current situation would need to be developed in light of the potential for conflict, particularly with respect to the local irrigators who have significant economic interests at stake. Other water users are also likely to be affected by changes to the weirs and consequently the river. A consistent finding across the participants was the need for information. This concerned likely social and ecological impacts for most but specific technical details relating to repair and modification were also requested.

Participants from all groups expressed a need to be involved in the decision making process. This ranged from being kept informed to direct involvement in decision making. There was a wide range of issues and alternatives canvassed within each group. Many indicated their willingness to become further involved in dialogue about the on-going management of the weirs.

Management of the weirs is part of the overall management of environmental flows. Many of the issues raised and concerns expressed during this investigation, are relevant at the catchment level and in relation to river management issues other than weir modification. Therefore, there is a need for an on-going framework for public participation in decision making on river management, and an associated communication strategy to ensure that community and stakeholder groups have an opportunity to become informed on the relevant issues, and to assist in making robust decisions.

Deliberative and participatory decision making processes, as proposed for the implementation of planFIRST by PlanningNSW[50] allow for appropriate development of informed decision making. The findings of this research suggest that it would be highly desirable for processes such as these to be incorporated into the management of the Hawkesbury Nepean Catchment.

[50] Carson, L. & Gelber, K., (2001) *Ideas for Community Consultation: A discussion on principles and procedures for making consultation work*. Prepared for the NSW Department of Urban Affairs and Planning.

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APPENDIX A: INFORMATION SHEET

INFORMATION SHEET

Community Research and the Management of the Upper Nepean Weirs

The Independent Expert Panel for the Hawksbury Nepean River Management Forum has commissioned the Institute for Sustainable Futures (ISF) to conduct research into the values held by river users and community members in relation to the weirs on the Upper Nepean River and concerns they would have with any potential change or removal. ISF is an independent research organisation at the University of Technology, Sydney. ISF is being assisted by Biosis Research who have previously carried out a cultural heritage study of the weirs in this area. The weirs at the centre of this research are Bergins, Thurns, Sharpes and Brownlow Hill. These four weirs were chosen for this 'pilot' research following other preliminary research conducted by government agencies. Over time all the weirs in the Upper Nepean will be considered in further studies.

The weirs in the Upper Nepean may provide a source of water supply for irrigation during dry seasons, provide a place for recreation and can have historical and cultural value. Therefore, when considering the future of the weirs a wide range of factors needs to be taken into account, including your views.

We are seeking input about how people use the weirs, what value they see the weirs having for the local community, culture and industry, and what concerns there may be about their potential removal. Community meetings and individual interviews will be conducted by the research team lead by Ms Helen Cheney. Written submissions will also be accepted. The research includes a feedback loop by which community input is sought, concerns are passed on to relevant agencies and where possible, appropriate information is given back to the community.

Complementing this research of the social, heritage and economic issues is independent scientific research considering the potential environmental impacts of any proposed change to the weirs. Some of the adverse environmental impacts that weirs can have are the restriction of river flows, riverbank erosion, blocking of fish migration, interruption of breeding cycles of fish and other organisms and an adverse affect on water quality.

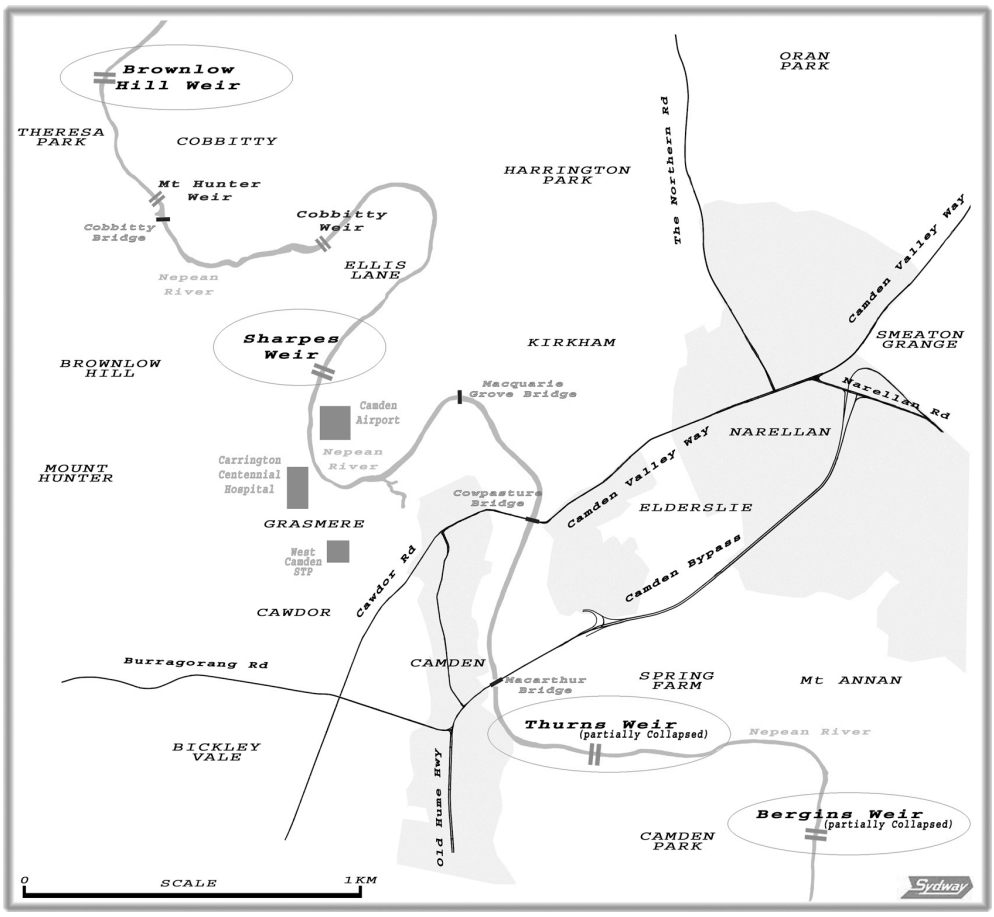
The Independent Expert Panel will consider the results of both the scientific, cultural heritage and this community research. Possible alternatives for secure water supplies for agricultural water users will also be investigated and recommendations will be made to the NSW Government about the future of these four weirs.

Also to be considered is the fact that at least two of the weirs are in a very poor condition. Bergins Weir is very old and has collapsed. The water level is low and stagnation

is evident and this may be harmful to the aquatic habitat. Sediment has builtup behind Thurns Weir, causing environmental degradation and the river may cut further into the steep bank of the river causing it to slump. The river has bypassed the weir on the western side.

A number of outcomes are possible from the studies that are being conducted and include retaining, modifying or removing the weirs or the fishways associated with them. It is expected that any decisions will take into account the feedback received from the general public, river (and water) users and community groups.

The map below shows the locations of the four weirs.



We are seeking *your* input about how you use the weirs, what value they have for you, and what concerns you may have about their possible removal. Please contact us to ensure that a community perspective is taken into account in the future management of the weirs.

- Your comments can be provided by email to isf@uts.edu.au or by mail to ISF, PO Box 123, Broadway, NSW 2007 or by telephone on (02) 9209 4350. We will be conducting research throughout October / November with individuals and community groups.
- The final report will be available to the public. This will be obtainable through Camden Council or the ISF website (www.isf.uts.edu.au).

APPENDIX B: WEIRS NEWSLETTERS

WEIRS NEWSLETTER 1

23 December 2002

Welcome

This is the first of three planned newsletters from the Institute for Sustainable Futures as part of our commitment to continuing dialogue with the community regarding our research into the weirs in the Upper Nepean River. Also attached is a set of answers to Frequently Asked Questions (FAQs), supplied by representatives of the Hawkesbury–Nepean River Management Forum (see Feedback in Action, over page).

Value of weirs

The Institute for Sustainable Futures (ISF) was commissioned by the Independent Expert Panel of the Hawkesbury–Nepean River Management Forum to conduct research into the values held by river users and community members in relation to the weirs on the Upper Nepean River. This includes research into the concerns of the community about change to the current situation. The weirs at the centre of this research are Bergins, Thurns, Sharpes and Brownlow Hill (see map).

Research aims

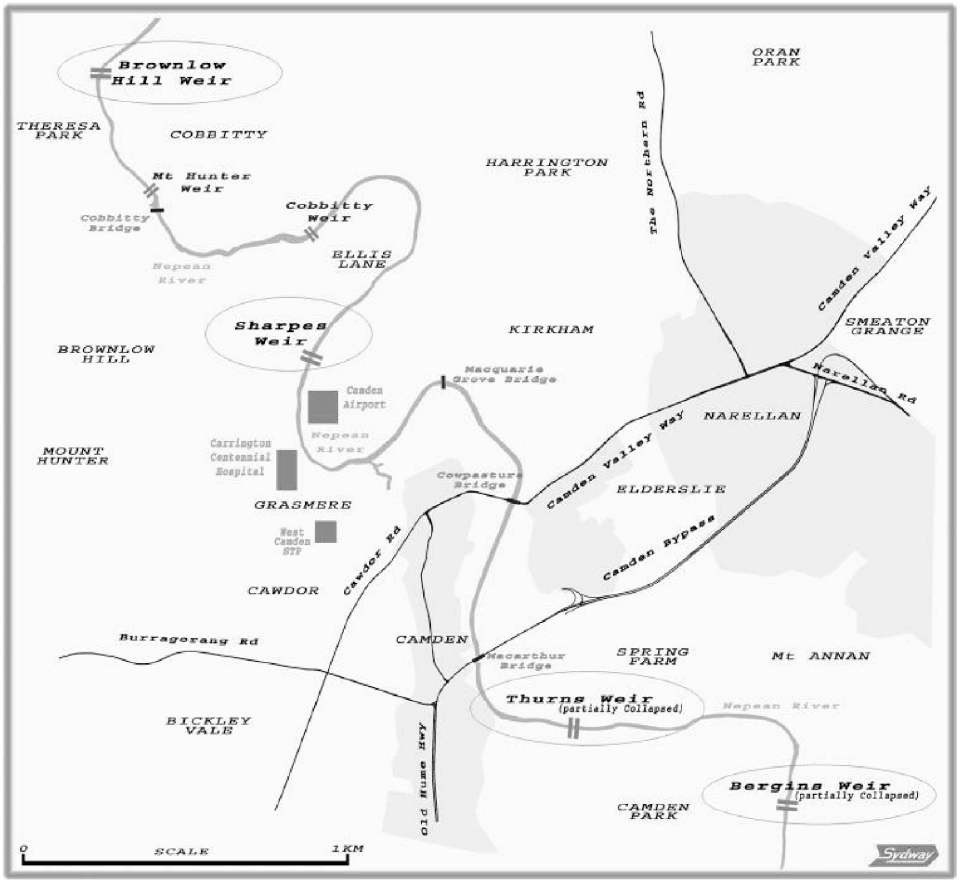
Complementing this localised research of the social, heritage and economic issues is scientific research considering the environmental impacts of the weirs in relation to environmental water flows. Together this research will feed into the Forum's decision-making processes with respect to potential retention, modification or removal of the weirs and the fishways associated with them. ISF's research is a first step in facilitating public participation in this decision-making process.

Research questions

The research is trying to answer two fundamental questions. Firstly, what is the nature of the social and economic relationship between people and weirs at a local level, and secondly, in what ways do people want to participate in decisions about the weirs and river management?

Our approach

Underlying the work of the Hawkesbury–Nepean River Management Forum is an understanding of adaptive management.



The weirs being considered in this research

In keeping with this, ISF's research has been responsive to issues that have arisen throughout the research and researchers have modified their approach accordingly. The Institute is also committed to including a broad range of community members and representing a diversity of views.

The research process

Who have we talked with?

We identified four groupings within the community to whom we have addressed the research. Contact with these groupings began in September and the dialogue has continued and developed. The groups are:

- General public
- Community groups
- Indigenous groups
- River/Water users

The Institute adopted a variety of communication strategies to facilitate the involvement of these various community members. We contacted both organised groups and individuals through direct fieldwork in the Camden area, through press releases and notices in local papers, direct mailing to group representatives and encouragement in all public correspondence for direct contact with us.

Data collection

Information has been gathered through a combination of written responses, written and telephone questionnaires, e-mail responses, telephone messages, group meetings and on-site interviews.

Over 300 water users were sent a survey after a questionnaire was developed with a representative group of users and 50 written submissions were received.

Over 150 community groups were also invited to make submissions and seven have been received.

The field work and requests for comment from the general public has generated over 100 completed responses.

Key meetings

There have been three key meetings crucial to the process. Firstly, a very important stage of the research was contact with the local councils early in the process. At a meeting with senior staff from Camden Council they expressed a concern that in addition to water resources and recreational amenity, the weirs' role in the community's history, identity and sense of place is critical. In response, we aimed to ask open-ended research questions to enable a range of community concerns to be expressed.

Secondly, researchers attended a meeting of the Camden Historical Society where a number of views and concerns were expressed by participants. These were recorded and reported back to the Society before the Society made a formal submission.

Thirdly, researchers have held two meetings with water users, and a summary of the second of these meetings follows.

Feedback in action

A lively, well-attended meeting of about 70 irrigators and members of the fishing community was held on Thursday, 12 December 2002 at Teen Ranch in Cobbitty. ISF researchers provided the meeting with feedback on data collected from the survey of water users within Camden District.

Discussion of the report writing process followed, with opportunities for participants to raise any crucial information and ideas that had so far been missed.

The research team presented five themes: Water, River, Community, Treated Effluent and Weirs. These themes were developed from the overriding concerns and issues expressed in the completed surveys and more generally through e-mails, letters and telephone conversations.

Discussion centred on Camden District community's requirements for water, which have traditionally been met by the Upper Nepean River and in the last 100 years or so, specifically met by the series of weirs on the river. There is an overwhelming view that the continuation and maintenance of the current weirs would secure a reliable water supply.

Survey respondents introduced new ideas such as using treated effluent and the possibility of incorporating urban stormwater run-off with conservation and demand management techniques to reduce water use. While these ideas were welcomed by most as ways to supplement existing options they were not seen as simple solutions or as replacements for the weirs.

The outcomes of the meeting were very positive and the research team would like to thank all of those who gave up their time to attend.

A number of questions were asked during this meeting which have also regularly arisen throughout the research. We hope the majority of these will be resolved by the answers to the Frequently Asked Questions (FAQ) which is attached.

Next steps

The data gathered in the research is currently being analysed and the research reports will be delivered and made available early in the New Year. Another newsletter will be produced at this time.

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Management Forum Support Team
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hnrmforum@dlwc.nsw.gov.au

Department of Land and Water
Conservation State Weirs Policy
http://www.dlwc.nsw.gov.au/care/water/wr

Gabby O'Neill (ISF) & Vanessa Hardy (Biosis Research) taking down the views of locals at Camden Market Day

WEIRS NEWSLETTER 2

April 2003

Welcome

As part of our commitment to a continuing dialogue with the local Camden community regarding research into the weirs in the Upper Nepean River this is the second of three planned newsletters from the Institute for Sustainable Futures.

Aim of research

The Hawkesbury Nepean River Management Forum and Expert Panel commissioned the Institute to conduct research into the values held by river users and community members in relation to the weirs on the Upper Nepean River and any concerns they would have with change to the current situation. The weirs at the centre of this research are Bergins, Thurns, Sharpes and Brownlow Hill.

We asked local people how they use the weirs, what value they see the weirs having for the local community, culture and industry, and what concerns they may have about any potential changes.

The research aims to help the Expert Panel and the Forum make appropriate decisions regarding these weirs. This may include retention, modification or removal of the weirs and the fishways associated with them and to facilitate public participation in the decision-making process.

The research questions

1. What is the nature of the social and economic relationship between people and weirs at a local level?

2. In what ways would people want to participate in decisions about the weirs and river management?

Dialogue and diversity

The project has been an opportunity to initiate dialogue with a number of sectors in the community about the possibility of future change and the nature of that change.

To distinguish between the diverse interests and perspectives of different groups in the community, the research team delineated four "sectors': general public, community groups, identifiable water users such as irrigators and recreational fishing users, and Indigenous groups.

The approach for each group was different, with different methods used to collect and record views.

General Public

A questionnaire was developed with input from Camden Council, the Expert Panel and DLWC. It had open-ended questions enabling a range of views and concerns to be expressed.

A press release and public notice was sent to the two major local newspapers inviting interested parties to contact the Institute. Research team members spent two days in the Camden area conducting direct fieldwork. A summary of the results of the 113 questionnaires completed by members of the general public follows.

River and weirs

Overwhelmingly, the general public emphasised the aesthetic and leisure value of the river. The community identifies very strongly with the river, with participants interpreting the existence of the weirs as integral to both the river's survival and the ongoing economic survival of the region and the river as an integral part of the Camden community. There was a strong response in favour of retention of the weirs.

Community Groups

Invitations to participate were mailed to 165 groups in the area, followed by telephone calls to selected groups. The research team attended a community group meeting and had continuing correspondence and telephone conversations with group representatives. We received ten formal submissions and the key findings are below.

Cover of the Institute's preliminary findings report

Response

There was a mixed response from participating groups, the most distinct difference being that participating environmental groups are in favour of removal of the weirs and encouraging environmental flows in the river. The historical, action and business groups argued for the retention and maintenance of the weirs.

The most significant theme to emerge from those in favour of retention of the weirs is the economic interdependence of the community.

It was argued that if irrigators had their livelihood threatened this would have consequences for all businesses. The cultural and heritage value of the weirs was also stressed as an important part of local people's sense of "place".

Groups that participated have significant local knowledge and experience of the river and issues concerning its management. The majority of participants made clear they would like to be further involved in the decision-making process.

Water Users

Two similar surveys were used to gather information from water users 'Irrigators' and 'Fishing and Recreational Users'.

A total of 54 responses were collected: 42 from Irrigators and twelve

from Fishing and Recreational Users.

Irrigators

One third of irrigators either depended on or came into contact with one or more of the weirs. All, however, reflected a strong connection with other weirs and the river.

Weirs are seen as both a secure and largely reliable source of water. Irrigators overwhelmingly regarded weirs as critically important to their enterprise and livelihoods. The majority indicated that the removal of weirs and the subsequent loss of water security would have a negative impact on their livelihoods, reducing crops or livestock so that they would no longer be viable.

Many pointed out other negative economic flow-on effects such as loss of employment, increased cost of maintaining the business as a result of having to compensate with external sources of water supply, and depreciation in value of their property. Some expressed the view that removal of weirs would particularly disadvantage them as a group, and that compensation would need to be made.

Irrigators were strongly opposed to the removal of weirs, but open to the idea of repair or modification.

Most irrigators did not think there were any viable alternative sources of secure water supply. Options such as bores, town water and dams were considered largely unfeasible because of cost or impracticality.

The benefits of treated effluent as an alternative source were recognised by a number of irrigators, but there was concern and mistrust about whether and how such an option would be implemented. Concerns about cost, quality of water, security of supply, regulations and safety were all raised.

Fishing and Other Recreational Water Users

Recreational users were more likely to use the river itself rather than the weirs, but many valued the contribution of weirs to a river environment which provided what they saw as unique social and community recreational benefits, and an area for wildlife, peace and tranquility.

This group had diverse views about the relationship between the weirs and the river, the benefits of weirs to their activities, and the potential economic impacts of their removal. Views differed on whether weirs were beneficial to water quality, water quantity, and hence fish stock and quality, fish migration, and river navigability. The inadequate maintenance of fish ladders was specifically mentioned as hindering fish passage.

Information and Decision Making

Participants across all groups requested information on a broad range of issues affecting the river, including studies done on the river system and research related to the weirs. The community wants information to be available to promote informed debate and to develop participation and dialogue. Technical information regarding the issues and the impact on both the environment and human communities was requested.

Some demonstrated a mistrust of the political process and asked to be told what was "really going on", or wanted information justifying "the ultimate agenda of removal" of weirs.

A few participants wanted reassurance that studies on which decisions would be made were scientifically rigorous and considered the full range of issues involved.

Most water users were concerned that decision-making processes be inclusive and respect local users and the affected community. Consultative processes were strongly advocated, with a few also indicating a need for a coordinated strategy, or a single decision-making body responsible for the Hawkesbury Nepean catchment.

The results of this research strongly indicate the need for continuing community consultation. Priority should be given to building mutual trust between potential decision makers and all stakeholders.

Indigenous Groups

A number of recommendations arose from consultations with Indigenous groups, based on recognising that custodianship of land, including the river, is fundamental to Indigenous culture and that Indigenous people's knowledge of culture and land should be acknowledged and respected. As well, it will be important to continuing developing relationships with Indigenous groups to facilitate the incorporation of Indigenous perspectives into decision-making and to ensure engagement with different ways of communicating values and knowledge.

Some comments made by research participants

"...too many weirs means less water flow."

"...an older member who was born in Camden told me before the weirs were installed you could walk up the river and not get your feet wet."

"Fishways work well but do clog up with rubbish and weeds need to be cleaned out regularly."

"It is an integral part of Camden's character."

"Healthy river = healthy natural environment"

"Knocking down the weirs would be like knocking down St John's Church."

Unpublished research by PlanningNSW, Aboriginal Consultations for Sustaining the Catchments complements this research and contains important recommendations.

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APPENDIX C: FREQUENTLY ASKED QUESTIONS

Community Research on the Upper Nepean Weirs

Frequently Asked Questions – Responses from the Hawkesbury Nepean River Management Forum[1]

1. Who are the ISF and why are they involved?

The Institute for Sustainable Futures (ISF) was established by the University of Technology, Sydney in 1997. ISF works with industry, government and the community to develop sustainable futures through research, consultancy and training. ISF believes that sustainable futures result from economic and social development that protects and enhances the environment, human well-being and social equity.

The Independent Expert Panel, which provides scientific advice to the Hawkesbury Nepean River Management Forum, commissioned ISF as an independent research organisation to conduct the research into the values held by river users and community members in relation to the weirs and concerns they would have with any potential change to them.

2. Who are the Hawkesbury Nepean River Management Forum and the Independent Expert Panel?

As part of the NSW Government's recent water reforms throughout NSW, it established the community-based Hawkesbury-Nepean River Management Forum in April 2001 to advise on how to provide environmental flows for the River from the Sydney Catchment Authority's (SCA) dams and structures. The Forum's recommendations to the Government are due in September 2003.

The Forum's membership includes representatives of local Government, State Government Agencies, industry, water users (including irrigators, Indigenous Peoples, recreational users and commercial fishers) and environmental groups.

The Independent Expert Panel was established by the Minister for the Environment in September 2001. The Panel's membership provides expertise on ecology, geomorphology, hydrology, economics and water supply/sewerage. Its role is to undertake research in order to provide relevant advice to assist the Forum in developing its recommendations.

3. What are 'environmental flows' and why do they matter?

Environmental flows are releases of water from the storage reservoirs of sufficient quality and quantity to help restore the natural health of the river system.

As a result of the construction of the water storages dams in the upper Nepean system and Warragamba, natural flows in the rivers downstream of those structures have been dramatically decreased. Sydney and the surrounding region's communities are reliant upon the Hawkesbury-Nepean River. However, The Healthy Rivers Commission has determined that this river is slowly deteriorating and is likely to become choked and polluted unless something is done to address the lack of natural flows to the parts of the system downstream of the dams. Environmental flow releases attempt to address this problem.

[1] These 'Frequently Asked Questions' responses were put together by members of the HNRMF Project Support Team and representatives from the Department of Land and Water Conservation.

4. Why were the weirs built in the first place?

The construction of the upper Nepean water supply system in the late 1800s and early 1900s resulted in the natural flow in the Nepean River being drastically reduced. Residents of the Nepean Valley were concerned they would not have enough water for farming and that the river was so silted a lack of clean water may affect general health and hygiene. As a result, the Public Works Department built a series of 'compensation' weirs in key locations.

5. Why are changes to the weirs being considered and why are just these four weirs being reviewed and not all the weirs on the river?

In order to ensure that any environmental flow releases from the upper Nepean dams are able to be delivered to downstream areas it is important that they are able to pass through the areas of the river where weirs currently exist. One way of ensuring passage of environmental flows is through weir removal, but there are other ways and the Independent Expert Panel is examining these.

The NSW Government's *Statement of Joint Intent (SOJI) for the Hawkesbury-Nepean River System*, published in March 2001 required that the NSW Weir Review Committee should review the weirs on the Upper Nepean River, with the *"primary goal of removing the maximum number of weirs, consistent with providing alternate, secure water supply to existing users".*

The Department of Land and Water Conservation (DLWC) has carried out a preliminary assessment of the eleven weirs between Menangle and Penrith to identify weirs that could be removed with minimum social and economic impacts and to gain maximum environmental benefits. As a result of this assessment, four weirs (Bergins, Thurns, Sharpes and Brownlow Hill) were identified as options for investigation. No formal proposal to remove these weirs has been made and DLWC stressed that removal of these weirs should only be undertaken following a detailed assessment of the environmental, social and economic costs and benefits. The research currently being undertaken by the ISF will inform the on-going decision-making process.

6. What would the impact of any change to the weirs be?

There are numerous scientific, social, economic, cultural and heritage issues and impacts associated with removal of any of the weirs. Some of the impacts may be beneficial while others may be viewed as detrimental. It is to help understand all of these impacts that the current scientific and socio-economic studies are being undertaken.

Should a firm proposal be developed to remove any weir, it would be the subject of an environmental impact assessment which would fully describe all of the beneficial and adverse impacts and which would be undertaken with community involvement.

7. What information is available and how can I get it?

Several background reports have been prepared by the Independent Expert Panel looking at the history of the weirs and heritage issues. Copies can be obtained though the Forum Support Team (Phone 4577 4243; email: hnrmforum@dlwc.nsw.gov.au).

Information concerning weir removal in New South Wales (under the State Weirs Policy) is available from the DLWC website (http://www.dlwc.nsw.gov.au/care/water/wr/). The Forum Support Team can also supply this information.

8. What decisions have been taken already? Who has made these decisions and who is making the decisions now? How will the decisions about the weirs be made in the future?

No decision has been made to remove any weir on the Nepean River. As already noted, any future proposal to remove a weir would be conducted through an environmental impact assessment which would include community involvement in the decision-making process.

There are several ongoing review processes that may influence weir removal:

- NSW Government's State Weirs Policy

  The primary goal of the *State Weirs Policy* (released in August 1997) is to halt and, where possible, reduce and remediate the environmental impacts of weirs. Some of the principles of the policy, as they relate to the Upper Nepean weirs, include:

  - Weirs that are no longer providing significant benefits to the owner or user should be removed, taking into consideration the environmental impact of removal.
  - Where retained, owners should be encouraged to undertake structural changes to weirs to reduce the impacts on the environment.
  - Areas of environmental degradation caused by the impacts of weirs upstream and downstream of weir pools should, where possible, be rehabilitated.

  The Weir Review Committee is yet to take any action on the preliminary assessment of the of the compensation weirs in the Nepean River**.** This research by ISF into the four weirs will contribute to this process.

- Healthy Rivers Commission

  The Healthy Rivers Commission, in its Final Report into the Hawkesbury Nepean River System, recommended that a program of structural review of the weirs of the Upper Nepean be conducted and that a works program be developed for implementing the most cost-effective means of mitigating or removing the impacts of structures on river health. As a result of this the *Hawkesbury-Nepean* Statement of Joint Intent (SOJI) required the NSW Weir Review Committee should review the compensation weirs on the Nepean River (as mentioned above).

9. Who will be involved in any action that is taken on the weirs? Who is responsible and who will pay?

The responsibility (including costs) for modification or removal of any weir rests with the weir owners (generally Sydney Catchment Authority or DLWC).

10. How can I, or my group, become more involved in the process?

As noted above, no action to remove any of the Nepean River weirs will be taken without community involvement. If a weir removal proposal is developed, notification will be undertaken in consultation with the local Council, though local newspapers as well as through direct notification to local community, industry and environmental organisations.

APPENDIX D: ENVIRONMENTAL FLOWS

Environmental Flows

What is an environmental flow?

Environmental flows provide water solely for the benefit of a river system by matching part of a natural flow regime. These flows aim to restore the ecological processes and biodiversity that were once found in the river.

Water has been extracted from the Hawkesbury-Nepean River system for drinking water and irrigation over hundreds of years, while water has been returned to the system as stormwater run-off and sewage effluent.

While it's impossible to return the Hawkesbury Nepean to the natural flow regime of 200 years ago, it is possible with environmental flows to replicate the variability of high and low flows that once occurred on the river.

The water used in environmental flows is usually obtained from dams, but it can also be released from sewage treatment plants and detained stormwater run-off to supplement natural flows from tributaries.

Why do we need environmental flows?

In the next few years, environmental flows will be supplied to many rivers in New South Wales following the introduction of the Water Management Act (2000). This Act identifies "the environment" as one of the many "users" that need to receive a fair share of water.

Probably Australia's most famous river about to receive an environmental flow is the Snowy River. Last year NSW and Victorian governments agreed to return 28% of the original flow to that river.

It is widely accepted that environmental flows have many benefits for river health as the additional water in the system can:

- trigger bird and fish breeding
- prevent blue-green algae outbreaks
- wash sediment through the system
- improve habitat such as wetlands

But it's important to understand that environmental flows won't solve all of the problems in the Hawkesbury-Nepean River. Environmental flows are just one component of a suite of environmental management strategies that must be undertaken to heal the river.

At the Nepean Dam 4.4 megalitres are currently released daily as an interim environmental flow

What about
environmental flows in the Hawkesbury-Nepean?

The Hawkesbury-Nepean River Management Forum (Forum) has been set the challenging task of developing options and strategies for achieving environmental flows. The Forum's final recommendations will go to the Minister for Land and Water Conservation and the Minister for the Environment in late 2003.

The Forum is composed of representatives from State government agencies, local government, community groups and industry across the catchment. An Independent Expert Panel has been established to advise the Forum about scientific, technical, socio-economic, cultural and heritage matters.

Responding
to the Challenge

In Australia there is much we don't understand about the natural processes of our rivers. So planning and managing a system of environmental flows is an extremely complex business.

Also the total water cycle in the Hawkesbury-Nepean catchment and the related Shoalhaven and Woronra catchments comprises a multitude of extractions and inputs which need to be taken into account.

Any environmental flow regime designed by the Forum will need to balance the needs of a rapidly growing Sydney population with those activities reliant upon a healthy environment for the Hawkesbury-Nepean River. The regime will also need to answer the following issues:

- what volume of water should be released;
- how quickly should the river rise and over what period of time;
- where it will be released from; and
- how the benefits of the flows will be maintained further downstream.

Release of 175 megalitres from Cataract Dam for drinking water supply

For more information on environmental flows or the work of the Hawkesbury Nepean River Management Forum contact Graeme Lindsay on (02) 4577 4243.

WATER FOR PEOPLE, WATER FOR THE RIVER

The Sydney Catchment Authority currently supplies 1700 megalitres a day of water to 4 million Sydneysiders. The SCA also releases up to 58 megalitres a day from all of the water supply dams as an interim environmental flow.

- 1 megalitre = 1 million litres
- 2 megalitres = the water in one Olympic size swimming pool

LAND & WATER CONSERVATION

DLWC (2002) The Source (1) Jun-Aug

APPENDIX E: GENERAL PUBLIC QUESTIONNAIRE & CONSENT FORM

Hawkesbury Nepean Weirs Community Research
Questionnaire

Thank you for taking the time to look at our survey. The purpose of this research is to understand the value of the river and weirs to your local community so that your view may be taken into account when decisions are made about their future. The questionnaire can be posted to the address at the end of this sheet or put into the box in Camden Council's foyer before the end of October. Please see the Information Sheet for more details about the research.

Q1. In what ways do you use the river or area around the river?

How often?

Q2. In what ways do you use the weirs/weir areas?

How often?

Q3. In what ways is the river environment important to you?

Q4. In what ways are the weirs important to you?

THANK YOU FOR YOUR PARTICIPATION

Your comments can be provided by email to isf@uts.edu.au or by mailto ISF, PO Box 123, Broadway, NSW 2007 or by telephone on (02) 9209 4350

Q5. In what ways are the weirs are important to the local community/ history/economy/ environment?

Q6. If there were a proposal for the removal of the weirs, what if any, would be your concerns?

Q7. What kind of action if any, do you think needs to be taken on the weirs?

Q8. If there were a proposal for the removal of the weirs:

a) What information do you think you would need/like to have (if any)?

b) In what way would you like to be part of the decision-making process (if at all)?

Q9. Are you?

☐ Under 18 ☐ 18- 25 ☐ 26- 40 ☐ 41- 60 ☐ 61 and over

Q10. Do you live

☐ Beside the river? ☐ 5 – 10 mins Walking distance?

☐ further away?

THANK YOU FOR YOUR PARTICIPATION

Your comments can be provided by email to isf@uts.edu.au or by mailto ISF, PO Box 123, Broadway, NSW 2007 or by telephone on (02) 9209 4350

REQUEST / CONSENT FORM

I *[please put your name here]* ..... agree to participate in the research project HNEP WEIRS COMMUNITY RESEARCH PROJECT being conducted by the Institute for Sustainable Futures of the University of Technology, Sydney and funded by THE INDEPENDENT EXPERT PANEL for the HAWKESBURY-NEPEAN RIVER MANAGEMENT FORUM (Please see attached information sheet for details).

I understand that the purpose of the research is to identify the values held by river users community members in relation to the weirs on the Upper Nepean River and concerns they have with any potential change or removal.

I understand that my participation will involve a request for information or further contact and if appropriate ISF may provide a response.

I am aware that I can contact TOM BERRY on 9209 4350 if I have any concerns about the research. I also understand that I am free to withdraw my participation from this research project at any time I wish without giving a reason.

I agree that my questions to date have been answered fully and clearly.

I agree that this information request may be published in a form that does not identify me in any way. I have given my name and contact details below in order that ISF may contact me in relation to the HNEP WEIRS Community Research Project.

Signature ..... Date .....

Contact Details:

.....
.....
.....
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.....
.....

Information Requested:

.....
.....
.....
.....
.....

Note:

Studies undertaken by the Institute for Sustainable Futures have been approved in principle by the University of Technology, Sydney, Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research you may contact the Administrator, ISF, [Tel 02 9209 4350] or the UTS Ethics Committee through the Research Ethics Officer, Ms Susanna Davis [Tel: 02 9514 1279]. Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

APPENDIX F: COMMUNITY GROUP INVITATION & CONSENT FORM

institute for sustainable futures

University of Technology, Sydney

31 October 2002

Dear XXXX,

I am writing to you because I feel that your group might be interested in taking part in the community research we are undertaking in your area.

The aim of this research is to determine how the local community might be affected by the possible removal of weirs in the Upper Hawkesbury–Nepean River. The NSW government is considering the future of these weirs and has set up an Independent Expert Panel to look at both scientific and community research before making recommendations. This Expert Panel has commissioned the Institute for Sustainable Futures (ISF) to undertake the community research, and we will be doing this throughout September and October, before reporting back to the panel with our findings. Biosis Research, who have previously undertaken a cultural heritage study of the weirs in this area, is assisting ISF.

ISF is an independent research organisation, and is committed to representing a broad range of community values and concerns to the panel. We hope to find out how you use the weirs (if you use them), what they mean to you, and how you feel about their future.

I am enclosing an information sheet, which I hope might answer some of the questions you might have regarding the future of the weirs. Please would you be good enough to make the sheet available to your members (further copies can be obtained by calling ISF on the number below). If there is interest expressed in this issue by your members, and you feel it might be appropriate for us to attend a meeting, then we would be happy to do that.

Thank you for taking time to consider this issue.

Yours sincerely

Jane Miller (Mrs)
Research Consultant

CRICOS provider no: 00099F

Located at: National Innovation Centre, Australian Technology Park, Redfern.
Tel 61 2 9209 4350 Fax 61 2 9209 4351 E-mail isf@uts.edu.au Web www.isf.uts.edu.au Mailing Address: UTS, PO Box 123, Broadway, Sydney NSW 2007

Consent Form

I……(please put your name here)

as a representative from ……

(please put the name of your society or organisation here), agree to participate in the HNEP WEIRS COMMUNITY RESEARCH PROJECT conducted by the Institute for Sustainable Futures (ISF) of the University of Technology, Sydney and funded by the INDEPENDENT EXPERT PANEL for the HAWKESBURY-NEPEAN RIVER MANAGEMENT FORUM.

I understand that the purpose of the research is to identify the values held by river users and community members in relation to the weirs on the Upper Nepean River and concerns they have with any potential changes.

I understand that my participation will involve a written submission or telephone interview, the details of which may be published in a written report, which will be made available to the public. I understand that the report will be used to inform decision-making about the future of the weirs and river management.

I am aware that I can contact TOM BERRY on 9209 4350 if I have any concerns about the research. I also understand that I am free to withdraw my participation from this research project at any time I wish without giving a reason.

I agree to

	my name, and the name of the society or organization I represent, being used in the final report being prepared by the ISF.
	the name of the society or organisation I represent being used in the final report being prepared by the ISF, with my own name withheld.
	the information I have provided to the ISF being used in the final report in a form that does not identify either me personally, and does not identify the society or organisation I represent.

(please tick one of the above boxes)

Signature…….Date……

Note

Studies undertaken by the Institute for Sustainable Futures have been approved in principle by the University of Technology, Sydney, Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research you may contact the Administrator, ISF, (Tel. 02 9209 4350) or the UTS Ethics Committee through the Research Ethics Officer, Ms Susanna Davis (Tel. 02 9524 1279). Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

APPENDIX G: WATER USERS QUESTIONNAIRES

Water Users Survey

1. Which of these weirs do you depend on / come into contact with in your use of the river?

   - Bergins
   - Thurns
   - Brownlow Hill
   - Sharpes
   - Other – please indicate which weir

2. In what ways are these particular weirs important to your:

   - Livelihood? Please Explain

   - Other Activities? Please Explain

3. What would be the economic impacts to you if the weirs were removed in terms of;
   - Crops or livestock impact?

   - Employment (numbers of people) impact?

   - Other economic impacts?

4. What would be the impacts of repair or modification of the weirs?

5. How are the weirs useful / important / beneficial in ways other than being a source of water? (Please state which of the four weirs your comments refer to in particular).

6. What volume of water do you use from these weirs?
   - Bergins
   - Thurns
   - Brownlow Hill
   - Sharpes

WEIR NAME:												
Past 12 months	NOV 01	DEC 01	JAN 02	FEB 02	MAR 02	APR 02	MAY 02	JUN 02	JUL 02	AUG 02	SEP 02	OCT 02
Estimated Volume Extracted MgL/day												

Would you say this was a typical extraction rate?

If not, could you tell us how it varies or has varied over time? (year on year, month on month)

7. How reliable / unreliable has the water supply been from the weirs? Were there any changes if / when a collapse occurred? (Please state which of the four weirs your comments refer to in particular).

8. In what ways has the water quality changed over the past 10/20/30 years, or even further back? (Please provide examples of how it has changed and you may wish to provide examples of your involvement in water/river management)

9. What action, if any, do you think needs to be taken on the weirs?

WEIR	**ACTION REQUIRED**
BROWNLOW HILL	
BERGINS	
SHARPES	
THURNS	

10. What are the other available / potential sources of secure water supply?

11. If a secure source of treated effluent could be provided, what benefits do you foresee AND / OR what concerns do you have?

Benefits?

Concerns?

12. If all of your concerns about treated effluent were alleviated (including cost, *i.e.* if it was free to farm gate and abundant), what would you want from your water in terms of Reliability, Quality, Pressure and Quantity?

13. What do you need / want to know from those doing the scientific / environmental and social research into the weirs?

14. What other information would you like to have? If you would like to be contacted further then please fill a consent form (as attached or as available from ISF)

15. What else could you add that would help the Hawkesbury Nepean River Management Forum make an informed decision that addresses not only environmental flows but also the social, economic, cultural and heritage factors surrounding the river and the Brownlow Hill, Bergins, Thurns and Sharpes Weirs.?

16. How do you think decision-making processes around this issue be improved?

Supported By:

THANK YOU FOR YOUR PARTICIPATION

Your comments can be provided by email to isf@uts.edu.au or by mail to ISF, PO Box 123, Broadway, NSW 2007 or by telephone on (02) 9209 4350.

Assisted By: BIOSIS RESEARCH

Fishing and Recreational Groups Survey

1. Which of these weirs do you depend on / come into contact with in your use of the river?

   - Bergins
   - Thurns
   - Brownlow Hill
   - Sharpes
   - Other – please indicate which weir

2. How often would you use the:

   * The river?

   * The river around the weirs?

3. In what ways are these particular weirs important to your:

   - Livelihood or other activities?

4. In what way do the weirs
    - Help your activities?

    - NOT help your activities?

5. What would be the economic impacts if the weirs were removed:
    - Positive?

    - Negative?

6. What would be the impact of repair or modification of the weirs?

7. How are the weirs useful / important / beneficial in ways other than being a source of water? (Please state which of the four weirs your comments refer to in particular).

8. What type of fish do you observe at these weirs?

    - Bergins
    - Thurns
    - Brownlow Hill
    - Sharpes

Would you say this was typical of the Hawkesbury–Nepean River system or particular to these weirs? (Please state which of the four weirs your comments relate to in particular).

9. In what ways has the water and / or fish quality and quantity changed over the past 10/20/30 years, or even further back?

10. Can you provide examples of how it has changed and of your if any involvement in water / river / fisheries management.

11. Describe how you view the relationship between the weirs and the river.

12. What action, if any, do you think needs to be taken on the weirs?

WEIR	**ACTION REQUIRED**
BROWNLOW HILL	
BERGINS	
SHARPES	
THURNS	

13. What do you need / want to know from those doing the scientific / environmental and social research into the weirs?

14. What other information would you like to have? If you would like to be contacted further then please fill in a consent form (as attached or as available from ISF).

15. What else could you add that would help the Hawkesbury–Nepean River Management Forum make an informed decision that addresses not only environmental flows but also the social, economic, cultural and heritage factors surrounding the river and the Brownlow Hill, Bergins, Thurns and Sharpes Weirs.?

16. How do you think decision-making processes around this issue could be improved?

APPENDIX H: RECOMMENDATIONS OF REPORT FOR PLANNINGNSW

Recommendations of the report for PlanningNSW, *Aboriginal Consultations for Sustaining the Catchment.*

Introduction

The following recommendations draw on the input and suggestions put forward during the consultations and are centred around two mutually supportive goals, namely:

> ***Building the capacity of Indigenous communities to contribute to the better management of the catchment,***
>
> ***while at the same time***
>
> ***Creating opportunities for cultural and economic development amongst those communities.***

This approach is consistent with the vision that is guiding the development of the Regional Environmental Plan which is to have:

> ***Healthy catchments delivering high quality water while sustaining diverse and prosperous communities.***

It is also inherent in the way Aboriginal people traditionally view the environment as an interrelated whole, with environmental, social, cultural, spiritual and economic objectives being seen as complementary. Aboriginal people have a connection to the land and with waterways, and with that comes natural insights into the interrelationships between activities, communities and the environment. Consultation, planning and management strategies need to look across functional and institutional boundaries in the same way.

In keeping with this approach, implementation of the recommendations of the McClellan report relating to water quality should not be undertaken to the exclusion of complementary objectives and strategies in other areas. In other words, the second limb of the Government's vision for the catchment should be actively pursued in tandem with the first.

Thus, while the following recommendations have, for convenience, been grouped under broad topic areas, they cut across all key areas - environmental, social, cultural, spiritual and economic. They have not been limited to the areas directly addressed in the Regional Environmental Plan, but also take in related areas of Government policy and environmental management.

Working together generally

It is recommended that:

R 1 The State Government provide a commitment to the full and consistent involvement of Aboriginal people in the development of proposals for the catchment;

R 2 Government proposals and processes that attempt to protect or otherwise impact on Aboriginal interests be developed with the close involvement of Aboriginal people;

R 3 The State Government recognise the potential contribution of Aboriginal people to better catchment management and pursue opportunities to work in partnership with Aboriginal communities;

R 4 Principles and protocols be agreed between Aboriginal people and the State Government to guide consultations and future relationships in a manner that respects Aboriginal people and their potential contribution to better catchment management;

R 5 The State Government ensure adequate opportunities and resources are provided to allow the review of impacts of Government proposals on Indigenous people.

Government processes and future relationships

It is recommended that:

R 6 The State Government promote improved co-ordination between the activities, plans and legislation of agencies involved in catchment management;

R 7 Preparation of the Regional Environmental Plan and associated documentation not be viewed as the end of the planning process, or of the need to work with local communities in catchment management;

R 8 The State Government identify, and communicate to stakeholders, future processes to guide future decision making for the catchment;

R 9 The State Government ensure adequate resources are available to enable the effective participation of Indigenous communities in the planning and management of the catchment on an on-going basis;

R 10 The State Government adopt strategies to raise the profile of Aboriginal issues amongst Government agencies, and where appropriate, encourage these agencies to act as advocates for Indigenous issues relating to the catchment;

R 11 The State Government take steps to secure on-going Indigenous representation on the Board of the Sydney Catchment Authority.

Protecting water quality and managing the catchment

It is recommended that:

R 12 The State Government undertake a review of the implementation of Rectification Action Plans within two years, and ensure that if the voluntary approach to implementation is ineffective in controlling adverse water quality impacts that alternative strategies be put in place;

R 13 The State Government examine the option of broadening of the approach to Rectification Actions Plans so that they can take in related objectives eg improving access to and protection of Aboriginal sacred sites;

R 14 The State Government examine widening the application of the approach used in green/pollution offsets to facilitate the provision of social justice and cultural offsets, eg where public or private proposals involve the alienation of Aboriginal resources in special areas, offsets could take the form of improved access to sacred sites elsewhere, assistance with identification of suitable areas for aquaculture, or targeted training and employment programs.

Aboriginal heritage protection

It is recommended that:

R 15 The State Government, in close consultation with Indigenous communities, review the effectiveness of current processes, plans and strategies aimed at protecting Aboriginal cultural heritage in and around the catchment, and identify areas for improvement;

R 16 The State Government examine opportunities that may be available under the Regional Environmental Plan or Special Area Plans of Management to re-establish access for Indigenous communities to sacred sites or other areas of Aboriginal cultural heritage where such access has been lost;

R 17 The State Government examine opportunities that may be available under the Regional Environmental Plan or Special Area Plans of Management to protect sacred sites or other areas of Aboriginal cultural heritage by restricting access by the general public or other measures;

R 18 The State Government actively discourage land management practices that restrict access by Indigenous people to sacred sites or other areas of Aboriginal cultural heritage;

R 19 All environmental management proposals involving reduced access by Indigenous people to sacred sites or other areas of Aboriginal cultural heritage be closely scrutinised by Government, with expert advice from the Aboriginal community, prior to implementation, and any such

strategies only be put in place where they are crucial to achieving agreed environmental objectives;

R 20 The State Government provide appropriate training and resources to enable Aboriginal communities to become more expert and active in identification of sacred sites;

R 21 The State Government review the effectiveness of government processes aimed at protecting cultural heritage, such as the National Parks and Wildlife Service Register of Sites (confirm name), to ensure that they can be relied upon by Aboriginal people;

R 22 The State Government provide assistance to Aboriginal communities, where required, to secure sites under threat.

Cultural awareness

It is recommended that:

R 23 A program be developed to promote Aboriginal cultural awareness amongst government agencies, local government, farmers and other land managers within the catchment;

R 24 The State Government examine opportunities within the catchment to facilitate cultural development amongst Aboriginal people.

A partnership approach to better catchment management

It is recommended that:

R 25 A partnership approach be developed between Indigenous communities and Government to achieve better catchment management, while providing tangible benefits to Aboriginal people;

R 26 The partnership approach draw on the environmental management expertise and knowledge available within Indigenous communities in the catchment and the ability for local communities to play an active role in enforcing licensing conditions, identifying breaches of environmental standards, and implementing environmental management schemes;

R 27 In developing the partnership approach, opportunities be examined to promote economic, social and cultural development of Indigenous communities within the catchment, for example by identifying appropriate eco-tourism strategies or suitable sites for aquaculture;

R 28 The partnership approach incorporate realistic career development opportunities for Aboriginal people related to natural resource management within the catchment.

Assistance in participating in planning process

It is recommended that:

R 29 The State Government ensure Indigenous communities within the catchment are adequately resourced to respond to the draft Regional Environmental Plan and any associated strategies or documents;

R 30 The State Government ensure Indigenous communities within the catchment are adequately equipped to meet the environmental planning requirements to be incorporated in the Regional Environmental Plan and elsewhere when preparing development proposals for the benefit of local people;

R 31 The State Government commit to undertaking Stage 2 of the consultation process including confirmation of the findings of this report and development of an on-going framework for participation;

R 32 That Stage 2 of the consultation process commence during the public exhibition period for the Draft *Sustaining the Catchments* Regional Environment Plan.

Source:

Kenney, S., & Richardson, R., (2002) *Aboriginal Consultations for Sustaining the Catchments, Draft Regional Environmental Plan (Draft Report),* Beyond Consulting for Department of Planning (PlanningNSW), August 2002.