

IN THE MATTER OF

the Resource Management Act
1991

AND

IN THE MATTER OF

applications by Central Plains Water
Trust to:

Canterbury Regional Council for
resource consents to take and use
water from the Waimakariri and
Rakaia Rivers and for all associated
consents required for the
construction and operation of the
Central Plains Water Enhancement
Scheme

Selwyn District Council for resource
consents to construct and operate
the Central Plains Water
Enhancement Scheme

AND

IN THE MATTER OF

a notice of requirement by Central
Plains Water Limited to:

Selwyn District Council for the
designation of land for works
associated with the construction and
operation of the Central Plains
Water Enhancement Scheme

BRIEF OF EVIDENCE OF CLAIRE MARGARET MULCOCK

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QUALIFICATIONS AND EXPERIENCE

1. My full name is Claire Margaret Mulcock.
2. I am a director of Mulgor Consulting Ltd, an environmental management consultancy, based in Christchurch. I have practised as a resource manager / hydrologist since 1976, as a consultant and for both government and non-government organisations. My area of particular expertise is in land and water resource management, particularly in rural communities. I am authorised to give this evidence on behalf of the Applicant.
3. I have the following qualifications: B.Sc. (Chemistry) and M.Sc. (Resource Management), both from the University of Canterbury. I also hold the Graduate Certificate in Hydrology (University of New South Wales). I am a member of the Australasia-Pacific Extension Network, the Environment Institute of Australia and New Zealand and Institute of Directors in New Zealand Inc.
4. I have been involved in many projects that link providers of scientific research with the research users. I have been R&D Manager for Merino NZ Inc (the industry good organisation representing all merino growers) for the last 5 years. I develop farmer ideas into projects, obtain funding, contract and manage the work and arrange dissemination of results.
5. I have been involved in RMA statutory processes including as a member of the special tribunal to hear and report on an application for a Water Conservation Order on the Rangitata River and as a member of the Waitaki Water Allocation Board to develop and approve a regional plan to provide for the allocation of water in the Waitaki Catchment. I am very familiar with the difficulties of writing statutory provisions that can achieve the desired environmental outcomes, are able to be practically implemented, and are sufficiently flexible to accommodate improved knowledge or technological advances.

6. I have governance experience as a Director of Landcare Research Ltd (1999-2003) and in my own business; and as a Trustee for Rural Futures Trust and Central Plains Water Trust¹. I chaired the advisory committee to the South Island high country 'Rabbit and Land Management Programme' for most of the programme's duration.
7. One of my other areas of particular expertise is in consultation and facilitation. I am familiar with the difficulties of trying to bring together the expertise and opinion of different groups and individuals so that there is clear understanding and resolution of different issues and objectives.
8. In preparing my evidence I have reviewed:
 - (a) The Code of Conduct for Expert Witnesses and I agree to comply with it. I have complied with its requirements in the preparation of my evidence;
 - (b) The Applicant's resource consent application and the Central Plains Water Enhancement Scheme: Assessment of Environmental Effects for Resource Consent applications to the Canterbury Regional Council;
 - (c) Other reports or relevant documents:
 - Evidence of Ian Brown (on auditable farm plans);

SCOPE OF EVIDENCE

9. I have been asked by the Applicant to prepare evidence in relation to the environmental management system (EMS) approach proposed as part of the Central Plains Water Enhancement Scheme (CPW).

¹ I served one term as a Trustee of Central Plains Water Trust. My term ended on 30 June 2005.

10. Specifically, I will describe the background to the environmental management system (EMS) approach and then cover the development and proposed implementation of the CPW:
 - (a) “Sustainability Protocol”; and
 - (b) “Farm Plan for Sustainable Irrigated Agriculture” template.
11. The Sustainability Protocol (Appendix 1) and draft template for individual Farm Plans (Appendix 2) for CPW have been produced as a case study in the development of a generic scheme management plan and environmental farm plan template that have been specifically designed to provide an environmental management process for irrigation schemes.

Environmental management arrangements

Background

12. The environmental management approach that I am going to describe has been developed through a project that seeks to produce a robust generic methodology that takes a rigorous approach to implementing and documenting sound environmental management at the farm level, coupled with strong leadership by the irrigation scheme management. This includes supporting farm families to improve their knowledge and understanding of the effects of their activities, as well as setting out the reporting, audit and compliance requirements for the scheme’s water users. This generic approach has then been tailored to CPW.

National Drivers

13. The approach takes the direction promoted by recent national policy discussion documents including the Parliamentary Commissioner for the Environment’s ‘Growing for Good’ reportⁱ (2004) and “Freshwater for the Future: a supporting document for the Government’s Sustainable Water Programme of Action” (2006)ⁱⁱ. These reports both look towards the need to achieve irrigation

performance in NZ that is clearly sustainable. “Growing for Good” signals clearly that if New Zealand wishes to remain competitive in the food and fibre industries and become more environmentally sustainable then it is not ‘business as usual’ for our land-based enterprises. The report focuses on the importance of two key inputs to farming productivity – nitrogen fertiliser and irrigation water. It notes that although these are fundamental to agricultural production, they also have major potential to result in adverse impacts. Therefore NZ must find innovative new directions for managing these vital inputs.

14. “Freshwater for the Future” points, among other matters, to the need for more efficient water use and catchment management, including more accurate information on water takes and use, and improved management of undesirable effects of land-use on water quality. It identifies the need to ensure that tools and knowledge developed from science are integrated into individual rural business decisions.

“Irrigation Scheme Sustainability” project

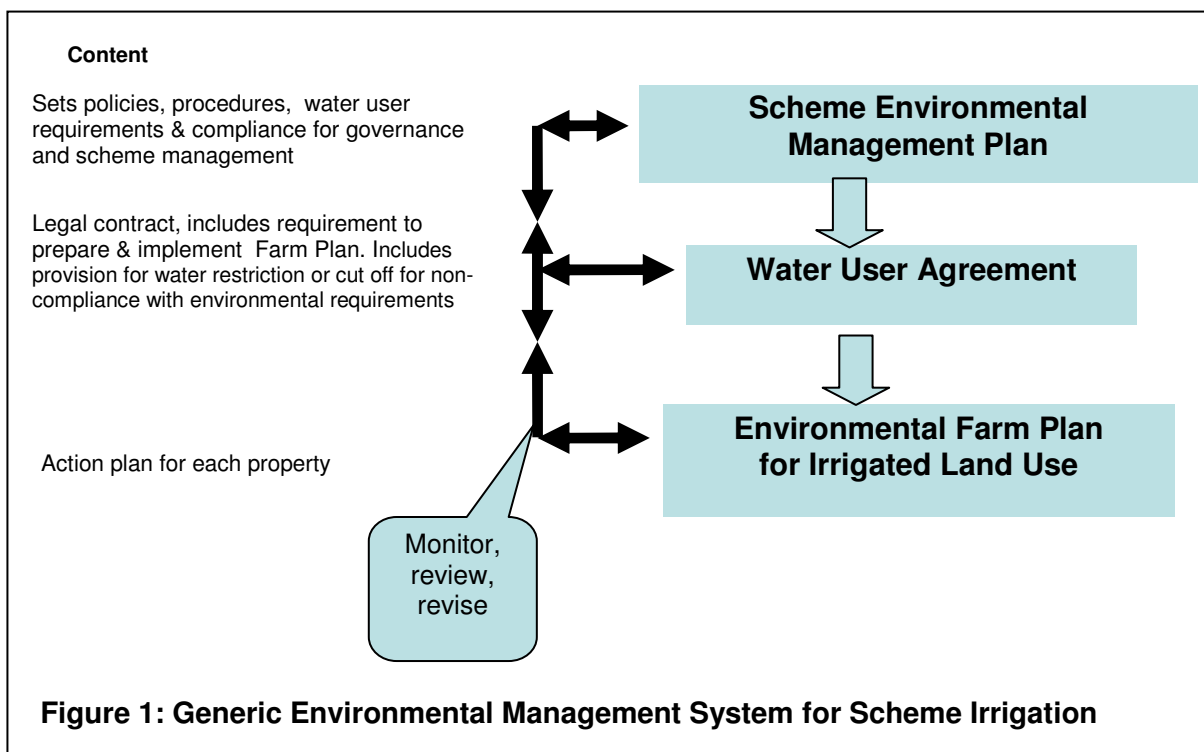
15. The Ritso Society Inc., a farming and community group in central Canterbury, is leading a project² that has the objective of developing a realistic, practical plan for sustainable management of irrigated agriculture, by bringing together the wide range of recent information already available or being developed in relation to 'best practice' technical, environmental and economic aspects of irrigation. The approach is pro-active and preventative and aims to show that irrigation and intensification of land use can occur in ways where both economic wealth is increased and high environmental standards are maintained. The group recognises that irrigation schemes and irrigating farmers need to show that they are maintaining high environmental standards, and that community irrigation schemes can support farmers in achieving best practice irrigation through adoption of new technology and research findings.

² “Irrigation Scheme Sustainability Code” Sustainable Farming Fund (Ministry of Agriculture and Forestry) Grant 05/117 to The Ritso Society Inc. (www.ritso.org.nz).

16. The project was initiated because of the lack of a systematic approach for irrigation schemes in New Zealand to demonstrate to regulatory authorities and the wider community how they are achieving sound on-farm and scheme-wide environmental management. In addition, scheme management and water users needed a clear process for understanding and implementing best practices to achieve environmental and production goals related to irrigated land uses. The intention is to make sure that best practice environmental management is part of normal farming business and that both water users and scheme managers can demonstrate with a high degree of proof how they are achieving environmental stewardship, while maintaining flexibility for innovation in the farm enterprises.
17. I identified the need for this work during my term as a trustee of the Central Plains Water Trust. In considering how this Trust could ensure sound environmental management, I found that there were a number of recent technical studies on water use and water management, including quality and quantity aspects, but no formal process for implementing these at a scheme or farm level. Having initiated the study and procured funding, I have been responsible for developing the overall framework and the governance and management level processes. I have also assisted colleagues with the individual farm plan template development.
18. The Ritso Society approach is for the irrigation scheme operator to require each water user to prepare and implement an environmental farm plan relating to the irrigated land use on their property. This plan must be in accordance with the irrigation scheme operator's own environmental management policies and plan.
19. This project has been funded by Sustainable Farming Fund (MAF), Central Plains Water Ltd and The Ritso Society Inc. Other parties have provided expertise and opinions, mainly through consultation on draft documents. Those consulted include technical experts in

water management, irrigation and farming, Water Rights Trust, Ngai Tahu and Fish and Game.

20. Figure 1 shows the relationship between the components of this process and summarises the contents of each document.



21. The generic 'Scheme Environmental Management Plan' sets out the governance and management policy for environmental responsibility in a formal scheme 'Sustainability Policy' that provides the principles that commit the scheme to responsible environmental action. The plan then describes how the scheme operator will implement its Sustainability Policy including:

- (a) Scheme level (governance and management) activities and responsibilities, including

- the process for preparing, approving and reviewing individual environmental farm plans
 - provision of skills and training for water users
 - reporting to users, regulatory authorities and wider community;
- (b) responsibilities and requirements for individual water users;
- (c) process for ensuring water user compliance, including enforcement measures.
22. The generic 'Environmental Farm Plan for Irrigated Land Use' requires each user to develop, implement, review and update an individual environmental farm management plan specific to the land being irrigated and the particular business enterprise. The scheme managers provide a template for the Farm Plan, and both workshops and individual support to assist each water user produce their own plan.
23. The Ritso Society project identified that the Farm Plan template needs to:
- (a) be straight forward, yet effective;
 - (b) be suitable for all farming activities;
 - (c) promote best practices and aim to make 'best practice' into 'normal practice';
 - (d) address issues relevant to irrigated land uses;
 - (e) provide the scheme operator with a process to ensure that on-farm environmental effects are being managed.
 - (f) be consistent with requirements of other farm plans (e.g. sector specific quality assurance);
24. The Farm Plans provide a risk management approach to environmental protection and enhancement on irrigated farms. The

template is designed so that it can be adapted for each farm business. Many of the requirements will have both economic and environmental benefits. This Farm Plan is specific to irrigated agriculture and addresses related management issues. It is not intended to be a 'whole farm' plan, and therefore does not deal with issues such as animal welfare, occupational safety and health, or business planning.

25. The Environmental Management Plan and the Farm Plans are linked through explicit requirements in the contractual arrangements between the scheme operator and the user for water supply (referred to as the 'water user agreement'). This supply agreement needs to set out the obligations to prepare and implement the farm plan, keep records, and comply with the review, audit and enforcement procedures. It would also include provision for water supply to be reduced or cut off for non-compliance with environmental management provisions.
26. The use of this process can be reflected in a scheme's consent conditions with the processes for consultation and sign off of both the Scheme Environmental Management Plan and the template for the Farm Plan being detailed rather than specific controls, such as fertiliser or stock number limitations. This recognises that different farm enterprises and topography require different best management practices to achieve good environmental outcomes.
27. This methodology is based on using an Environmental Management System (EMS) approach and embodies a feedback loop for adaptive management ('learning by doing').

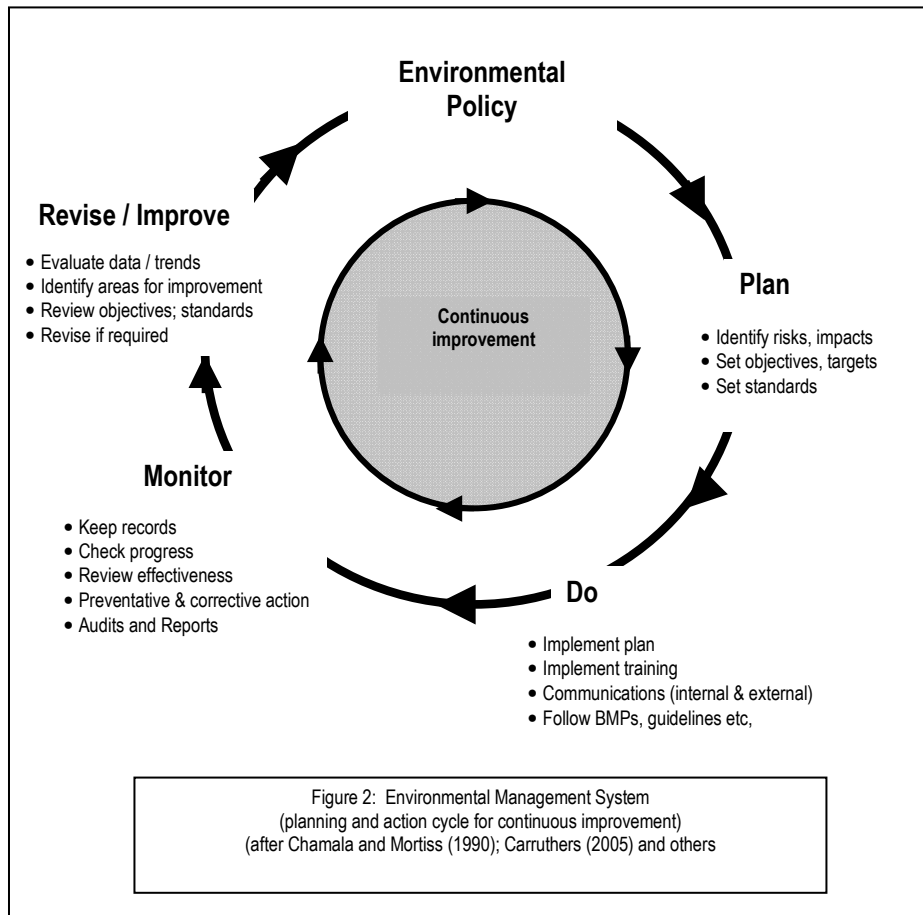
EMS methodology

28. An environmental management system (EMS) is a systematic approach that any enterprise can use to identify and manage the effects of its activities on the environment and to continuously improve its business management to achieve efficiencies and better environmental outcomes. An EMS can be integrated with, and build

on, other tools such as best management practices (BMP), Codes of Practice, standards, product certification and quality assurance (QA). An EMS sets the organisation's goals for environmental performance and a plan for achieving those goals.

29. An EMS is an ongoing cycle of planning, implementing, reviewing and improving the actions that an organisation undertakes to manage its impacts on the environment. With an EMS approach the organisation undertakes to meet both its own environmental objectives and, where applicable, externally regulated, environmental obligations. The EMS methodology was developed by business and industry to systematically identify and incorporate environmental management within a particular organisation. Figure 2 shows a schematic diagram of an EMS. It incorporates a cycle of activities comprised of five stages:

- (a) making a **commitment** to manage one's environmental impacts
- (b) **planning** for management of the environmental impacts
- (c) **implementing** a plan to manage the impacts
- (d) '**checking**' that operations are proceeding according to plan, and
- (e) **reviewing** the whole process from time to time to ensure that the system and its plan are appropriate and the assumptions on which it is based are correct and changing your actions accordingly.



30. The EMS management cycle can most easily be summarised as a flexible 'Plan, Do, Check, Act' process that an organisation can use to improve and demonstrate their overall environmental performance. Although well-recognised in other industries, the adoption of formal EMS in agriculture is relatively new.
31. Two internationally recognised EMS programmes are the ISO 14001 Standard (ISO 1997) and the European 'EMAS' (Eco-Management and Audit Scheme Regulation) which many European countries require their large manufacturing facilities to implement. EMAS is similar to ISO 14001 but has 2 additional requirements: a baseline environmental assessment and a public environmental performance report.
32. The Australia and New Zealand Standard for EMS (AS/NZS ISO 14001: 1996) is identical to ISO 14001. EMS is defined as:

...The part of the overall management system that includes organisational structure, planning activities, responsibilities, practices, procedures and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy (Standards Australia 1996a).

33. ISO 14001 is an internationally recognised standard for certification of environmental management. Certification involves a third party audit by an accredited body. The ISO 14001 standard was developed largely by secondary industry and regulators, and has been perceived by small/medium enterprises, including in the agriculture industry sector, that it is 'too hard', 'too complex' and 'too expensive'ⁱⁱⁱ. Despite these views on the use of ISO 14001 by individual farm enterprises and other agricultural industries a number of certifications have been achieved in Australia and New Zealand, especially by groups in order to reduce the certification and audit costs. E.g. a North Otago farmer group (NOSLAM) with a range of farm types has achieved 14001 certification. In NSW, Colleambally Irrigation Ltd obtained ISO 14001 certification in order to be able to demonstrate to the public that they are managing scarce resources responsibly.
34. Note that I am not recommending that irrigation scheme managers need to go down the track of becoming ISO 14001 accredited, although they could if it was deemed to be beneficial to their water users in marketing their products.

Features of an EMS

35. There are number of features that are a required for an effective EMS:
 - (a) An environmental policy that sets out the organisation's commitment to environmental management;
 - (b) Planning to implement the environmental policy;

- (c) Implementation and operation of specified objectives and targets;
 - (d) Checking and corrective actions to measure and track performance;
 - (e) Regular review by 'top management' to ensure its ongoing suitability, adequacy and effectiveness;
 - (f) Continuous evaluation and improvement.
36. An EMS may highlight knowledge, training, data, research and resource needs. Minimum requirements are to address all applicable legislation, but moving beyond compliance is encouraged by the 'continual improvement' concept. If there is a need to meet certain operating requirements (due either to regulatory or customer demand) then the EMS process can be used to achieve these outcomes. By using a process-based approach, an EMS encourages innovation, as it does not focus on pre-determined ways to achieve specific environmental outcomes. Because an EMS is a process standard, it can be used to integrate relevant product and performance standards, including those specified in BMPs and Codes of Practice, where they exist.

EMS in New Zealand and Australian Agriculture

37. Generally the EMS approaches that have been developed for agriculture in NZ and Australia have been designed as 'process' standards that can be readily integrated with other on-farm management processes and records that landholders may already maintain, such as financial accounts, food safety, occupational health and safety, and quality assurance. In fact EMS can help integrate these other processes. EMS approaches may also have product or production-oriented standards that define how a product is produced, or a mix of process and product standards.
38. In Australia use of EMS in agriculture, both on-farm and in agricultural industries is promoted and supported at government

level ('Australia's National Framework for Environmental Management Systems in Agriculture' 2002), whereas in NZ use of EMS has been primarily market driven and developed by the sector concerned. In both countries the use of an EMS process is voluntary.

39. EMS of various types are increasingly being adopted for agriculture, especially in Australia where the Australian government has recently completed a 3 year \$8.5m EMS National Pilot programme to support primary producers to trial and further develop the potential of EMS in agriculture. Fifteen pilot projects were trialled across a range of regional, industry and supply chain contexts. Some of the industries already have BMPs or codes of practice (e.g. cotton & rice industries for pesticide use) and are looking to move to a more comprehensive EMS approach that could be certified if desired. Some of the issues that arise with implementing EMS at farm enterprise level (e.g. lack of information, training requirements etc) can be more readily addressed with a sector approach or, in this case, by the irrigation scheme.
40. A number of the farm environment related codes of practice and guidelines developed in New Zealand take the EMS 'plan, act, review, revise' approach. For example: the "Code of Practice for Nutrient Management (with emphasis on fertiliser use)" (which supersedes the CoP for Fertiliser Use); the kiwifruit industry "KiwiGreen" and wine grape "Sustainable Winegrowing New Zealand" program. The North Otago Irrigation Company Ltd (NOIC) has a mandatory Environmental Farm Plan and audit process required by their consent conditions, but this does not appear to be linked in to a scheme environmental policy or plan. Mr Brown will describe the NOIC programme in his evidence.
41. An EMS process is suitable for a (large) irrigation scheme, such as CPW, to use as its approach to environmental management because:

- (a) An irrigation scheme needs to demonstrate commitment to sound environmental management, and have a process for ongoing mitigation and improvement;
- (b) Water users in a large irrigation scheme will be involved in a range of land uses, with different sized enterprises and scales of operation which will require specific environmental management actions to meet overall environmental goals and objectives;
- (c) Some growers will have existing sector or product specific quality assurance programs or product standards to meet and this approach can incorporate these without duplication;
- (d) Significant current investment in R&D is expected to refine or revise best practice information (e.g. nutrient management; riparian management) and provide new technology for farm enterprises (e.g. irrigation scheduling tools), within the next 5 – 10 years;
- (e) The extent of some effects of the scheme development and operation will only be clear post-development when the range of management options can be clarified;
- (f) Training and support to implement on-farm plans can be facilitated at scheme level;
- (g) Scheme management can provide a range of support services including policy development, technical support, regulatory and other reporting.

Typical family farms do not have the management resources to implement complex systems on their own, and even large farms will be seeking management systems that avoid duplication.

42. With the EMS approach there are opportunities for farm businesses to be innovative in both their land use enterprises and their environmental management. The EMS approach also provides a

continuous, rather than discrete adoption of new practices / technologies.

Codes of Practice and Guidelines for Irrigated Land Use

43. Because EMS is a process, existing (and new) codes of practice and other best management practice (BMP) guidelines can readily be incorporated. There are many existing codes of practice, quality assurance systems and other guidelines for achieving sound environmental management on-farm through use of appropriate management practices. These have been developed for New Zealand farm systems, generally with extensive consultation.
44. Some of these are sector or product specific (e.g. pork, dairy, kiwifruit, blackcurrants). Others are general and relate to specific activities such as fertiliser use or waterway management. In developing the generic farm plan template the Ritso Society project discovered that there are so many of these BMP codes and guidelines that we decided to refer only to those that are not specific to a particular primary sector, with the exception of the 'Dairying and Cleans Streams Accord'. Growers would be expected to implement their own sector or product specific codes, quality assurance or Best Management Practice systems and documents according to market or processor requirements. The 'Dairying and Cleans Streams Accord' has been included because the focus is on waterways, rather than dairy produce.
45. Rather than summarise or incorporate material from the various codes and guidelines into the generic Scheme Plan and Farm Plan template the Ritso Society project considers that it is more appropriate to reference or link the source material. This avoids errors and will make it more straightforward to ensure that updates are incorporated as they are produced. The general codes and guidelines that the Ritso Society project has included all provide practical approaches to managing key environmental issues. They include:

- (a) Irrigation Design Code of Practice and Irrigation Design Standards (Irrigation NZ)
- (b) Irrigation Evaluation Code of Practice (Irrigation NZ)
- (c) Code of Practice for Nutrient Management
- (d) Spreadmark Code of Practice for the Placement of Fertiliser in New Zealand
- (e) 'GROWSAFE' - Agrichemical Use
- (f) Dairying and Clean Streams Accord
- (g) "Guide to managing waterways on Canterbury farms" & companion guides "Lowland Plains, Streams and Drains" & "Hill Country Streams".

Further information on these codes is provided in Appendix 3.

CPW Environmental Management System

- 46. The EMS process for irrigation schemes being developed in the Ritso Society project 'Irrigation Scheme Sustainability Code' described above and shown in Figure 1 has been adopted by CPW. The Applicant has refined the process to make it specific to CPW. The overall approach remains the same as that designed through the Ritso Society project. Similarly, the proposed Hunter Downs Irrigation Scheme has tailored the generic plans to produce draft plans for their scheme.
- 47. The Applicant proposes to call their documents:
 - (a) 'Sustainability Protocol' and
 - (b) 'Farm Plan for Sustainable Irrigated Land Use'
- 48. CPW proposes to include appropriate provisions in the water supply agreement with users, to ensure that its environmental management processes are implemented and can be enforced. Figure 3 shows the relationship between the various components in the CPW

environmental management approach, and includes linkages to the draft consent conditions for CPW.

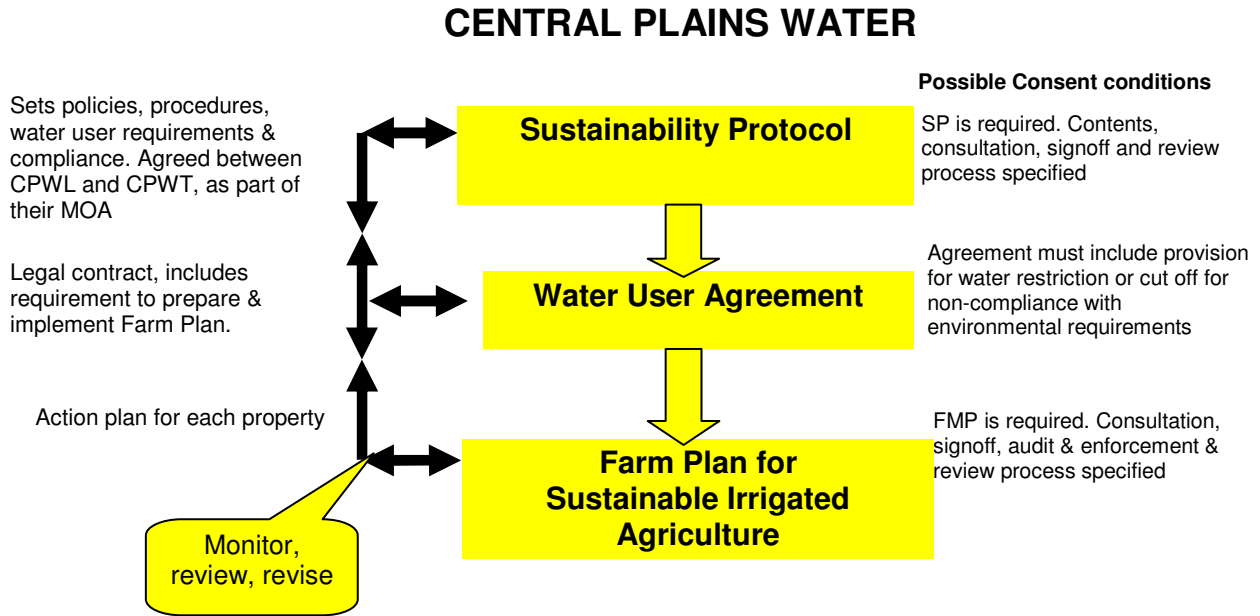


Figure 3: Outline of the CPW EMS

49. Table 1 summarises how features in the CPW Sustainability Protocol (SP) and Farm Plans (FP) provide the components of an EMS.

Table 1	
EMS feature	CPW implementation
<i>Environmental Policy</i>	SP ³ section 2 “Sustainability Policy”
<i>Planning for implementation</i>	SP identifies key environmental issues, FP ⁴ process; role of CPW Trust
<i>Implementation and operation</i>	SP sets out: Responsibilities; Focus areas; FP preparation; training; review & audit; compliance
<i>Checking and corrective measures</i>	Internal and external reviews and audits; compliance and enforcement; training
<i>Review</i>	Liaison group inputs; FP template reviews; scope to require users to update plans and best management practices

Sustainability Protocol

50. The draft Sustainability Protocol for CPW provided in Appendix 1 sets out the environmental policy and planning for the EMS for CPW. This draft focuses on the water use issues, however the final plan would also include operational management matters related to the water take, including fish deflection.
51. The Sustainability Protocol recognises that the consent holder (CPWT) needs to have formal arrangement for environmental management, as part of its Memorandum of Agreement with CPW Ltd to operate the scheme.

Scheme Sustainability Policy

52. The ‘Sustainability Policy’ (section 2) states the CPW environmental responsibility policy.

³ Sustainability Protocol

⁴ Farm Plan

Scheme Operation

53. Section 3 of the Sustainability Protocol sets out operational matters including

- Operational Management responsibilities
- Information provision by CPW for users
- Reporting

It is envisaged that these sections would become more detailed as scheme design advances.

54. Internal and external communications and reporting are an integral component of EMS implementation. CPW proposes the following formal reporting:

- Annual Environmental Compliance Report (includes Farm Plan audit report)
- Sustainability Report (after the scheme has provided water for 2 years)

55. The Sustainability Report would be made publicly available. In addition, water users would receive feedback reports following reviews and audits of the Farm Plan.

56. The Central Plains Water Trust also provides formal communication and liaison links with the wider community.

Key issues for CPW Environmental Management

57. The key issues that were identified as focus areas in the generic scheme plan development have been confirmed by the Applicant through the AEE process as those relevant to this scheme. The focus areas for environmental management for CPW (Sustainability Protocol section 4.2) are:

- Kaitiakitanga (guardianship);

- Biodiversity & ecosystem information and management;
 - Efficient Water Use;
 - Water Quality;
 - Water Quantity: flows and levels;
 - Local Communities
 - Resource use – energy and waste.
58. CPW proposes a suite of environmental programmes to address the focus areas. Each programme addresses issues identified in more than one key focus area. The proposed programmes that will be implemented are:
- (a) An Environmental Farm Plan programme, including providing training and support, relating to implementation of sustainable irrigated agriculture
 - (b) An Environmental Fund programme
 - (c) Water quality, flow and level monitoring and management
59. The Sustainability Protocol sets out the initial framework for the implementation and operation of the programmes. Later in my evidence I will describe the CPW Farm Plan programme and the Environmental Management fund. Other witnesses will cover the water monitoring programme.

Compliance and enforcement

60. Monitoring and evaluation includes keeping records of activities and conditions. This is an integral component of an EMS. The Sustainability Protocol outlines how CPW will implement this both at the scheme operation level and with individual water users.

Review and improvement (adaptive management)

61. Section 4.4 of the Sustainability Protocol covers adaptive management. The Sustainability Protocol sets out the process for learning from information gained through monitoring and management actions and using that learning to make improvements both at scheme level and at farm level. In the implementation of their Sustainability Protocol, CPW management would regularly check whether they are satisfied that the scheme is effectively addressing issues and potential areas for improvement are being identified and actioned. The Sustainability Protocol would be revised as required.
62. The EMS approach incorporates a feedback loop that provides for 'continuous improvement'. This provides the basis for the adaptive management - "learning to manage by managing to learn" (Bormann et al, 1993). It recognises that there are inherent uncertainties in our understanding of catchment processes, water user priorities, and the effects of the scheme operation. Knowledge about complex natural systems continues to change, natural systems are themselves dynamic, community expectations and priorities also change. Therefore scheme management systems need to be flexible and able to evolve.
63. In summary, the philosophy of *adaptive management* is followed where policies and practices are continually revised by learning from the outcomes of previous work. The process is iterative and aspects of the management processes are revisited and reviewed.

Environmental Farm Plan Programme

64. CPW will require each water user to prepare and implement a Farm Plan for their irrigated land use. CPW's farm plan programme includes:
 - Providing users with the template for development of individual enterprise Farm Plans for Sustainable Irrigated Land Use;

- Setting scheme standards for on-farm environmental management;
- Assisting water users to prepare their plans through workshops and individual support;
- Carrying out a formal process for approval, review and audit of the plans and their implementation;
- Implementing compliance and enforcement procedures;
- Provision, by CPW, of training and education related to sustainable irrigated land use;
- Provision, by CPW, of information to assist in managing water use, where there are benefits to providing this scheme-wide (e.g. climate information).

Codes of Practice and Best Management Practice Guidelines

65. The CPW Farm Plan Template adopts the codes and guidelines set out in the generic farm plan, and described in Appendix 3. These are recognised as industry best practice techniques.

Farm Plan template

66. The CPW Farm Plan template is based on work to date in the Ritso Society “Irrigation Scheme Sustainability” project. In the wider project, case studies are now underway to refine and further develop the template to make it practical to use, appropriate for recording actions, problems and remedies and to ensure that it is auditable. Experience gained from the NOIC first-year farm plan audits has been incorporated and two farm plans are being developed as case studies. Mr Brown in his evidence discusses the lessons from NOIC that are relevant to CPW.
67. The CPW Farm Plan template covers 7 topics, identified as the key environmental management issues related to the on-farm effects of irrigated land use. They are:

- Irrigation management
 - Soils management
 - Nutrient management
 - Collected animal effluent management
 - Biodiversity & ecosystem management
 - Waterway and riparian management
 - Agrichemical Management
68. Each of the management areas covered in the CPW plan has a similar template covering:
- Specific Management objectives
 - Key concerns / impacts
 - Scheme management requirements
 - Best management practices (These need to be further defined for each individual farm)
69. For each topic the Farm Plan template sets out the management objective, and the key problems that the water user will avoid, remedy or mitigate. It then lists the CPW 'requirements' . These are matters that are mandatory for water users to achieve. The next section lists the key areas where water users need to implement best practice to manage potential environmental impacts. Each user must consider each aspect in relation to their specific property (e.g. soil type, slope, irrigation method, irrigated area, land uses) and determine how they will achieve best practice and what monitoring and records they will use to show their achievements. For example soil moisture measurements in a cropping system may be through use of an irrigation consultant who provides a measurement and analysis service, whereas pasture systems for dairy may have

permanent soil moisture equipment (e.g. Aquaflex) that is monitored by farm staff.

70. CPW, through its commitment to provide training and support, would ensure that water users have up-to-date information (e.g. through workshops) so that they can use best practices to achieve both production and environmental goals.

Irrigation management example

71. To demonstrate how the approach would work, I will cover in further detail one topic from the Farm Plan template: 'Irrigation Management'. An example of a partially completed Irrigation Management section of a plan for a dairy farm is attached as Appendix 4.
72. I have selected this example because the scheme requirements and best practices for 'Irrigation Management' are fundamental to achieving good environmental outcomes at the scheme level. Achieving efficient and effective water use will reduce the likelihood of other problems occurring and will reduce irrigators' costs.

Irrigation Management Objective

73. The stated objective is that each water user uses water efficiently, minimising runoff and drainage. The key concerns arising from poor irrigation management include:
 - wasteful use of water e.g. ponding of irrigation water
 - inefficient application
 - drainage to other properties
 - irrigation during/after rainfall, or when significant rain is forecast

'CPW Requirements'

74. Good design of on-farm systems has been identified as the key to achieving efficient water use and minimising ponding and runoff that

create undesirable adverse effects. The Irrigation New Zealand Design Code of Practice (formally released in September 2007) has been developed so that there are standards as well as a training programme leading to certification for designers. In addition to requiring water users to use certified designers, designers would also be required to be accredited to design for CPW. This would ensure that designers were familiar with the local soils, topography, climate etc.

75. While design is critical, poor management and operation of the irrigation system can also reduce efficient use of water. Evaluating systems and their management, using the Irrigation Evaluation Code of Practice enables users to either demonstrate that their practice meets or exceeds best practice, or to identify matters that need to be improved.
76. CPW water users who have existing irrigation systems would be required to complete an evaluation using this code, and determine what upgrades, if any, are required and the timeline to achieve these.

'We will use best practice'

77. The other matters that each water user must address for irrigation management relate to water application and the need to be tailored to the specific property and the land use activities and intensity of each property. Irrigation design must take these into account, however, each water user must use appropriate techniques to apply water according to knowledge of day-to-day soil moisture, evapotranspiration, plant requirements etc.
78. Methods for best practice irrigation are readily available (e.g. in 'Irrigation Manual'^{iv}, 'Irrigation Guide'^v). I envisage that these or similar resources would be made available by CPW to each user.
79. In the example in Appendix 4, the dairy farm identifies that they use 'neutron probe' and 'Aquaflex' technology for soil moisture

measurement and how this is used to schedule irrigation. The CPW plan approval process would check that the methodology is suitable for the enterprise. Mr Brown, in his evidence, will describe how the audit process would check the farm records to ensure that the data is collected and used to ensure that water is applied efficiently and effectively.

Appendices to Farm Plan

80. The appendices to the Farm Plan would provide information directly relevant to completing a plan, including all scheme requirements for on farm irrigation practices. The appendices would need to be consistent with Sustainability Protocol which sets the scheme's environmental policy and procedures.
81. It is not intended that the appendices necessarily provide all information requirements, as there are well-developed resources available, including those that are industry specific (e.g. dairy industry). Key references to resource material that is readily available elsewhere will be provided. Mr Brown notes in his evidence that farmers need to have ready access to relevant information. I concur with this point.

Farm Plan Preparation and Review

82. The Applicant proposes that CPW use a workshop process to assist water users prepare their initial farm plan. For example, water users in the North Otago Irrigation Company's (NOIC) Downlands scheme attended two workshops, and were able to complete their plan during the second workshop. Based on the NOIC experience, CPW would also need to provide some individual support in addition to the workshops. Completed plans would be checked and approved by (or on behalf of) the scheme management.
83. Farm Plans will need to be updated when management changes are made relating to plan activities. This requires a process for scheme management to check and approve changes to plans. This process

would be included in the Sustainability Protocol and the water user agreement.

84. All water users will be required to keep certain records including their nutrient budget and plan, and their fertiliser records and provide these to the scheme operator on request. Example record sheets will be included in the final Farm Plan template. As part of the project to develop a generic Farm Plan for Irrigated Land Use further work is being carried out on the record keeping and audit elements, so that farm plan performance can be readily checked. For example, both implementation and review of nutrient budgets and plans need to be demonstrated. The results of this further work should be incorporated into the CPW environmental management system.
85. CPW proposes to use a process of both internal review and third party audit to monitor Farm Plan performance. For at least the first two years that a farm receives scheme water CPW would carry out an annual review of each FP and its performance. This is to ensure that water users are provided with support and information and do get their plans implemented. It would also give users, regulatory authorities and the wider community assurance that farms within the scheme are being well-managed to avoid or minimise adverse environmental effects. After 2 years, water users who are achieving all their plan targets may have extended periods between reviews, up to a maximum of 5 years. There may be other incentives that can be provided to recognise environmental management achievements. Again this is an area where there is further work in progress.

Reporting of Farm Plan performance

86. Water users would receive a feedback report following any review or audit.
87. CPW would prepare an annual report on Farm Plan performance that would not disclose individual information but would provide

aggregated data that demonstrates overall CPW performance. This report would be provided to the Regional Council (as part of the consent compliance reporting)

Farm Plan Compliance Strategy and Enforcement Procedures

88. To ensure that the scheme can maintain community confidence that it can get the Farm Plan requirements fully implemented, CPW needs to be seen as credible and fair in implementing its environmental farm plan programme.
89. The compliance process (section 7 of the Sustainability Protocol) identifies the set of actions that CPW will undertake to achieve compliance by all water users, and to correct or halt situations that endanger the environment. This process will be further developed and refined.
90. It includes the following elements:
 - Promoting compliance (e.g. through providing training, information etc.)
 - Inspections and monitoring (e.g. internal and independent third-party audits of Farm Plan performance)
 - Deterrence (i.e. identification and enforcement of breaches with appropriate penalties to show that there are adverse consequences of non-compliance)
91. A process for responding to water user non-compliance is set out, with water take restricted or cut off as the penalty, where breaches are not dealt with. The provision for CPW to restrict or cut-off water would be included in the water supply contract.

Environmental Enhancement Fund

92. The proposed scheme environmental enhancement fund acknowledges that there will be changes and potential adverse effects from this new irrigation development. As the impacts of the

scheme cannot all be determined in advance, the fund provides a mechanism to support opportunities either in the scheme area or areas affected by the scheme to undertake maintenance, restoration and improvement projects or activities.

93. The fund would be established through contributions from the water users. In my opinion, the level of funding needs to be an affordable contribution from water users that provides an adequate sum over time to address appropriately matters relevant to the scheme. The initial contribution will be at least \$0.32 per share per annum. This would provide an initial sum of \$120,320 per annum (376,000 shares).
94. Section 4.3 of the Sustainability Protocol sets out preliminary ideas on the types of projects that could be funded, and the mechanisms for funding.

Consent Conditions

95. Inclusion in the consent conditions of specific requirements regarding the Sustainability Protocol and Farm Plans would tie in and commit the consent holder, scheme management and the water users to the proposed process that I have described. For example, a number of specific requirements for all individual Farm Plans could be included in a condition setting out details of the Farm Plan Template. These could cover requirements for irrigation infrastructure design, nutrient budgets, and exclusion of heavy stock from waterways. Some of these would need to be met before water is first provided to a property, and others on an ongoing basis. Conditions could then require each individual property that receives water to have an individual Farm Plan based on the Template, and require the consent holder only to provide water to property if it has a current Farm Plan. Other conditions could then require the consent holder to restrict or cease supplying water to properties if the ongoing requirements of the individual Farm Plans are not complied with.

96. In my view this is a preferable approach to using prescriptive conditions especially in situations where techniques do not (yet) exist for robust, accurate monitoring that can clearly link an adverse effect (e.g. increased nitrate levels in ground water) back to a specific property or action.
97. I note that use of some types of input controls in consent conditions (e.g. stock number limitations or annual fertiliser limits) would be difficult to determine and monitor at a scheme level. Unlike an integrated catchment management approach, an irrigation scheme is likely to have its water users interspersed amongst properties that are not part of the scheme, and it may be difficult to determine from monitoring, such as groundwater quality testing, to what extent problems that arise are attributable to the scheme.
98. The proposed Farm Plan approach builds on the Environmental Farm Plans (and audits) that NOIC has implemented as a consent condition for their 'Downlands' scheme. The addition of the scheme environmental policy and implementation processes in the Sustainability Protocol strengthens the NOIC farm plan concept.

CONCLUSIONS

99. The EMS approach that I have described is being widely developed, especially in Australia, not only as a method for market certification (e.g. through ISO 14001), but also as a tool for improved natural resources management.
100. The proposed linked Sustainability Protocol /Farm Plan approach provides a systematic approach to environmental management for CPW. This approach is based on internationally recognised methodology.
101. Environmental management arrangements based on an EMS approach and designed specifically for community irrigation schemes have the potential to overcome some limitations that occur in an orthodox rules approach, especially if specific practices are

defined. The EMS process means that not only are environmental issues recognised, but active planning and management of them must occur.

102. In my opinion, the proposed use of an integrated Sustainability Protocol /Farm Plan approach for CPW is an appropriate approach that can achieve regulatory compliance and environmental performance that moves beyond compliance through commitment by the scheme management to continuous improvement in environmental performance.
103. I consider that this approach encourages proactive, rather than reactive organisational culture and style of management.
104. In my opinion this approach is consistent with achieving the purpose of the RMA (s. 5), as it clearly connects the elements of safeguarding the life-supporting capacity of air, water, soil and ecosystems and avoiding, remedying or mitigating any adverse effects directly with the use and development of natural and physical resources.
105. By incorporating the Sustainability Protocol /Farm Plan processes into the consent conditions the regulatory authority can maintain control while providing for innovation and risk management through improving adaptive capacity.
106. The proposed EMS process for CPW has incorporated recent experience from the NOIC's environmental farm plan and audit process into a recognised methodology. Further development of the detail of various aspects as the scheme design advances will enable a robust and credible environmental management process to be adopted.
107. With the CPW EMS approach the training and support that is vital, but is often difficult for individual farmers to access, is provided by the Scheme.

Appendices

- Appendix 1: CPW Sustainability Protocol
- Appendix 2: CPW Template for Farm Plan for Irrigated Land Use (DRAFT)
- Appendix 3: Codes of Practice and Best Management Practice Guidelines
- Appendix 4: Farm Plan template: Draft Irrigation Management Example

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ⁱ Parliamentary Commissioner for the Environment. 2004. *Growing for good: intensive farming, sustainability, and New Zealand's environment*. Wellington: Parliamentary Commissioner for the Environment.

ⁱⁱ Ministry for the Environment. 2006. *Freshwater for the Future: a supporting document- a technical information paper outlining the key outcomes for the sustainable management of New Zealand's freshwater*

ⁱⁱⁱ Carruthers, G. 2005 *Adoption of Environmental Management Systems in Agriculture- an analysis of 40 case studies* A report for the Rural Industries Research and Development Corporation. Publication no 05/032 NSW Department of Primary Industries Canberra Australia 2005.

^{iv} *The New Zealand Irrigation Manual – a practical guide to profitable and sustainable irrigation* A Malvern Landcare group Project (May 2001)

^v *The Irrigation Guide- a guide to decision-making when going irrigating* prepared for the Farmers Irrigation Management Group includes Environmental Checklist for Irrigated Farms (2000 (approx))