



Environmental Audit of the Goulburn River Detailed Audit Scope - 2 September 2004

1 Project Brief

This detailed audit scope has been prepared in response to the project brief issued to the auditor in June 2004. The brief was intended to guide the appointed environmental auditor engaged to undertake the statutory environmental audit of the management of the Goulburn River. The client for the statutory audit is the Minister for the Environment and Water.

The primary audit objective, the primary approach and issues for consideration for the audit documented in the project brief are presented below.

Primary Audit Objective

The primary audit objective is to:

Obtain the information and understanding to guide the management of the Goulburn River towards providing a healthier river system. This will include improvements towards meeting the needs of the environment and water users, therefore reducing the likelihood of further fish kill events in the future.

The audit report must contain management recommendations that are capable of being used to improve management practices.

Primary Approach and Issues for Consideration

The primary approach and issues for consideration for the audit as identified in the June 2004 Project Brief are listed below.

1. Identify the land and water management policies, strategies, plans and operational procedures that guide the management of the relevant reaches of the Goulburn River;
2. Identify roles and responsibilities of the organisations responsible for the management of the Goulburn River and determine the Acts of State and Federal Parliament under which these organisations undertake that management;
3. Identify any gaps or inconsistencies within 1 and 2 above;
4. Determine whether relevant policies, strategies, plans, procedures, roles and responsibilities are being followed, with particular reference to the period covering November 2003 to January 2004 inclusive;
5. Determine whether relevant policies, strategies, plans, procedures, roles and responsibilities are adequate; and
6. Assess catchment management effectiveness in delivering recommended criteria.



The audit is not an investigation into the most recent, or any other, fish kills and is not intended to provide a new response plan or fish kill protocol. It is however required to assess the emergency response plan(s) used in previous incidents, and the adequacy of changes to the plans. Irrigation Drainage Memorandum of Understanding

2 Development of the Detailed Audit Scope

The detailed audit scope has been developed following:

- the Technical Workshop which was held on Friday 16th July. (The key outcomes of the Technical Workshop are presented in Attachment 2).
- individual discussions with a broad range of stakeholders including governmental agencies, the Local Community Network, environmental groups, fish protection bodies, the Yorta Yorta Nation, recreational users, water users, landowners, and other interested organisations.
- consultation with the Reference Committee on Wednesday 21st July including the consideration of comments on a preliminary draft detailed audit scope by members of the Reference Committee.

The draft Table of Contents of the audit report, based upon the audit scope is presented in Attachment 2.

The detailed audit scope addresses high priority geographical areas, environmental conditions, and management issues for achieving the primary audit objective. The audit scope describes:

- the activities to be audited and the geographic extent
- river health indicators
- the approach to benchmark the health of the river
- the audit criteria
- the audit process

3 Audit Activities and Geographic Extent

Activities

The EP Act (1970) defines an "environmental audit" as a total assessment of the nature and extent of any harm or detriment caused to, or the risk of any possible harm or detriment which may be caused to, any beneficial use made of any segment of the environment by any industrial process or activity, waste, substance (including any chemical substance) or noise.

The environmental audit report is to be prepared in accordance with Section 53V of the EP Act (1970). This section of the Act requires "the industry process or activity " to be specified in respect of which the environmental audit is conducted.



This environmental audit of the Goulburn River will be restricted to an audit of the following activities:

- Activity A:** River flow regulation (including management of riparian zone)
- Activity B:** Fish kill response arrangements
- Activity C:** Biocides usage
- Activity D:** Irrigation drainage

and other specific activities, as identified in the conduct of the audit, that are considered to contribute to the following threats to the health of the Goulburn River:

- flow regulation (including thermal pollution)
- habitat degradation
- lowered water quality
- barriers
- alien species
- exploitation
- diseases
- translocation and stocking

These threats were identified at the Technical Workshop and are consistent with the MDBC Native Fish Strategy as being the key threats to native fish recruitment and survival along the Goulburn River. Flow regulation and reduced water quality were considered by Technical Workshop participants to be the highest priority threats to consider.

River flow regulation (including management of riparian zone) will be the primary activity subject to the audit. It includes the operation and management of both urban and irrigation supply systems, management of environmental flows, and riparian management practices along the river including the Goulburn weir pool.

While biocides usage and irrigation drainage could be considered as sub-activities within the river flow regulation activity, they are addressed separately within the audit due to specific concerns raised by stakeholders through the Local Community Forum and the Technical Workshop.

Geographic Extent

The river segment for the audit is the main stem of the Goulburn River from below the Eildon Dam outlet structure to the Murray River with the inputs from the tributaries, channels and drains treated as point sources.



Where appropriate the audit will independently consider the following Goulburn River reaches:

- Eildon Dam outlet structure to the limit of the influence of backwaters of the Goulburn weir (south of Nagambie).
- Goulburn weir backwaters above Kirwans Bridge (to the limit of the influence of the weir) including Lake Nagambie, and the eastern and western backwaters.
- Goulburn weir pool below Kirwans Bridge.
- Goulburn River below Goulburn weir to the Murray River.

In addition major fish kill data from the Broken system will be considered where it can lead to a greater understanding and knowledge of fish kills in the Goulburn River.

The land segment will be constrained to the pre-regulation flood plain (i.e., including cut off wetland systems).

4 River Health Objectives and Indicators

The audit will assess compliance against specific audit criteria for each of the audit activities. Several "river health indicator" criteria are included with compliance against the criteria being assessed against legislation, policy, strategy and guideline obligations. In addition performance against operational and management responsibilities, as they relate to threats to river health, are also addressed in the audit criteria.

River health indicators addressed through the assessment of compliance against the audit criteria include physical, chemical, and biological indicators. The "recruitment and survival of native fish" will be considered as a critical river health indicator for the whole of river. It will also recognise valued exotic fish species (including salmanoid) recruitment and survival in the river reach below the Eildon weir.

It is noted that at this time there is no single or transparent statement of Government policy or objectives in respect to current or future fish populations along the full length of the Goulburn River, and nor is there any simple quantifiable performance indicator or measure to audit. The Goulburn Eildon Region Fisheries Management Plan provides the only specific policy commitment relating to the management of fish populations in the Goulburn River.

Examples of key audit activities which recognise the "recruitment and survival of native fish" as a key river health indicator are:

- benchmarking against the Victorian River Health Strategy (VRHS) Index of Stream Condition (ISC) as the basis of condition assessment.
- determining whether the objectives and targets of the MDBC Native Fish Strategy and the MDBC Sustainable Rivers Audit (as it relates to native fish) are incorporated in the Goulburn Broken CMA's Regional Catchment Strategy and supporting documentation and whether processes are in place to allow these objectives and targets to be met in the future.



- determining compliance with the Waters of Victoria State Environment Protection Policy (WoV) environmental quality objectives and indicators. (These objectives and indicators are essential to sustain living organisms including fish).
- determining whether the January 2004 fish kill response was informed and refined by knowledge gained by other historical fish kills and in particular whether there was sufficient background information, prior to, during, and after the fish kill to identify the cause

The VRHS and the MDBC Native Fish Strategy objectives for native fish will also be used to assess the four designated reaches of the river system. The "Blue Book" *VicFishInfo: Biological Information for Management of Native Freshwater Fish in Victoria* by J.D. Koehn & W.G. O'Connor (DSE Parks, Flora and Fauna Division) will be a useful resource document in terms of spawning requirements, physio-chemical tolerances as well as other key biological data.

5 Benchmarking of River Health

As part of the scene setting for the audit, the environmental condition of each of the designated river reaches will be benchmarked using:

- the most recent Index of Stream Condition (ISC) survey of 10 representative sites along the Goulburn River. This combines information on the biota, flow regime, water quality, and physical condition of the river.
- the following characteristics of an ecologically healthy river as defined in the Victorian Healthy Rivers Strategy:
 - the majority of plant and animal species are native in the river and riparian zone;
 - native riparian vegetation communities exist sustainably for the majority of the river's length;
 - native fish and other fauna can move and migrate up and down the river; and
 - linkages between river and floodplain and associated wetlands are able to maintain ecological processes.

These characteristics are also considered in the draft Goulburn-Broken River Health Strategy.

6 Audit Criteria

The process of undertaking an environmental audit is "a systematic, documented verification process of objectively obtaining and evaluating audit evidence to identify whether specified environmental activities, events, conditions, and management systems or information about these matters conforms with audit criteria and communicating the results of this process to the client" (AS/NZS, ISO 14050: 1999, Environmental Management - Vocabulary).



The audit process will establish audit evidence against the audit criteria presented below for each of the four activities subject to the audit. Findings and conclusions will then be drawn from the evidence.

For some audit criteria, evidence will be obtained through selective sampling, as an indicator of overall compliance, rather than from an analysis all of the data. For example compliance with the Waters of Victoria State Environment Protection Policy (WoV) environmental quality objectives (under the audit of Activity A: River Regulation) will be verified on the basis of 2 years of data rather than the full historical suite of monitoring records.

The discussion for each audit criteria relates to the audit tasks that will be undertaken including the gathering of evidence to establish the audit findings.

Activity A: River Regulation (including management of riparian zone)

For this audited activity all of the "primary approach and issues for consideration" for the audit (see Section 1) will be addressed by validating evidence against each of the audit criteria, with the exclusion of:

Determine whether relevant policies, strategies, plans, procedures, roles and responsibilities are being followed, with particular reference to the period covering November 2003 to January 2004 inclusive.

Criterion 1: Compliance with Cl 11 of WoV - Environmental Quality Objectives and Indicators

- Identify Beneficial Uses (Table 1 of WoV) for the Goulburn River.
Cl. 11 of the WoV states that "environmental quality objectives describe the level of environmental quality needed, in most surface waters, to avoid risks to beneficial uses, and to protect them". Furthermore it states "Risks would be manifest, for example through human health impacts, the increased occurrence of fish kills and algal blooms, excessive growth of aquatic plants, sedimentation, loss of biodiversity and environmental flows, loss of cultural and spiritual values, objectionable odours, colours, taints, visible floating material, foam, oil or grease or dirty water".
- Identify whether environmental quality objectives and indicators are met for beneficial uses (Tables A1 to A6). The environmental quality objectives are identified in Schedule A of the WoV and are specified in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality and Schedule A of the WoV. (The EPA has prepared an assessment of current attainment against WoV objectives for use in developing the Goulburn Broken CMA's River Health Strategy and related management action and resource condition targets).

Note where environmental quality objectives and indicators may not be attained in all segments within 10 years, or not at all, the WoV requires regional targets to be set (Clause 24).



Criterion 2: Compliance with Cl 12 of WoV - Attainment Program

- If the environmental quality objectives are not met in full, identify whether there is a framework for the development of appropriate attainment program targets for the Goulburn River and whether it has been used and appropriately applied.

Criterion 3: Compliance with Cl. 41 of WoV - Water Allocations and Environmental Flows

- Determine whether the obligations under Clause 41 of the WoV '*Water allocations and environmental flows*' have been met.

Criterion 4: Compliance with Thermal Water Quality Objectives

- Identify whether there are thermal objectives that may apply to the Goulburn River. This should include consideration of Clause 42 of the WoV '*Releases from Water Storages*'.
- Document data on thermal variations (temporal and for each of the designated river reaches).
- If there are, determine whether they are met.

Criterion 5: Consistency of the Regional Catchment Strategy with Cl. 24 of the WoV - Regional Target Setting

- Identify whether the Regional Catchment Strategy (RCS) and Plans have set regional targets for progressive rehabilitation of the Goulburn River that are consistent with Clause 24 of the WoV (for circumstances in which environmental quality objectives and indicators may not be attained in all segments within 10 years, or not at all).
- Identify whether the RCS, Plans, and the Irrigation Drainage Memorandum of Understanding, have an established monitoring and auditing process, whether the process is being undertaken, and whether adequate resources are available to determine whether regional targets for progressive rehabilitation are being met.
- Identify whether the RCS and Plans provide for the meeting of regional targets for progressive rehabilitation of the Goulburn River.

Criterion 6: Consistency of the Regional Catchment Strategy with Cl. 15 of the WoV - Catchment Management Authorities - Identification of the Regional Environmental, Social, and Economic Values of Surface Waters

- Identify whether the RCS and Plans identifies the regional environmental, social, and economic values of surface waters, and after careful consideration of environmental, social, and economic needs, sets appropriate goals, priorities, and environmental targets for the catchment.
- Identify whether consideration of environmental, social, and economic needs has been given to setting targets between June 2003 (the release of the new WoV) and June 2004.



Criterion 7: Consistency of the Regional Catchment Strategy with other River Health Objectives and Targets

- Identify whether the RCS river health and environmental objectives and targets are consistent with other State and Federal targets including:
 - Victorian Healthy Rivers Strategy
 - Sustainable Rivers Audit (MDBC)
 - Living Murray Initiative (MDBC)
 - Integrated Catchment Management Strategy (MDBC)
 - Native Fish Strategy (MDBC)
 - Recreational Strategy (MDBC)
 - National Action Plan for Salinity and Water Quality
 - Goulburn Eildon Region Fish Management Plan
- Specifically identify whether the RCS and supporting Plans adopt the Victorian Healthy Rivers Strategy definition of an ecological healthy river, identify the MDBC Native Fish Strategy (NFS) threats (Table 1; pg 5) and targets (pg 17 and 18) and the long term targets are consistent with the MDBC's Sustainable Rivers Audit, the Integrated Catchment Management Strategy, and the Living Murray Initiative.
- Identify whether RCS and supporting plans have a process in place to monitor and audit native fish populations (pg 17, NFS), whether the process is being undertaken, and whether adequate resources are available. The process should allow for determination whether native fish recruitment and survival targets are being met. (The recruitment and survival of native fish species is a critical indicator of the overall river health and its communities (NFS; pg 5). To sustain viable populations both recruitment and survival must be sustained).
- Determine whether the criteria for a sustainable Salmonoid fish populations downstream of the Eildon dam outlet structure and above the Goulburn weir are being met based upon the research of Paul Brown "Trout Spawning and Rearing Habitats in the Goulburn River" Marine and Freshwater Systems, Primary Industries Research Victoria (PIRVic), DPI.

Criterion 8: Compliance with Environmental Management Obligations under the Water Act

- Identify up to 10 key Water Act (1989) obligations, and the responsibilities of Authorities, under:
 - Part 6 (Division 3) Clause 107 - Authorities - Environmental and Recreational Areas
 - Part 10 - Waterway Managementas they relate to the environmental health of the Goulburn River.
- Identify whether these obligations are being met.



Criterion 9: Compliance with Obligations under Bulk Water Entitlement

- Identify whether G-MW is complying with its obligations under the Bulk Entitlement (Eildon-Goulburn Weir) Conversion Order 1995 which are relevant to environmental health. The compliance will be limited to:
 - Clause 11 - Passing Flows
 - Clause 12.3 - Releases
 - Clause 15 - Environmental obligations

The environmental obligations require G-MW to have a program to manage the environmental effects of the Authority's works to take water under the Bulk Entitlement including:

- The effects on the bed and banks of the waterway in the vicinity of the Authority's works;
 - Operational practices to remove silt from the works;
 - Operational practices to manage water quality in works on the waterway;
 - Operational rules to control releases from works to the waterway; and
 - Operational rules to manage flood flows through works on the waterway.
- Identify whether a monitoring and auditing process has been developed, is being undertaken, that there is a feedback corrective action in the audit process, and that resources are available to meet obligations under Clauses 11, 12.3, and 15 of the Bulk Entitlement (Eildon-Goulburn Weir) Conversion Order 1995.
 - Identify whether the Goulburn Valley Region Water Authority is complying with its obligations under the Bulk Entitlement (Shepparton) Conversion Order 1995 as they relate to Goulburn River passing flows.
 - Identify whether Pacific Hydro has a Bulk Entitlement, or another form of entitlement, and is complying with its obligations for releases from the Eildon Dam as a result of its electricity generation activities.
 - The evidence collected to assess against this audit criterion will be limited to July 2000 to June 2004.

Criterion 10: Compliance with Obligations under DSE Operational Licence

- Identify whether G-MW is complying with its obligations under the DSE Operational Licence as it relates to the environmental health of the Goulburn River.

Criterion 11: Compliance with other Acts where relevant to River Health

- Identify whether key obligations relevant to the protection of endangered species, river water quality and the control of riparian land along the Goulburn River under the following Acts are being met:
 - Agricultural and Veterinary Chemicals (Control of Use) Act
 - Catchment and Land Protection Act
 - Electricity Industries Act



- Environment Protection Act
- Emergency Management Act
- Fisheries Act
- Flora and Fauna Guarantee Act
- Heritage River Act
- Safe Drinking Water Act
- Water Act
- Water Industries Act
- Environment Protection and Biodiversity Conservation Act (Federal)

Criterion 12: Consistency between Legislation, Policies, and Strategies

- Identify any gaps or inconsistencies within land and water management legislation, policies, strategies, plans and operational procedures (as they relate to the environmental health) that guide the management of the designated reaches of the Goulburn River;

The evidence to be used to validate whether this criterion is complied with will be limited to that obtained for validating compliance against criteria 1 to 11.

- Identify whether the WoV environmental quality objectives and indicators, the VRHS objectives, and the NFS targets are likely to be achieved in the context of obligations under the Water Act, the Bulk Entitlement, and other agreements.
- In forming recommendations arising out of the findings and conclusions identify whether these recommendations are addressed in the Irrigation Drainage Memorandum of Understanding, the Victorian White Paper and the National Water Initiative.

Criterion 13: Consistency between Organisational Roles and Responsibilities

- Identify whether the roles and responsibilities of the organisations responsible for the management of the Goulburn River, from a river health perspective, are unambiguous and that duplication of roles and responsibilities does not occur.
- Identify any gaps or inconsistencies within roles and responsibilities of the organisations responsible for the management of the Goulburn River and the Acts of State and Federal Parliament under which these organisations undertake that management.

The evidence to be used to validate whether this criterion is complied with will be limited to that obtained for validating compliance against criteria 1 to 11.

Activity B: Fish Kills Response Arrangements

For this audited activity all of the "primary approach and issues for consideration" for the audit (see Section 1) will be addressed by validating evidence against the Criterion 14.



Criterion 14: Evaluating the Extent of Fish Kills as an Indicator of River Health and Current Response Arrangements in Providing for a Healthier River

The intention of the audit against this activity is to determine whether the extent of fish kills is an indicator of declining river health and whether the current response arrangements to fish kill events in the Goulburn River are sufficient to guide management in providing a healthier river system. This will be evaluated from the perspective of:

- investigations required to determine the cause of fish kills;
 - learning process to improve the overall understanding of fish kill causes, and how prevention can be built into management actions; and
 - clarity with respect to roles in fish kills.
- The first audit task is to examine the frequency and types of fish kill events to see if their occurrence is increasing or causes are systematic.
 - The second audit task is to determine whether the management of fish kills through the response arrangements:
 - meets the legislative and policy requirements for managing a fish kill.
 - identifies agency responses and that relevant staff are aware of the response arrangements, and are trained and equipped to undertake the assigned roles.
 - covers all needs for management of such events.
 - is refined by knowledge gained by the response to fish kills.
 - provides for sufficient information and evidence to be collected, prior to, during, and after the fish kill to identify the cause.
 - provides for a process of review, follow up of actions, and refinement of management in order to reduce or eliminate the likelihood of the incidence and severity of future fish kills.
 - The following evidence will be obtained in respect of both audit tasks:
 - relevant reports and records from previous fish kills.
 - the legislation and/or policy(s) that identify the principal authority for implementing the response, and the responsible authority.
 - documentation of the mechanisms the agencies have in place to meet their obligations.
 - statements from agencies in respect to their knowledge of current response arrangements, training and equipment provided to relevant staff and how planning systems are adjusted when causes are identified. Interviews with relevant staff will be conducted to confirm their knowledge and understanding.
 - the responsible authority under the EP Act and any other Act for identifying the cause of the fish kill.
 - records of previous events, incidents, debriefs for major fish kills, and any recommendations for improvements in response and knowledge needs that have been made and followed up.



Activity C: Use of Biocides

For this audited activity the focus will be on one of the "primary approach and issues for consideration" for the audit (see Section 1):

Determine whether relevant policies, strategies, plans, procedures, roles and responsibilities are being followed - as they relates to use of biocides.

Criterion 15: Compliance with Cl. 37 of the WoV - Chemical Management (Biocides)

- Determine compliance with Cl. 37 of the WoV obligations as it relates to biocides storage, training, use, contingency planning, and emergency response to spills.
This will be limited to the July 03 to June 04 period, and to G-MW activities.

Criterion 16: Compliance with Agricultural and Veterinary Chemicals Act (Biocides)

- Determine compliance with Agricultural and Veterinary Chemicals (Control of Use) Act as it relates to biocides storage, training, use, contingency planning and emergency response to spills.
This will be limited to G-MW activities between July 2003 and June 2004.

Activity D: Irrigation Drainage

Criterion 17: Compliance with Cl. 51(2) of the WoV - Irrigation Channels and Drains

For this audited activity the focus will be on one of the "primary approach and issues for consideration" for the audit (see Section 1):

Determine whether relevant policies, strategies, plans, procedures, roles and responsibilities are being followed - as they relates to irrigation drainage.

- Determine compliance with Cl. 51(2) of the WoV obligations as it relates to the management of irrigation drains.
This will be limited to two public drains with discharges to the Goulburn River, downstream of Shepparton, between July 2003 and June 2004.
- Determine whether a process has been established to ensure all relevant aspects of the Irrigation Drainage Memorandum of Understanding will be implemented.

Other measurable audit criteria will be established and audited against if obvious gaps in the preliminary audit findings and recommendations, as they relate to the primary audit objective, are identified.



7 Draft Table of Contents

The chapters of the draft Table of Contents (Attachment 2) for the audit report are organised in the following order:

- Executive Summary
- Introduction (Section 1)
- Audited activities (Section 2)
- Audit criteria (Section 3)
- "Setting the Scene" and "Threats to River Health" (Sections 4 & 5)
- Audit evidence (Section 6)
- Audit findings (Section 7)
- Audit conclusions (Section 8)
- Recommendations arising out of the audit (Section 9)

The following comments are provided for clarification:

1. Section 1 includes a description of the consultation phase - see Section 1.4 "Stakeholder Engagement in the Audit Process".
2. Section 4.1 "Overview of the River & its Regulation" will be brief and will focus on the history of regulation.
3. Sections 1, 4, and 5 will be introductory, and hence are unlikely to be of a greater than 20 to 30 pages in length (in total).
4. The detailed documentation for Sections 6 is likely to be presented as appendices with a summary of key relevant information and discussion in the main report. Its structure within the main audit report may change to reflect the evidence requirements for each of the audit criteria.
5. The high level recommendations associated with each of the audited activities will be supplemented, where considered necessary, by supporting recommendations. Recommendations will also be split into those actions for which immediate action is considered necessary, and those for which action in the medium to long term is considered appropriate. Responsible organisations will be identified for each recommendation.

8 Audit Process

The detailed scoping has been completed (see above). It includes the confirmed audit objectives, activities to be audited, audit criteria, and draft content of the audit report. In addition the audit team has been finalised, with the appointment of an expert support team.

It is also noted that a large number of documents which will be used in the establishment of evidence have been obtained; either electronically, in hard form, or through meetings (all of which have been documented). Additional evidence will be obtained through a combination of written requests and meetings.



The overall steps to complete the audit are as follows:

1. Prepare an audit quality plan for the audit that is in compliance with Nolan-ITU's third party certified ISO 9001: 2000 Quality Management System. The audit quality plan will incorporate the audit objectives, audit criteria, and involve the identification of auditees, and the scheduling of written information requests and meetings and interviews.
2. Conduct an audit team meeting, with all expert support team members, to workshop and peer review and finalise the audit quality plan.
3. Notify auditees.
4. Conduct inspection of key reaches of the river and activities along the river.
5. Prepare list of evidence required to assess compliance with audit criteria.
6. Submit written requests, or arrange audit meetings, to obtain evidence from relevant auditees.
7. Receive responses to the requests.
8. Conduct additional audit meetings for further clarification as required.
9. Prepare the initial draft report for peer review by Expert Support Team members.
10. Submit draft audit report to the EPA to ensure that the detailed scope of work has been completed.
11. Address any omissions of scope items as identified by the EPA and engage a professional editor of technical reports to finalise the language of the audit and to ensure the report is suitable for publication.
12. Once the EPA is satisfied that the detailed scope of work has been completed, submit draft report to auditees for the purpose of assessing whether the factual information (the evidence) they provided is correctly reported. (This assessment will not include a review of factual information provided by others). At the same time submit the draft report to the Reference Committee for comments on matters of fact as they relate to the findings, conclusions, and recommendations.
13. Submit final report, in PDF digital form, to the Minister for the Environment and Water.

The audit report shall be independent and hence will be prepared in the absence of any direction on the interpretation of the evidence, or the adequacy of the evidence, used to draw the conclusions and recommendations. It is understood that stakeholders will have the opportunity of making submissions to the Minister on the findings, conclusions and recommendations.



Environmental Audit of the Goulburn River Attachment 1 Key Outcomes of Technical Workshop (16th July 2004)

Key Environmental Conditions

Flows:

- appropriate requirements for fish recruitment
- appropriate requirements for habitat health
- aspects necessary for floodplain maintenance
- impacts from illegal extraction

Water quality:

- conditions: thermal pollution, nutrients, turbidity, role of oxygen, biocides, ground and surface interaction pathogen
- land management practices: sedimentation, historical industrial activity (mining), riparian zone grazing, allocation of net water, “connectivity” between river and floodplain, landscape changes
- climate change
- unseasonality
- fish farms

Fish barriers:

Goulburn weir, Eildon weir, 3 channels from Goulburn Weir

Flow and water quality are high priority conditions. Gap analysis should be applied to assess whether all aspects are “adequately” addressed in other processes.

What Actions Should be Considered to Reduce the Threat Associated with These Environmental Conditions

Group a:

- Institutional arrangements / clear vision for river and landscape management (High)
- Restoration of “more natural” flow regimes (High)
- Modification / removal of barriers (Medium)
- Improved thermal regime (Medium)
- Improved riparian / floodplain vegetation integrity; creation of floodplain reserves etc (High)
- Improved societal investment in river health (High)
- Establishment of effective benchmarks and monitoring on river health (High)
- Matching landscape capability to water use (High)



Group b:

- Reset bulk entitlement in terms of flows; reset considering in-flows and longer term change (High)
- Pay on order for irrigation order (economic instruments) (Medium)
- Mandation of biocide use markers – evaluate their necessity; id alternatives (High to Very High)
- Introduction of “enviro bond” for biocide use / enviro insurance on levy (Medium)
- Address thermal pollution at Eildon and Nagambie (High)
- Installation of fish ladders at Lake Nagambie and in channels to Waranga Basin
- Continuous, alarmed water quality monitoring stations at storage outlets

Group c:

- Identification of values that protection is sought for, where trade-offs can or cannot be made (V High)
- Weed management options, including examination of bans, acceptable reporting regimes (Medium to High)
- Riparian management: benchmarks (Medium)
- Thermal pollution: multi-level off points (depending on geographic area)
- Storage Management Plan: Lake Nagambie, Goulburn Weir (including fish / vegetation protection) (High)
- Fish barriers to channels (Medium – High)
- Appropriate monitoring (High)
- Environmental flow regime / requirements (High)

Priority Geographic Areas

River segments

Goulburn River excluding the upper Goulburn, excluding Broken Creek, and limited to in-flow from the Broken River

Land segments

Pre-regulation flood plain including major channels, drains and tributary streams (includes ‘cut off’ wetland systems)



**Environmental Audit of the Goulburn River
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