Australian Wine Environmental Stewardship Coordination



FINAL REPORT to
GRAPE AND WINE RESEARCH & DEVELOPMENT CORPORATION

Project Number: **WFA0901**

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Date: **28/6/13**

Grape and Wine Research and Development Corporation

Final Report, June 2013

Project Code: WFA0901

Project Title: **Australian Wine Environmental Stewardship Coordination**

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Abstract

The main objective of the Australian Wine Environmental Stewardship Coordination project was to provide coordination and implementation support for national industry environmental initiatives. As part of this role the Winemakers' Federation of Australia (WFA) has undertaken a number of activities over the project lifespan. These activities have included development and administration of Entwine Australia and its resources, Maintaining the Australian Wine Carbon Calculator (AWCC), coordination of regional Environmental workshops, national and international advocacy activities to build recognition of Australian wine industry environmental initiatives and development of an online environmental reference collection for the Australian wine industry.

Executive Summary

For many years now the need for the Australian wine industry to operate in an efficient and sustainable manner has grown substantially. Increased cost of production, the rising Australian dollar, global financial crisis, increased international market competition, retail power and significantly increased scrutiny around how products are produced, have all put significant pressure on the Australian wine sector.

The good reputation of Australian wine has for many years been its strength, with existing perceptions holding strong in key international markets. Typically Australia has been seen as a new and exciting wine environment consisting of wide open spaces and clean production. However the industry can no longer afford to rely solely on this good reputation.

As the peak national wine industry body, the Winemakers Federation of Australia recognised these pressures and the need to provide the industry with a means of addressing them. Entwine Australia has provided industry with a national framework for continuous improvement and the sustainable, efficient production of wine.

Through the provision of additional industry resources WFA was able to create, maintain and improve this program and ensure its success. With significant infrastructure and planning being undertaken during the initial years of the program it is now in a position to expand and improve significantly to provide real value to the sector.

For the Australian wine industry the uptake of Environmental Management Systems will help to foster efficient sustainable production and through certification, will provide producers with a means of proving their credentials. This coupled with measurement and benchmarking of environmental inputs provides a highly valuable resource for the industry. It allows the sector to highlight its strengths and address its weaknesses.

Background

The WFA is the lead agency on environmental matters on behalf of the Australian wine industry. The WFA has been administering the Australian Wine Industry Stewardship (AWIS) program since 2005. In response to market demands, the AWIS program has evolved into a broader environmental certification scheme. This was occurring concurrently with escalating demands for other environmental activities, including carbon footprint assessments and guidance on emissions trading proposals. The WFA had also increased its role in the international arena to ensure both Australian and international wine industry environmental initiatives are recognised in export markets and supported by a critical mass of international wine producers. These national environmental activities were being supported by a single staff member at the WFA. The demand for action on environmental activities currently had exceeded the WFA's capacity to respond.

The purpose of this project was to provide support, via an additional staff resource, to the national industry environmental programs to ensure that they could be rapidly implemented to the fullest extent possible. This was in recognition that Australia was lagging behind other wine producing countries in the uptake of environmental management initiatives. This support was also needed to ensure that industry receives the maximum return on time and money invested into industry environmental programs. The development of the Australian Wine Environmental Stewardship (AWES) certification program was the culmination of a number of industry initiatives that had in the past focused on awareness raising and self-assessment. This evolution was intended to bring Australia into line with environmental assurance programs offered by other New World wine producers.

The original outcomes of the project were as follows:

- Provide coordination and implementation support for national industry environmental initiatives
- Assist with the development of Australian Wine Environmental Stewardship (AWES)
- Work with regional industry associations to coordinate group training and audit clusters to reduce the cost to industry of the implementation of AWES certification
- Maintain an online environmental reference collection for the Australian wine industry
- Maintain the online register of AWES participants
- Undertake primary assessments to recognise environmental certification scheme equivalence with AWES
- Assist with national and international advocacy activities to build recognition of Australian wine industry environmental initiatives
- Develop environmentally-themed WineSkills training modules
- Develop and deliver an industry communication package

During the project AWIS evolved into AWES and then became known as Entwine Australia. These 3 names are used concurrently throughout this report but refer to the same program at different stages of its development.

Project Aims and Performance Targets

Based on the aims of the project the following outputs and activities were set:

Yr 1	Output	Due	Activities
A	Revised Freshcare Code Environmental (Winery) and (Viticulture), winery and viticulture Freshcare Environmental Workbooks and Essential Documents templates	08/09	Following the collation of all feedback from the Freshcare Environmental pilots, due for completion in July, a final version of the codes and supporting material will be produced for the 2009/10 season
B	2009 National AWIS Report	08/09	Collate, analyse and report on findings of 2008/09 AWIS surveys
C	2009 National AWIS Regional Report	08/09	Break down national results into regional results
D	Completion of state Entwine Australia information sessions	11/09	Sessions are booked in WA, Qld, Tas, Vic and SA (national industry environmental conference). NSWWIA did not express interest in holding a session.
E	Revised Australia Wine Carbon Calculator and User Guide released (June 2010)	06/10	Calculator and Used Guide to be revised in light of any changes to government endorsed emissions factors and developments in the international wine industry arena

Yr 2	Output	Due	Activities
A	Endorsement of equivalence of Entwine Australia under the HAL Recognition Framework for environmental assurance, and therefore recognition by Australian retailers	07/10	Recognition framework due for completion by February 2010, after which individual schemes can be assessed for equivalence
B	Revised 'Sustaining Success' document launched	07/10	National industry environment strategy to be revised through the WINEC
C	Revised Freshcare Code Environmental (Winery) and (Viticulture), winery and viticulture Freshcare Environmental Workbooks and Essential Document templates	07/10	Following collation of industry feedback from the 2009/10 season implementation, the codes and supporting material will be revised and reissued in time for the 2010/11 season
D	National Entwine Australia report released	08/10	Summary report of industry certification rates, carbon footprint results and Entwine Australia indicators to be developed and released
E	Revised Australian Wine Carbon Calculator and User Guide released	06/11	Calculator and Used Guide to be revised in light of any changes to government endorsed emissions factors and developments in the international wine industry arena

Yr 3	Output	Due	Activities
A	Revised Freshcare Code Environmental (Winery) and (Viticulture), winery and viticulture Freshcare Environmental Workbooks and Essential Document templates	07/11	Following collation of industry feedback from the 2010/11 season implementation, the codes and supporting material will be revised and reissued in time for the 2011/12 season

Yr 4	Output	Due	Activities
A	2010–11 and 2011–12 National Entwine Report	10/12	Prepare an interim report for GWRDC on industry Entwine participation and feedback to date. Outline the process for database development and the benefit this system will provide to the program
B	Revised Australian Wine Carbon Calculator and User Guide released	11/12	Calculator and User Guide to be revised in light of any changes to government endorsed emission factors and developments in the international wine industry arena.
C	National Entwine Australia report released	06/13	Summary report of industry certification rates, carbon footprint results and Entwine Australia indicators to be developed and released
D	2010–11 and 2011–12 National Entwine Report.	06/13	Prepare a report on industry Entwine participation, feedback and recommendations for continuous improvement.

In the final year of the project a variation to these outputs was agreed as the Entwine program had evolved over the preceding three years, leaving some of the original targets less relevant.

The creation of an online Entwine membership database was therefore approved as a means of improving management and communication of the program. The online database focused on capture, storage and reporting of the Entwine member data and would provide industry with greater capacity to assess its environmental performance. The project end date was extended to ensure adequate time to create, test and transition to the new Entwine database. Year 3 outputs were amended and Year 4 outputs were then agreed upon as per the tables above.

Method

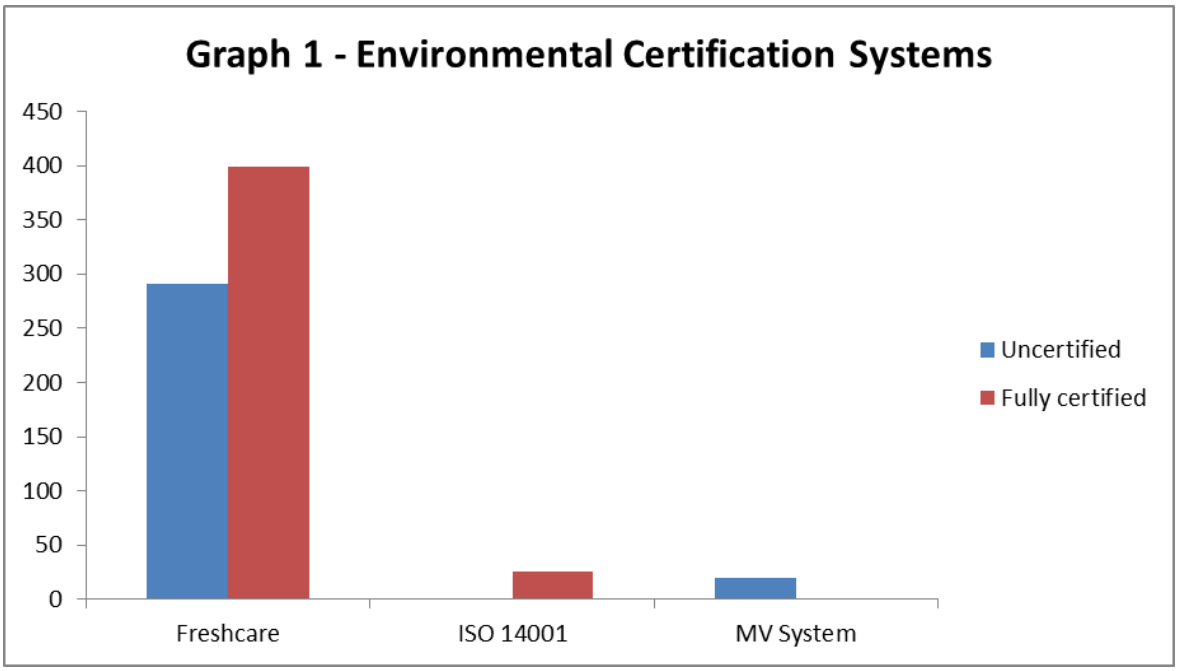
The project appointed an additional staff resource to support industry environmental initiatives. Throughout the project the staff member has worked to a plan, developed in consultation with the WFA Director Natural Resources and GWRDC, addressing the agreed milestones and activities of the project.

It should be noted that during the project the WFA underwent an extensive staffing restructure. This resulted in a single resource being available to achieve the outputs of the project. To account for this restructure the staff resource was assisted and managed for the remaining project by WFA General Manager of Strategy and International Affairs.

Results/Discussion

Wine Industry National Environment Committee (WINEC) – While WINEC is not referenced as a key output of the grant, the committee has formed a critical part of the project and WFA broader environmental activities. Coordination and organisation of meetings has been a role primarily undertaken by project staff. The committee is representative of the broader industry concern and has taken an advisory role in all WFA environmental activities. WINEC has been actively involved in an advisory capacity for all activities during the project, to assist with aligning outcomes with industry needs. A list of current WINEC members (2013) can be found in Appendix 4 of this report.

Freshcare Environmental Certification Resources – The Freshcare Environmental Winery/Viticulture codes and associated resources are an integral part of the overall Entwine program and provided a credible and viable option for certification of environmental practices. Freshcare was the original certification that was approved for use under Entwine and remains the most used approved Entwine certification to date (Graph 1 below) with over 93% precent of total members (734) undergoing Freshcare training/certification. ISO14001 (the international environmental standard) was approved for use under Entwine and made up roughly 4% of certified members. A regional sustainability program from McLaren Vale (MV System) that was provisionally allowed for preliminary membership, represented fewer than 3% of total members.



Throughout the project a major output has been an annual assessment and update of the two Freshcare certification codes (winery and viticulture) and their associated training resources including extensive resource workbooks, member forms/templates and auditing compliance criteria for both winery and viticulture. All of these resources were reviewed and updated in Years 1, 2 and 3 of the project. Both resources are now on their second published edition and form the basis for all Freshcare Environmental winery/vineyard training and auditing. The review of these resources has incorporated consultation with WINEC and feedback from broader industry through workshops and general communication. The latest versions of the codes have been included in Appendix 2 of this report. The additional resources are only available to those who complete the Freshcare training and as such have not been included in the Appendices.

Australian Wine Industry Stewardship (AWIS) Report – The AWIS report consisted of a grower survey and subsequent report which WFA had been producing since 2005. This survey

formed the original basis for Entwine and many of the questions utilised in the AWIS report still remain a part of the Entwine vineyard environmental indicators. In response to market demands, the AWIS program subsequently evolved into a broader environmental certification scheme i.e. AWES/Entwine. The final AWIS survey and associated report for 2009 was included as an output of Year 1 of this project. The survey results of 1839 wine grape growers were collated, analysed and released in a report on the WFA website in August 2009 http://www.wfa.org.au/activities/environment-and-biosecurity/environment-resources/. The report attempts to provide a simplistic visualisation of national vineyard environmental performance over time (2007-2009). AWIS formed a vital point of reference for the continued reporting of Entwine data into the future. The 2009 AWIS national report is provided in Appendix 2 of this report. A regional report was also produced but only made available upon request.

Australian Wine Carbon Calculator - The Australian Wine Carbon Calculator (AWCC) was launched in April 2009 to help Australian wineries understand and measure their carbon emissions. The project was a joint initiative of WFA, the South Australian Wine Industry Association and the Winegrape Council of SA.

The Australian calculator builds on the international version that has been in use since early 2008 and includes components specific to Australian needs, such as Australian Government-endorsed emission factors. WFA was part of the international group that developed the initial calculator. The Australian calculator is comprehensive, requiring even more data than is needed under the Government's National Greenhouse and Energy Reporting Scheme (NGERS). However, an output sheet has been included that collates the subset of data needed to complete NGERS

The AWCC was not created under this project however its annual updates were a key project output. These updates included updating technical information and methodologies based on the latest available data as well as adding/removing content based on industry feedback and direction from WINEC. These updates were applied to both the calculator and associated user guide resource. The calculator has subsequently undergone three updates moving from version 1.3 to 1.5 (current) during the project. At time of writing, the calculator currently exists in its original form of an MS Excel file, downloadable from the WFA website here http://www.wfa.org.au/entwineaustralia/carbon_calculator.aspx . Specific information on version updates can be viewed in the "change log" tab in the current version 1.5. The AWCC User Guide version 1.5 is provided in Appendix 2.

The tool has attracted significant interest within the industry with the page above being the second most visited page on the Entwine Australia website.

Through consultation during the project it has been identified that a simplified, more user friendly online version of this tool would prove to be of significant value to the industry. As this type of update was not included in scope of this project, the WFA is currently exploring other avenues to achieve this objective. Some initial preparation for this update, including a review of the metrics/methodologies, has been undertaken under the current project.

HAL recognition framework - An agreed project output in Year 2 of the project for endorsement of equivalence of Entwine Australia under the HAL Recognition Framework for environmental assurance, was achieved but requires some clarification. A comprehensive explanation of the achievement of this output was provided as part of the GWRDC 2011/12 EOFY Progress Report. An extract from the report can be found in Appendix 5 of this report.

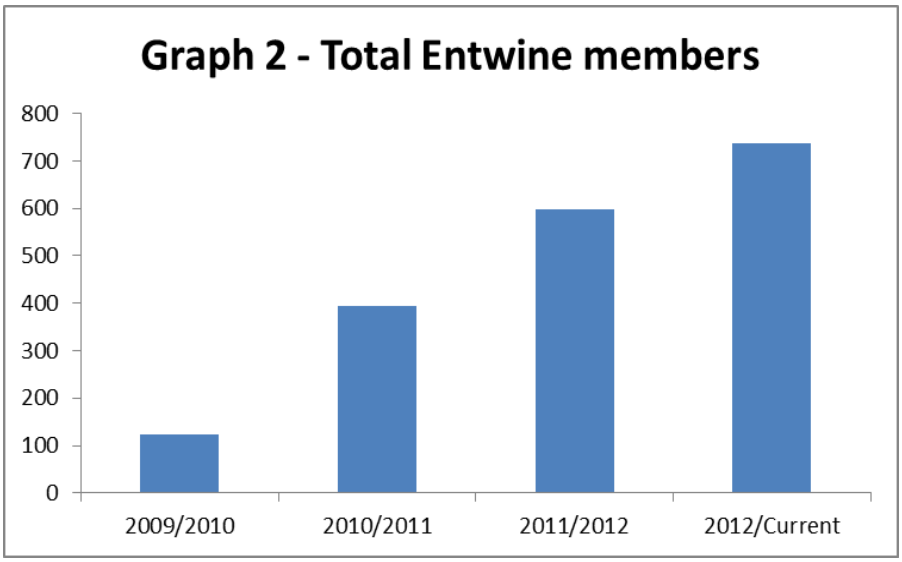
Policy and Advocacy – The WFA Policy and Advocacy work on environmental matters has formed a portion of the activities undertaken by the project staff member. Some of the key areas of activity include:

- Carbon Farming
- Carbon tax
- Water - Murray Darling Basin Reform
- Biodiversity - National Wildlife Corridors Plan
- Product Stewardship Legislation – National Waste Policy
- Container deposit legislation
- CCA posts
- Energy Efficiency
- Climate change policy
- NRM Board/CMA engagement
- On-Farm environmental management
- Retailer engagement - national and international
- International environmental collaboration – Standards Australia, FIVS, OIV WWTG

In addition to activity in these areas WFA also consulted and developed a broader NRM strategic plan, the basis of which was to highlight the key priorities for environmental activities. The NRM Plan was informed through a consultation day (August 2011) that included stakeholders representing industry and government as well as a number of environmental experts. Since the creation of the plan WINEC has utilised it to inform activities and is working through the actions of the plan via an internal work plan. The consultation and development of the NRM strategy were undertaken through the project in order to fulfil the Year 2 output, Activity B (Revised 'Sustaining Success' document launched). A public summary version of this plan has been published on the WFA website http://www.wfa.org.au/environmental_sustainability.aspx . The summary version is also provided in Appendix 2.

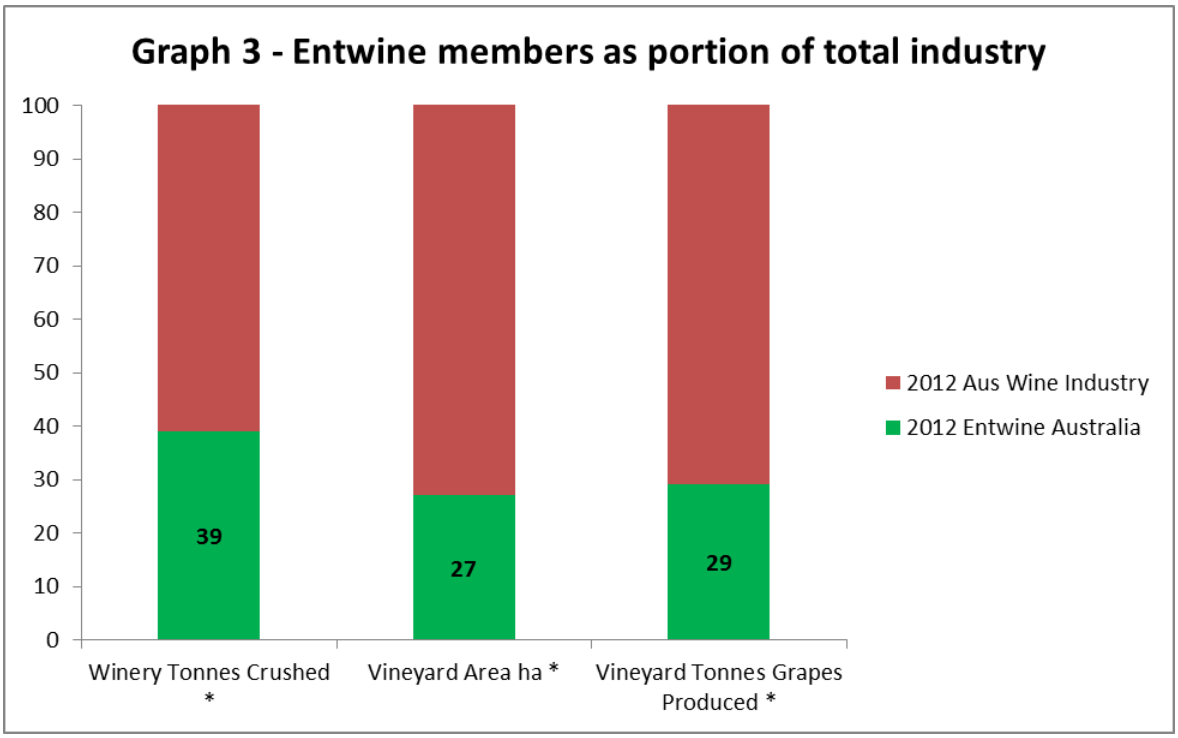
Entwine Australia – Entwine Australia has formed a critical part of the outputs of this project. The program's success to date would not have been possible without the additional resources provided through this project.

Overall the uptake of Entwine membership to date has been encouraging with 734 members joining the program since December 2009 (Graph 2). To date the uptake has been strongly weighted towards vineyard participation. Of the 734 members only 47 are wineries. The larger portion of vineyard sites is not surprising when considering the makeup of the Entwine Australia members and indeed the Australian wine industry. Entwine Australia winery membership is strongly supported by a number of larger wine companies. Each of these wine companies is supplied by large numbers of contract grape suppliers and several have begun to work towards membership of Entwine Australia across their supply chain. These contract growers go a long way to explaining the large skew of vineyard members.



The Entwine Australia winery members account for almost 40% of the total wine industry crush based upon available 2012 crush data. The vineyard members make up just fewer than 30% of the total industry by both hectares and grapes produced (Graph 3).

Entwine Australia has had a reasonably high retention rate of members. Since it began, Entwine Australia has only had 48 members (three wineries and 45 vineyards) not renew. This represents on average an annual loss of around 1.5% with the annual increase in membership far surpassing this each year. These retention rates are expected to continue, as the work involved in becoming a member means that non-renewals are not common. Non-renewals typically only occur in vineyard members due to the sale of a business or ending of a contract supplying to a winery requiring Entwine Australia certification. Winery non-renewals have only occurred due to a sale of business.



* Based on most recent Entwine Australia data provided by members and available ABS/Vintage figures.

Entwine Review

Another key outcome of the project was the delivery of the Entwine review, which has driven the program and will inform its future activities. The Entwine Australia review day was held in

in August 2012 as it was identified that there was a need to improve upon several areas of the program. The day incorporated around 40 major stakeholders and included invitations to all regional associations, state and national bodies. The intent of the day was to address several key areas and conduct a SWOT analysis to identify the major issues. A synopsis of the review day SWOT analysis feedback is available as an appendix of this report.

From the day several key themes were identified and based on these, groups were formed to help address the issues. The groups consisted of:

1. Framework/structure
2. Business Case
3. Communications
4. Resources
5. Entwine Australia-extended

As a result the WFA in conjunction with WINEC are working on a number of key initiatives related to Entwine. Some of the major works include:

- Database – improved value for members, streamlining program management, refining program communications and improving reporting capacity.
- Resourcing.
- Revision of program structure and provision for clearer communication.
- A clearly defined and well communicated the Entwine Australia value proposition.
- Development of a clearer framework for integration of alternate programs, with a strong focus on regional programs.
- Integration of alternate elements into the program including a strong focus on Organics, Biosecurity, Packaging etc.
- Improved industry relations with NRM/CMA bodies.
- Working with WAC for assistance with broader industry promotion of program and possible export compliance requirements. Stronger focus on program promotion with market gatekeepers.
- Creating a model for regional interaction with NRM groups for assistance with Entwine Australia.
- Provision of regional benchmarking data and reporting to industry.

Work is being undertaken in each of these areas and it is anticipated that their effects will greatly improve the viability of Entwine Australia and result in continued improvement of the program into the future.

An extract from a presentation on Entwine review outcomes (including revised program goals and barriers to achievement) is provided in Appendix 2.

Entwine Data

A major element of Entwine has been the provision of industry environmental data. Originally it was intended that Entwine data would form the basis for industry environmental reporting that would replace the reporting undertaken through AWIS after 2009. As such, outputs were included in the original project that referred to national reporting. It was quickly realised that this would not be viable due to the data population size, scope, altered method and overall quality. It was therefore agreed that an Entwine newsletter would be released instead, as a measure of industry progress reporting. The industry newsletter is provided in Appendix 1.

The membership reporting outputs outlined in Year 4 of the program have been produced and provided to the GWRDC however are not included in this report due to data sensitivity. Entwine members have also been provided with individual personalised reports of regional benchmarks.

Entwine web and online database content has also been created through the support of this project. The Entwine Australia membership processes have all in the past been managed manually, however with membership expanding to 734 members this method is no longer practical. In order to streamline this process and provide better service to the industry it was identified that a new online system that incorporated automated processes would be necessary.

The improved online database will ensure delivery of outcomes and continued value/stability of Entwine Australia after the project funding has ceased. The new database will provide:

- Improved capacity for national, regional and individual benchmark reporting
- Greater benefit to Entwine Australia members
- More efficient/effective administration of the program
- Improved interaction between WFA and Entwine Australia members

Provision has also been made by WFA for a future review of the system after its first year of collecting/maintaining Entwine member information. This review will incorporate member feedback and ultimately improve the system in coming years.

This system will also be utilised to check and provide regional and national benchmark information to industry once quality and quantity of data is reached.

The Entwine database and associated new web content will be available to members from the 2013/14 renewal period. Screenshots of the database and new web content are provided in Appendix 2 of this report.

Communication and Extension - There has been significant input throughout the project into extension and communication of project outputs/activities and results. Entwine information sessions as part of the initial extension activities under Output D, Year 1 were undertaken and were a very useful means of program extension. A comprehensive list of major communication and information activities is provided in Appendix 1

Outcomes/Conclusions

The project performed extremely well against all of the planned outputs and performance targets. All have been completed and achieved.

The original outcomes of the project were as follows:

- Provide coordination and implementation support for national industry environmental initiatives.
- Assist with the development of Australian Wine Environmental Stewardship (AWES).
- Work with regional industry associations to coordinate group training and audit clusters to reduce the cost to industry of the implementation of AWES certification.
- Maintain an online environmental reference collection for the Australian wine industry.
- Maintain the online register of AWES participants.
- Undertake primary assessments to recognise environmental certification scheme equivalence with AWES.
- Assist with national and international advocacy activities to build recognition of Australian wine industry environmental initiatives.
- Develop environmentally-themed WineSkills training modules.
- Develop and deliver an industry communication package.

The only aspect that threatened the achievement of project outcomes was limited resourcing. Given this, the final year of the project was aimed towards ensuring that the program would be sufficiently set up to continue with the existing limited resources, assuming no changes. The Entwine database and a clear plan driven by the Entwine review recommendations and NRM strategic plan will greatly assist this in future. The continued support of industry and WINEC will also be critical.

Entwine has provided the Australian wine industry with:

- A national framework to highlight its environmental credentials and provide a means to meet market needs, whether they be wineries, retailers or consumers (international and national).
- Risk management for future market access demands.
- A means of capture and storage of historical environmental indicators for the Australian wine industry, with powerful policy and advocacy implications.
- Benchmark data that can be used to help businesses understand their performance compared to their peers and encourages improvement.
- A framework that drives continuous improvement and efficient use of natural resources, which benefits the environment and business.
- Better understanding and ability to calculate the carbon footprint of wineries and vineyards.



All members of Entwine are required to develop Environmental Action Plans, addressing multiple areas such as water, energy, waste, biodiversity, chemical use etc. This means that all 734 members currently hold internal plans for on-ground action to improve in these areas. The systems also include a process of Plan, Do, Check, Act which ensures members are continually reviewing their progress and improving.

Uptake of a system like Entwine is about creating a framework within business for continuous improvement. These improvement gains lead to better practices and efficient production. While there can sometimes be negative perceptions around management systems due to their inherent level of rigour and

documentation, there is no denying the positive impact they inevitably have on business. The brief case study below was created during the project to highlight this important point:

Case Study: Cape Mentelle - Margaret River (WA)

Cape Mentelle in Margaret River (WA) is taking full advantage of its Entwine membership. Spurred on by Entwine Australia membership requirements around energy efficiency and carbon footprint monitoring, an extensive winery energy use audit was conducted of all plant, machinery and processes to measure energy use and identify areas for significant energy savings.

The outcome has resulted in a plan to change practices, reduce energy consumption and provide a framework for maintenance and capital investment to maximise energy efficiencies in the winery. This will yield environmental benefits, reduce Cape Mentelle's carbon footprint and provide financial gains as well.

After less than a year, energy use has fallen by 17% (amounting to a cost saving of around $30,000 off the energy bill), with an expectation to make further savings over time. Similar achievements have been made in the vineyard operations, with funding secured for fencing a sensitive stream bank to protect native vegetation when sheep are grazed in the vineyard over winter at the Chapman Brook Vineyard, thanks largely to the efforts of former chief viticulturalist at Cape Mentelle, Jim White.

Evan Thompson, Cape Mentelle Winery Operations Winemaker.

The Entwine program encourages operators to consider their business and related practices to identify the areas for change and drives them along a path of efficiency and continuous improvement.

Many more Entwine members are undertaking these types of initiatives, driven by the program. A key component of future activities for WFA will be in collecting and communicating these types of examples to highlight the value and benefit that the program holds for the Australian wine sector.

Recommendations

Entwine Membership
For the program to continue to be successful, the WFA needs to ensure significant uptake across Australia. This will aid both the financial stability of the program as well as significantly improving the data quality and reliably. Future activities of the program will therefore need to address the ability to drive or encourage uptake.

It is also widely acknowledged that Entwine's success is primarily a result of the efforts of a few major wine companies and their commitment to include their entire supply chain within the program. The efforts of these companies have been immense and it will be important that other large companies also follow this example. While the support of these companies has been crucial it does pose a risk to the program if they were ever to withdraw. Although this is highly unlikely, it does need to be considered. Improving the value of Entwine for small/medium wineries and vineyards will be a significant focus for 2013/14 and beyond.

Regional and or state engagement is another area that is crucial for Entwine moving forward. The program has clearly highlighted that uptake is strongest when driven by champions at regional/state level. Continued support and integration at a regional state level is a must. NRM and CMA engagement is also important to these activities.

Expansion
In order to improve the value of the program and maintain relevance in international markets, the scope of the program must evolve. Since the inception of Entwine there has been a growing international trend towards broader sustainability that incorporates the social and economic aspects of business. Adaption and expansion of Entwine will therefore be needed to remain relevant. The Entwine review has identified a few areas of expansion including biosecurity, social, packaging and food safety issues.

Market recognition
Industry needs to provide stronger investment in the marketing of the Entwine Australia program and other environmental initiatives taking place within the industry. This will aid in improving the reputation of the Australian wine brand and help underpin the industry's premium wine proposition.

Name and logo
For a program to be driven in markets, the market-facing name of the program needs to immediately identify what it stands for. Wineries need to have a simple and easily recognisable visual cue that can be used to identify them as being environmentally responsible. As the name Entwine Australia does not provide this instant recognition, consideration needs to be given to providing some form of logo/branding that can achieve this. The brand Entwine Australia currently holds some value within industry and therefore may have use as a program name. However, consideration should be given to the adoption of an alternate market-facing brand.

Resourcing
Entwine membership is currently not at a high enough level to sufficiently self-fund the programs managed and the recommended developments. Supplementary resources need to be sought and this process is currently under way at varying levels.

Continued or increased industry organisation support
- GWRDC – Continued support of future program developments through information services and or financial investment as necessary.
- WAC – Future promotion and marketing of Entwine (environmental sustainability) as part of the broader Australian wine brand proposition.

- AWRI – Continued technical and information provision to assist with continued improvement of the program.
- WGGA – Role in grower communication currently being investigated.
- State and regional – Entwine has worked best in states or regions where the state/regional association has backed, linked activities with or driven the program. This level of "on ground" championing is vital to the program's success as this is not an area where national bodies have significant influence.

Entwine Review

Overall the recommended actions of the Entwine review should all be pursued as a means of continual improvement and ensuring the success of Entwine in the future.

Appendices

Appendix 1 Communication

In this appendix

- Project communication activity by year
- Project newsletter
- Project Brochure

Year 1 (09/10)
Entwine Australia Launch was held on December 7 2009 at the National Wine Centre. The Honourable Tony Burke MP was in attendance to launch the program as well as a contingent of trade media.

Information sessions were held through the following:

- QLD - Queensland Wine Business Conference
- VIC – VWIA Conference and AGM 2009
- SA – Australian Wine Industry Environment Conference - speakers included Stephen Strachan (WFA), Evan Hiscock (Lion Nathan Wines) and Russell Johnstone (Pernod Ricard). The WFA also had a booth providing conference attendees with information regarding Entwine Australia
- WA - WIAWA Outlook Conference
- TAS – Keep it Real 2009, National Food Safety, Quality and Environmental Assurance Conference.
- NSW – NSWWIA did not express interest in holding a session

Additional information sessions have since been held across SA including:

- McLaren Vale
- Adelaide Hills
- Clare Valley
- Limestone Coast (including: Wrattonbully, Padthaway, Robe & Mount Benson)
- Langhorne Creek

Year 2 (10/11)
During 2010/11 project staff placed substantial emphasis on encouraging membership in the fledgling Entwine Australia scheme. Staff visited many wine regions to give presentations on the Entwine Australia scheme at regional association meetings and wine sector events (specific activities over the last twelve months are listed below). In addition a number of visits to individual wineries and vineyards have been conducted to promote membership of Entwine Australia and learn about the experiences members have had in joining the scheme to date.

- Workshop as part of AWITC
- Promotion to the Barossa Technical Group
- Meetings with representatives of the NZ, Californian and Chilean sustainable winegrowing programs in Adelaide
- Wine Environment Network Facebook
- Presentation on Entwine Australia at the “10+ ways to improve your Environmental Footprint” conference Adelaide
- Wine Industry Outlook conference – Entwine Australia stand

- Co-authored presentation for the Californian 'Vinecology' workshop and associated paper
- Presentation at the Wine Australia outlook conferences in Perth and Margaret River
- Entwine Australia Newsletter and Flier development and distribution to Industry
- Chief judge of 2011 Federation Square Sustainability Award
- Updated Entwine Australia website content
- Articles in wine press and regional newspapers

Regional Association Presentations and/or meetings:

- Limestone Coast (including Coonawarra, Wrattonbully, Padthaway, Robe & Mount Benson), Langhorne Creek, Clare Valley, McLaren Vale, Barossa Valley, Tasmania, Orange, Tumbarumba, Cowra, Hilltops, Gundagai, Goulburn Valley, Western Victoria, Mornington Peninsula, Yarra Valley, Rutherglen, Riverina, Sunbury and Macedon Range, Hunter Valley, Margaret River, Geographe, Perth Hills, Swan District, Great Southern

Year 3 (11/12)
Year 3 coincided with the WFA restructure and there were therefore fewer resources for extension/communication activities. In Year 3 project staff engaged with presentations to students at the AWRI and Melbourne University as well as presentations at regional level.

The significant drop-off in communication activities from this point has had a negative impact on Entwine, further highlighting the strong need for continued resourcing and the importance of engagement.

The NRM strategic plan workshop including over 40 stakeholders was also held in August 2011.

Year 4 (12/13)
As in the previous year, a lack of resources resulted in fewer communication and extension activities. Students were again engaged through the AWRI as well as continued regional engagement. Project staff also presented to around 30 participants at a Freshcare Trainer/Auditor workshop in Year 4.

The Entwine Review day was undertaken in August 2012.

The development of new web and online database content was the other major source of communication in Year 4 of the project. www.wfa.org.au/entwineaustralia

Entwine Australia Newsletter

entwine australia

February 2011 - No.1

Entwine celebrates over 400 members in its first year!

The first 12 months of Entwine Australia have been fantastic; we exceeded all expectations by surpassing over 400 members, so thank you to all members for helping to make this scheme a success. During the year Damien Griffante (Entwine Coordinator) and I were busy visiting many wine regions to talk about Entwine and meet with interested winery and vineyard managers, so thanks also to all those regional associations which have taken the time to meet with Damien or me. This will continue in 2011. For those who have missed out, please get in touch to arrange a meeting or information session for your region.

A great help for people joining Entwine has been the Australian Government's FarmReady training rebate for the Freshcare viticulture certification. Whilst the FarmReady scheme is fully subscribed for this financial year, we urge everyone thinking about joining Entwine to sign up for courses early in the next financial year to avoid missing out.

As the wine sector emerges from the currently stormy financial waters we can be sure that environmental concerns will return as a hot topic, because global environmental problems such as overpopulation, water management, pollution and climate change just don't seem to be going away.

Entwine membership provides a prudent course of action so that you can be ready to succeed in the face of future environmental and market challenges. Over the coming year Damien and I will be working hard to make sure that Entwine is as practical and cost-efficient as possible, and that members can address the concerns of both wine lovers and the communities that we live and work in.



Jonathan Green
WFA Natural Resources Manager

The Rosenzweig Family — Our First Member

The Rosenzweig family, which owns and manages around 90ha of vineyard in the Barossa Valley, became aware of Entwine through initial pilot workshops that were conducted before the program got underway. The family decided to get involved as it recognised the increasing pressure for the industry to substantiate environmental claims within the market place. James Rosenzweig provided the following thoughts.

"Growers are the start of the wine value chain. We were a little worried that becoming involved would add to our workload and have a large cost. However, help was provided by our winemaker in the form of group training, organising a government subsidy (FarmReady) to cover the training cost and a free on site visit to check how we were going before our audit date. This onsite visit was the most value and I recommend it being done in a timely manner after training because it ended up ticking all the boxes I had not completed. The visit went through every part of the program in detail and demonstrated that we were already almost compliant with the certification code.

"I would say that most growers with a good management system would also not be far from compliance with the requirements. It is simply a matter of recording the good environmental practices that most Australian wine grape growers practise every day. Entwine puts your good work on paper for all to see."

Promoting your membership

To promote wine as 'Sustainable Australian Wine' on the basis of Entwine membership you need to demonstrate that 85% of the grapes were grown in an Entwine member vineyard and that the wine was made in an Entwine member winery. The next step is to decide how to promote your credentials. The point here is to make sure that any consumers or retailers who want to know about your sustainability can access this information easily. If you have marketing staff or contractors, make sure they understand your achievements. Your website is a great place to start! Key points to bear in mind include:

- Third-party certified sustainable practices in accordance with world's best practice
- Carbon accounting
- Resource use accountability
- Striving for continuous improvement

Guidelines for promoting your Entwine membership on wine packaging will be available soon. In the meantime, if you wish to use the Entwine logo on promotional materials such as websites, signage and newsletters please contact the WFA for formal approval first.

We're on Facebook

Get up to date with all the latest Entwine and national environmental news with the Wine Environment Network on Facebook. The group provides Facebook users within the Australian wine industry with a means of networking with like minded people. Other interesting features include news updates, discussion boards and pictures. If you would like to join the network visit:
http://www.facebook.com/group.php?gid=5985333306

Certification — Training and Auditing

Most Entwine members are utilising the Freshcare Environmental viticulture and winery certifications, these offer a relatively low cost but comprehensive certification with a three-yearly audit cycle.

Environmental certification training and auditing is available in all wine regions from a range of providers. However if you are having any trouble finding audit or training services, contact Damien for advice. We recommend that you shop around among the trainers and auditors available to get the best deal available. Further information is available on the Entwine website: **http://wfa.org.au/entwineaustralia/certification.aspx**

Some regional associations are supporting their members by organising group certification training sessions and negotiating a set price for audits, which can mean that audit prices are as low as $450 for the three-yearly audit. For contact details and more information regarding the Freshcare Certification Bodies, visit: **http://www.freshcare.com.au/certBodies** .

Entwine and continuous improvement

As well as including elements of continuous improvement in the requirements of Entwine membership, we at the WFA are taking this theme to heart and will be reviewing Entwine over the coming months to make sure that the certification and reporting is relevant, up to date and cost efficient.

A new development this year will be confidential resource-use benchmarking for members that is based on your annual resource use reports. If you would like to provide feedback on the Entwine program, feel free to contact Damien.

Entwine in Action—Cape Mentelle

Cape Mentelle in Margaret River (WA) is taking full advantage of its Entwine membership. As a result of the certification process, the company has been able to secure government funding to conduct several projects.

At the Chapman Brook Vineyard, funding will assist with the fencing of a sensitive stream bank to protect native vegetation when sheep are grazed in the vineyard over winter.



Secondly, funding was granted for consultants to conduct an extensive winery energy use audit to examine all plant, machinery and processes to measure energy use and identify areas for significant energy savings. The outcome will provide a plan on how operational practices can be changed to reduce energy consumption and provide a framework for maintenance and capital investment to maximise energy efficiencies in the winery, yielding environmental benefits, reducing Cape Mentelle's carbon footprint and providing financial gains as well.

Jim White, Viticulturist, Cape Mentelle

To view the energy audit report visit: **www.winewa.asn.au/Documents/Cape%20Mentelle%20Report.pdf**

What's the difference?

Many growers and wineries have enquired about the difference between Entwine Australia, Freshcare, ISO14001 and systems such as HACCP.

Entwine Australia is the national environmental assurance scheme. As a member of Entwine you are highlighting that your operation is environmentally responsible, and that you are contributing to the national efforts to prove our environmental credentials. This effort supports the sector to represent you on environmental issues and you benefit from a consistent market message and benchmarking advice.

To become a member of Entwine you need to have gained a Wine Industry National Environmental Committee approved environmental management certification. Currently the only two approved Environmental certification schemes are Freshcare Environmental and ISO14001. We are reviewing some other environmental certifications such as organic.

HACCP is a food safety certification, not an environmental management certification. Some have suggested that HACCP and environmental management certifications could be rolled into one, but such a certification would require a similar amount of record keeping, planning and auditing as if you were holding two separate certifications, given the two separate purposes. Additionally this approach requires a certification body to develop, promote, administer and conduct training and auditing for such a system. We have made enquiries but had no interest to date.

Entwine on the road

Entwine regional visits have so far been held in the following areas:

South Australia — Limestone Coast, Langhorne Creek, Clare Valley, McLaren Vale, Adelaide Hills, Barossa Valley.

Victoria — Mornington Peninsula, Yarra Valley, Bendigo, Goulburn Valley, Rutherglen.

New South Wales — Hunter, Riverina, Orange, Cowra, Hilltops, Tumbarumba

Tasmania — Launceston

Additionally Jonathan and/or Damien have visited a number of vineyards and wineries in these and other regions.

Regional promotions are now being planned for this year. If you are interested please contact us.

Want to know more?

Want more information about Entwine, other national environmental issues or to discuss anything in this newsletter? Contact the WFA environment team:

Jonathan Green
Manager, Natural Resources
Email: jonathan@wfa.org.au
Phone: 08 8222 9262

Damien Griffante
Entwine Coordinator
Email: damien@wfa.org.au
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entwine
australia

entwine australia is a voluntary national environmental assurance scheme that allows local winemakers to receive formal certification of their practices according to recognised standards.



entwine australia

entwine australia

Winemakers increasingly are being asked to show their environmental credentials.

In Australia, as around the world, retailers, restaurants and ordinary consumers are looking to buy or offer wines that meet modern standards for environmental stewardship. Those that don't may be ignored, irrespective of quality.

EntWine Australia is a voluntary national environmental assurance scheme that allows local winemakers to receive formal certification of their practices according to recognised standards.

The scheme is open to all wine companies and wine grape growers. As membership grows, the benefits will be felt across the industry and by the industry as a whole.

Members can carry the EntWine Australia logo and will be listed on the new EntWine Australia website, where consumers and retailers will search for wine companies that meet their environmental expectations.

EntWine Australia was developed by the Winemakers' Federation of Australia (WFA) through the Wine Industry National Environment Committee and builds on the success of the four-year Australian Wine Industry Stewardship (AWIS) program.

membership

Full EntWine Australia membership is offered to winemakers and wine grape growers who:

- are certified against a recognised, independently audited environmental certification program and audited at least every three years
- report a scope 1 and 2 carbon footprint to the WFA each year
- report to the WFA each year against the EntWine Australia Indicators.

Preliminary membership for up to two years is offered to those who meet the carbon footprint and EntWine Australia indicator requirements and have begun but not completed the certification process. Preliminary Members are listed on the EntWine Australia website but cannot use the EntWine Australia logo.

The EntWine Australia Indicators for wineries are: tonnes of grapes crushed; total winery water use; total wastewater and liquid waste generated; and percentage of solid waste recycled.

Indicators for vineyards are: tonnes of grapes produced; area under vine, excluding headlands; electricity use; total water use; total nitrogen applied; use of unleaded petrol, LPG and diesel (excluding biodiesel).

Carbon footprint can be calculated using the Australian Wine Carbon Calculator or the National Greenhouse & Energy Reporting Scheme calculator. Grape growers also can comply by reporting annual fuel, energy and nitrogen fertiliser use in their Indicators.



certification

A third party audit must be completed at the winery or in the vineyard. WFA has customised and endorsed an existing certification scheme and is in the process of formally recognising other schemes that are deemed equivalent because they meet key criteria.

WFA's customised program is based on the horticulture industry's Freshcare Environmental Code. Both the Freshcare Environmental Code (Winery) and Freshcare Environmental Code (Viticulture) comprise a one-day training course, a site visit by the trainer and an independent audit. (For more information about Freshcare Ltd visit www.freshcare.com.au)

If grape growers and wine producers are already certified against another equivalent scheme recognised by the WFA, they do not have to be certified against the Freshcare Environmental Codes.



costs

Members and Preliminary Members pay an annual fee of:

- $400 + GST for wine companies that are not members of the WFA
- $100 + GST for wine companies that are members of the WFA
- $100 + GST for wine grape growers.

A wine company can choose to take out one membership covering all brands or individual membership for some brands. In this case the membership fee applies for each brand.

Growers and winemakers are responsible for the cost of certification. Actual costs will vary depending on which certification system is used. Indicative costs for certification under WFA's Freshcare Environmental Codes are:

- registration fee, $77
- training costs, $150–$250 per participant in a group
- audit fee, about $450 (payable every three years)
- Freshcare certification management fee, $140 (payable at audit every three years).

The cost of the trainer's site visit will vary according to the trainer, travel costs and the time required.

EntWine Australia logo

Members can feature the EntWine Australia logo on websites and marketing material.

To use the logo on wine labels, the wine must be produced in an EntWine Australia Member winery and at least 85% of the grapes must be from EntWine Australia Member vineyards.

entwine australia

Winemakers' Federation of Australia

CARING FOR OUR COUNTRY

For more information:
Please contact the Winemakers' Federation of Australia
Phone: 08 8222 9255 **Email:** wfa@wfa.org.au
Web: www.wfa.org.au/entwineaustralia

Photos courtesy of the Australian Wine and Brandy Corporation

Appendix 2 Intellectual property

In this appendix

- Freshcare Environmental Winery Code of Practice
- Freshcare Environmental Vineyard Code of Practice
- 2009 AWIS National Report
- NRM Strategic Plan Summary
- Screenshots of the database and new web content.
- AWCC User Guide v1.5
- Entwine review – SWOT summary
- Entwine review - Revised Program goals and barriers

The Entwine website contains a large number of resources created throughout this project. Further resources not attached to this report can be accessed at the website: www.wfa.org.au/entwineaustralia

Freshcare
Code of Practice

Environmental Winery

The Environmental Assurance Program for Australian Wineries

2nd Edition

Endorsed by Entwine Australia

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www.freshcare.com.au

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Preface

Acknowledgments

Many individuals and organizations have been involved in the development of the Freshcare Code of Practice Environmental Winery Second Edition. Their contribution and support is much appreciated.

Disclaimer

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Code Review Process

The Freshcare Technical Committee in conjunction with the Winemaker's Federation of Australia is responsible for the review and amendment of this Code of Practice. Freshcare members are advised of all Code updates and should ensure theirpractices comply with amendments within the timeframes specified by Freshcare.

Suggestions for improvement to this Code of Practice are encouraged from all users. Suggestions should be submitted in writing to Freshcare Limited or the Winemakers' Federation of Australia.

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Introduction

Purpose and scope

The Freshcare Code of Practice Environmental Winery is an industry owned standard, describing the practices required on siteto provide assurance that winery operations are managed with care for the environment. This code, together with the Freshcare Code of Practice Environmental Viticulture Second Edition can be used to meet the certification requirements for Entwine Australia membership.

The program offers benefits to suppliers, customers and other interested parties. It provides verification that an industry recognised environmental assurance program is followed. Certification to the program is achieved through independent auditing to this Code of Practice.

Freshcare continues to work closely with key customer groups and industry stakeholders, maintaining a level of awareness of program developments and ensuring continued compliance with market requirements and community expectations.

How the Code was developed

A team of quality, food safety and environmental facilitators, experienced in developing management systems, developed the original Freshcare Code of Practice Environmental. A risk assessment approach was used to identify environmental impacts in site management, and where potential environmental harm may occur, the practices needed to minimise the impact.

This winery code has been developed from Freshcare's original Environmental code in collaboration with the Winemakers Federation of Australia. During 2009 a number of wineries across Australia trialled the draft code to adapt it and ensure its relevance to wineries. The First Edition was released in November 2009. Feedback from participating wineries, trainers, auditors and other stakeholders has been incorporated into this Second Edition. The Second Edition also incorporates the structural changes and relevant elements from the Freshcare Code of Practice Environmental Viticulture Second Edition.

An important criterion in developing the Freshcare Code of Practice Environmental Winery was the need for consistency with the Freshcare Code of Practice Environmental Viticulture. This has been achieved through adopting a similar structure, elements and compliance criteria where relevant.This consistency enables a single on-site management system to be developed and audited where viticulture and winery operations occur on the same property.

The following publications were referenced when determining the practices required:

1. Environmental Management Systems [ISO14001:2004]
2. Freshcare Food Safety and Quality Code of Practice – 3rd Edition [2009]
3. Environmental Assurance Recognition Framework for Australian Horticulture [2010]
4. Freshcare Code of Practice Environmental Viticulture Second Edition [2011]
5. GlobalGAP Integrated Farm Assurance Fruit and Vegetables [2012]

Using the Code

The elements of the Freshcare Code of Practice Environmental Winery are grouped into two sections, Management and Environment.

Each section has elements that describe the outcomes required and the practices necessary to ensure compliance.

More information on compliance is provided in the Freshcare Code of Practice Environmental Winery Compliance Criteria - a document which forms the basis of Freshcare Code of Practice Environmental Winery training. Together with the Freshcare Forms these provide the foundations for the effective implementation of the Freshcare Code of Practice Environmental Winery.

Meeting the requirements of Freshcare Code of Practice Environmental Winery does not guarantee compliance with local, state or national legislation. Wineries are responsible for ensuring that they comply with all applicable laws.

Freshcare structure

Freshcare is the horticultural industry's own on farm assurance program, developed by industry, for industry and operated as a 'not for profit' organisation.

Freshcare is 'owned' by twenty two peak industry bodies:

1. Apple & Pear Australia
2. Australian Banana Growers Council
3. Australian Chamber of Fruit & Vegetable Industries
4. Australian Lychee Growers Association
5. Australian Macadamia Society
6. Australian Mango Industry Association
7. Australian Melon Association
8. Australian Mushroom Growers Association
9. AUSVEG
10. Avocados Australia
11. Canned Fruits Industry Council of Australia
12. Chestnuts Australia
13. Custard Apples Australia
14. Growcom
15. NSW Chamber of Fruit & Vegetable Industries
16. NSW Farmers Association
17. Passionfruit Australia
18. Potato Processors Association Australia
19. South Australia Farmers Federation
20. Summerfruit Australia
21. Victorian Farmers Federation - Horticulture Group
22. Winemakers Federation of Australia

The owner organisations provide a vital link and conduit for communications between Freshcare and their individual members.

Representatives from the owner organisations (both producer and non-producer groups) comprise the Board of Freshcare Ltd.

The Freshcare Office undertakes the day-to-day management of the Freshcare Program.

Definitions

Adjacent	Immediately adjoining, neighbouring, lying near or close by.
APVMA	Australian Pesticides and Veterinary Medicines Authority. Australian Government authority responsible for the assessment and registration of pesticides and veterinary medicines.
Audit	A systematic examination of compliance, to determine whether practicesare being followed and to ensure that the system achieves its aims.
Biodiversity	The variety of species of plants, animals and microorganisms, their genes and the ecosystems they comprise. Often considered in relation to a particular area.
Business enterprise	An undertaking occurring on the property that may cause environmental harm. May include - but is not limited to - wine production, packaging, warehousing, horticulture, broadacre, livestock and dairy operations.
Chemical handling	Includes measuring and mixing chemicals.
Competent	Demonstration of knowledge and skills to complete tasks to specified performance criteria.
Conservation	The preservation, protection and management of the environment and natural resources.
Contamination	The introduction or occurrence of a hazard in the environment. In the case of soils and waterways contamination may include - but is not limited to -persistent chemicals and heavy metals.
Controlled waste	A waste that may cause harm to human health and the environment if it is not managed properly. It is the most hazardous category of waste and disposal of controlled wastes is regulated. Types of controlled waste may include hazardous substances and dangerous goods containers, winery waste products, waste oil, oil filters, paint, adhesives, batteries, tyres, fluorescent light tubes and some types of old electronic equipment.
Corrective Action Record (CAR)	A written record of an issue (or issues) that must be addressed to demonstrate compliance with this Code of Practice or Certification Rules. They may be raised during self-assessment, at initial assessment/annual audit or during routine site activities.
Customer	A commercial packer, marketing group, wholesaler, exporter, processor, retailer or consumer who receives produce from a supplier.
Dangerous Good	Solid, liquid or gaseous substances that can cause immediate risk to life, property or the environment during transport, storage and handling.
Ecological Communities	A unique group of plants, animals and micro-organisms that occupy and interact within the same geographical space. Each ecological community is adapted to occur in a particular habitat type, usually determined by factors such as soil type, position in the landscape, climate and water availability.
Environment	Surroundings in which an organisation or property operates, including landscape, soil, air, water, flora, fauna, humans and their interrelation.
Environmental harm of significance	Significant adverse (negative) change to the environment, wholly or partially resulting from the organisation/property's activities, products or services.
Environmental issue	Human impacts on the biophysical environment.
Environmental management	The management of the environment, particularly in relation to the balancing of the often conflicting requirements of natural and human-made resources, so that the maximum use of the land can be achieved without causing environmental harm of significance.

Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Australian Government legislation relating to the protection of the environment and the conservation of biodiversity. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places.
Environmental value	Worth that a community or society places on environmental resources or services for theirlife sustaining, recreational, aestheticor intrinsic ecological aspects.
Environmental weeds	Plant species that require action to reduce harmful effects on the environment. Environmental weeds can include both exotic and non-indigenous native plants. Each state and territory administers weed management legislation including lists of species and the responsibilities of landholders.
Feral animals	An introduced animal, with an established, self-supporting population in the wild.
Fuel	Petrol, diesel, LPG, kerosene, ethanol, oil, or any other gaseous, liquid or solid resource combusted for power or heat.
Hazard	A source of potential environmental harm or a situation with the potential to cause harm.
Hazardous substances	Solid, liquid or gaseous substances that may cause harm to living organisms and the environment. For example ethanol, hydrogen peroxide, sodium hydroxide and other substances used during the processing of winegrapes into wine or for cleaning of processing equipment. Also includes other products used on-site such as fuel, pesticides and sanitisers, but excludes small quantities of chemicals stored and used in on-site laboratories.
Highly degraded soil	Soil with three or more degradation factors (see soil degradation).
Irrigation	The application of water to cultivated land or open space, to promote the growth of vegetation or disperse wastewater.
Land and Soil	Land and Soil management at the winery site can involve areas such as: waste management areas, drainage areas, spillways, gardens, road edges and other open spaces at the winery site.
Management Plan	A structured, documented and authorised strategy for controlling processes and achieving desired outcomes.
Monitoring	A planned sequence of observations and measurements to assess whether control measures are effective.
Non compliance	A failure to comply with the requirements of the Freshcare Environmental Winery Code of Practice or Certification Rules.
Off-target	Any misplacement or movement away from the target to which the property activity is directed (for example, spray drift on to neighbouring area/crop or nutrient run-off into sensitive areas).
Optimise	To modify in order to maximise effectiveness and efficiency.
Original initiative	An initiative that has not previously been implemented on the property.
Property	The whole property/facility and/or areas leased from other landholders for the purpose of wine production. It includes all houses, buildings, paddocks, production areas, roads, fauna and flora, watercourses, etc, within the surveyed boundaries of the property title and/or leased areas specified.
Property activity	Wine production, packaging, movement, development, commercial cropping, stock management, residential and maintenance activities conducted within and around the surveyed boundaries of the property and/or other leased sites.
Property map	Aerial photographs, topographical maps, self-drawn maps or overlays that document the required features, infrastructure and natural resources on or adjacent to the property.

Ramsar	A term adopted following a 1971 international conference held in the Iranian city of Ramsar to identify wetland sites of international importance.
Record	Documentary evidence to support compliance with this Code of Practice. The medium can be paper, photographic, magnetic and electronic or optical disc or any combination thereof.
Registration	Approval of substances for use as an additive or processing aid by the relevant authority. Includes off-label permit system variations to label directions.
Riparian vegetation	Vegetation on or near the banks of a waterway (creeks, streams, rivers, wetlands).
Risk	The chance of something happening that will have an impact upon objectives. It is measured in terms of severity and likelihood.
(Material) Safety Data Sheet (SDS)	A reference document for hazardous substances and dangerous goods, fuels and other products that includes information on the products: physical and chemical properties; safe handling, storage, transport and disposal procedures; first aid; health hazards; impacts on the environment; and what to do in accidents and emergencies. In 2012 the term 'material' has been removed – now called SDS only but with 5 year transition period for naming change.
Salinity	The presence and level of soluble salts in soil or water. Salinity occurs both naturally and as a result of human activity. Its use here is taken to mean salinity increase, caused by property (human) activity.
Sensitive areas	Areas at high risk of environmental harm, caused by property activity. Sensitive areas may include, but are not limited to: Regionally Significant Vegetation, National Parks, World Heritage sites, Ramsar wetlands, biodiverse areas, other crops, livestock, watercourses, marine areas, wetlands, remnant native bushland, soils, neighbouring properties and public areas.
Signature	Handwritten or digital signatures, initials, marks and other authorisations confirming the identity and intent of records.
Sodicity	A relatively high proportion of sodium ions adsorbed to clay particles in the soil. This causes soil structure decline and soil instability on wetting.
Soil	Unconsolidated minerals, organic materials, water and air. Parent materials and geological processes contribute to characteristics of soil structure and function
Soil acidity	Increasing acidity of soils. This can occur naturally or be increased through prolonged heavy use of some nitrogenous fertilisers, the removal of alkaline soil materials and the leaching of calcium and magnesium. Soil acidity development can reduce soil productivity, soil biology and run-off water quality.
Soil degradation	Loss of soil chemical, biological and physical characteristics. Degraded soil has poor structure and/or organic carbon; with salinity, pH and nutrient levels that are outside the acceptable range for producing healthy crops in an economically and environmentally sustainable manner.
Spill	Accidental release of solid, liquid or gaseous substances that may cause environmental harm.
Threatened species	Any native species (including animals, plants, fungi) that is listed as vulnerable, endangered or critically endangered under the *Environment Protection and Biodiversity Conservation Act 1999*. Threatened species are also listed and recognised on a State-by-State basis under relevant State or Territory legislation.
Training	Provision of knowledge and skills to perform tasks to a specified competency. Training can be delivered on-the-job or through qualified external providers.
Verification	A set of procedures, processes and tests designed to ensure the system is working effectively.

Vulnerable species	Any species (including animals, plants, fungi, etc.) which has a high risk of extinction in the wild in medium-term future. The Environment Protection and Biodiversity Conservation Act 1999 contains lists of vulnerable species. While individual states and territories of Australia are bound under the EPBC Act, they may also have legislation which gives further protection to certain species, and additional lists of threatened species.
Wastewater	Winery effluent, contaminated stormwater or run-off from other processes that is captured for reuse as irrigation or is treated before release back into the environment.
Workers	All people working in the business, including family members and contractors working on the property or in the business.
World Heritage	Properties listed as part of the cultural and natural heritage which the World Heritage Committee considers as having outstanding universal value.

Management

Code element	Compliance criteria	Viticulture Criteria
M1 Scope and commitment		
M1.1 Define the business scope and the scope of Freshcare Code of Practice Environmental Winery Certification.	1. The business enterprises undertaken on the property are documented.	M1.1.1
M1.2 Identify property areas, infrastructure and neighbouring areas on a property map.	1. A property map(s) is established that identifies: • property boundaries • buildings, tanks, cellar door, sheds, houses, on-property roads and access points • on-property vineyards or other production areas • neighbouring public roads, public places (schools, sports fields, etc) and production areas • bulk fuel storage, including underground tanks • hazardous substances and dangerous goods storage areas, mixing areas, equipment clean-down areas • drainage system of winery site, showing drainage lines through the site, surface drain network, direction of flow and drain interceptors • wastewater storage and treatment areas, and areas irrigated with wastewater • solid waste storage and or stockpile areas, including grape marc, treated timber and empty chemical containers • organic waste, composting/ageing areas • water sources and extraction points • areas that are or at risk of being highly degraded, eroded or contaminated • natural waterways, wetlands, riparian areas and lakes • sensitive environmental areas adjacent to the property boundary such as National Parks, World Heritage areas, Ramsar wetland areas, wildlife sanctuaries/corridors or other specified conservation areas • significant stands of remnant native vegetation • threatened species populations or habitat areas • other sensitive areas with high conservation value	M1.2.1

Code element		Compliance criteria	Viticulture Criteria
M1.3	Document the business commitment to the Freshcare Code of Practice Environmental Winery.	1. The owner or appropriate senior manager signs a commitment statement or an equivalent environmental policy to support and comply with the Freshcare Code of Practice Environmental Winery, Freshcare Certification Rules and Environmental Action Plan.	M1.3.1
		2. The commitment statement/environmental policy is communicated to all workers.	M1.3.2
		3. The commitment statement/environmental policy is displayed in the office reception area and/or on the company website.	
		4. The commitment statement/environmental policy is reviewed annually in conjunction with the Environmental Action Plan.	M1.3.3
		5. A management representative is nominated as the environmental compliance point of contact for workers.	
		6. Entry to the property is granted to persons who are authorised for the purposes of auditing for Freshcare Code of Practice Environmental Winery certification.	M1.3.4

M2 Documentation

M2.1	Verify compliance to this Code of Practice through relevant documents and records.	1. The current editions of the Freshcare Code of Practice Environmental Winery and the Freshcare Certification Rules are kept.	M2.1.1
		2. Legible records and documentation required to verify compliance are kept.	M2.1.2
		3. Documents and records are identified by a version number or date of issue.	M2.1.3
		4. As documents and records change, out-of-date versions are replaced with the new version.	M2.1.4
		5. All records are signed and dated by the person completing the record.	M2.1.5
		6. All records are kept for a minimum of five (5) years (or longer if required by legislation or customers).	M2.1.6

M3 Training

M3.1	Train all workers who complete tasks relevant to this Code of Practice.	1. A management representative completes approved training for the Freshcare Code of Practice Environmental Winery.	M3.1.1
		2. Training is provided for workers who complete tasks relevant to the Freshcare Code of Practice Environmental Winery.	M3.1.2
		3. Training is provided in the relevant language or pictorially.	M3.1.3
		4. A record of training is kept and includes: • name of the worker trained • title or topic of the training • signature of the worker trained and date of the training • signature of the trainer (not required for external training)	M3.1.4

Code element		Compliance criteria	Viticulture Criteria
M4	**Internal audit and corrective action**		
M4.1	Conduct internal audits to verify on-going compliance with this Code of Practice.	1. An internal audit of all activities and records relevant to the Freshcare Code of Practice Environmental Winery is conducted at least annually. A record is kept. 2. Workers responsible for completing sections of the internal audit are identified and, where possible, independent of the practices being assessed.	M4.1.1 M4.1.2
M4.2	Complete corrective actions for any non-compliance or deficiency.	1. A Corrective Action Record (CAR) is completed when: • the requirements of the Freshcare Code of Practice Environmental Winery or Freshcare Certification Rules are not being met, as identified during internal audits, external audits, or routine property activities • a complaint relevant to the Freshcare Code of Practice Environmental Winery or Freshcare Certification Rules is received from a neighbour, customer or regulatory authority • environmental harm has occurred/may occur as a result of property activity, neighbouring activity or a natural event 2. A Corrective Action Record (CAR) includes: • description of the problem • cause of the problem • whether or not the problem has occurred before • short term fix (action taken to fix the problem) • long term fix (action taken to prevent the problem re-occurring) • date action completed and name and signature of the person responsible • verification that action has been effective • name and signature of the person reviewing that short term and long term actions are completed and effective • date of the review 3. A new Corrective Action Record (CAR) is implemented if short term or long term fixes have not been effective in addressing the problem. 4. Corrective Action Records (CARs) are retained for a minimum period of five (5) years (or longer if required by legislation or customers).	M4.2.1 M4.2.2 M4.2.3 M4.2.4

Environmental

Code element	Compliance criteria	Viticulture Criteria

E1 Environmental action planning

E1.1	Establish an Environmental Action Plan to identify actions for improving the property's environmental values.	1. An Environmental Action Plan is established that documents the actions planned for improving the property's environmental values. The Plan includes: • date of Plan development • positive environmental actions already undertaken on the property • location on property of environmental issue or value • environmental issue or value being addressed • actions proposed to address the issue or value • estimated date of completion for each action • date when action was completed or reason for the action not being completed • name and signature of the person verifying action has been completed	E1.1.1
		2. The Environmental Action Plan is reviewed and verified/updated at least annually. The name and signature of the person completing the review and the date of the review are documented.	E1.1.2

E2 Land and soil

E2.1	Manage land and soil, and minimise degradation, erosion and contamination.	1. Soil conservation practices around the winery site are chosen to minimise soil degradation, erosion and contamination.	E2.1.1
E2.2	Manage areas with highly degraded, eroded or contaminatedsoil.	1. Areas identified as being highly degraded, eroded or contaminated are: • managed to minimise further degradation, erosion or contamination • contained to minimise soil movement on and off-site	E2.2.1
		2. Remediation activities for areas identified in E2.2.1 are documented in the Environmental Action Plan.	E2.2.2

Code element		Compliance criteria	Viticulture Criteria
E3 Hazardous substances and dangerous goods			
E3.1	Select hazardous substances and dangerous goods that minimise risk to the environment	1. Consideration is given to all available options before hazardous substances and dangerous goods are chosen. 2. When necessary to use hazardous substances and dangerous goods, those that are less hazardous and dangerous and/or have a lower environmental impact are considered.	E3.1.1 E3.1.2
E3.2	Obtain correctly labelled hazardous substances and dangerous goods.	1. Hazardous substances and dangerous goods are purchased from accredited suppliers. 2. Hazardous substances and dangerous goods containers, on receival, are adequately labelled and in acceptable condition.	E3.2.1 E3.2.2
E3.3	Store, manage and dispose of hazardous substances and dangerous goodsto minimise the risk of environmental harm.	1. Hazardous substances and dangerous goods storage areas are: • located and constructed to minimise the risk of contaminating the site • structurally sound, adequately lit and constructed to protect substances and goods from direct sunlight and weather exposure • restricted to authorised workers 2. Hazardous substances and dangerous goods are stored in designated separate areas for each category, and for hazardous substances and dangerous goods awaiting disposal. 3. A current Safety Data Sheet (SDS) for all hazardous substances and dangerous goods stored on site is kept. 4. Hazardous substances and dangerous goods are stored in original containers according to directions on the container label. If transferred to another container for storage purposes, the new container is a clean hazardous substances and dangerous goods container and a copy of the hazardous substances and dangerous goods label is transferred to the new container. 5. Deteriorating hazardous substances and dangerous goods labels are replaced immediately with a legible copy. 6. A check is conducted at least annually to identify and segregate hazardous substances and dangerous goods for disposal that have: • exceeded the label expiry date • had their registration withdrawn • containers that are leaking or corroded or have illegible labels	E3.3.1 E3.3.2 E3.3.3 E3.3.4 E3.3.5 E3.3.6

Code element		Compliance criteria	Viticulture Criteria
		7. A record of the check is kept, including: • date of the check • name and quantity of hazardous substances or dangerous goods awaiting disposal	E3.3.7
		8. Unusable hazardous substances and dangerous goods and empty hazardous substances and dangerous goods containers are legally disposed of through registered collection agencies or in approved off-site disposal areas.	E3.3.8
E3.4	Train and authorise workers who store, handle, apply and/or dispose ofhazardous substances and dangerous goods.	1. Workers involved in the storage, handling, use and disposal of hazardous substances and dangerous goods: • have completed hazardous substances and dangerous goods training; and • are able to demonstrate competency in storage, handling, application and disposal as specified by the Freshcare Environmental Winery Code of Practice.	E3.4.1
		2. Workers authorised to store, handle, apply and/or dispose of hazardous substances and dangerous goods are trained in practices that minimise the risk of environmental contamination from hazardous substances and dangerous goods and in actions to be taken in the event of potential contamination.	E3.4.2
		3. A register of workers authorised to store, handle, apply and/or dispose of hazardous substances and dangerous goods is maintained and displayed in the hazardous substances and dangerous goods storage area.	E3.4.3
E3.5	Use hazardous substances and dangerous goods	1. Hazardous substances and dangerous goods are used according to label directions.	E3.5.1
E3.6	Maintain and calibrate hazardous substances and dangerous goodsapplication equipment.	1. Hazardous substances and dangerous goods usage equipment is maintained and checked for effective operation before and during each use.	E3.7.1
		2. Equipment requiring calibration is calibrated at least annually or as per manufacturer's instructions. Equipment is calibrated using a recognised method and a record of calibration is kept, including: • description of method and calibration results • date of calibration • name and signature of person calibrating the equipment	E3.7.2

Code element		Compliance criteria	Viticulture Criteria
E3.7	Manage mixing and disposal of hazardous substances and dangerous goodsto minimise risk to the environment.	1. Hazardous substances and dangerous goods handling and mixing areas are located to minimise the risk of contaminating the site and surrounding environment. 2. Leftover hazardous substances and dangerous goods are disposed of according to label directions (where specified) and in a manner that minimises environmental harm.	E3.8.1 E3.8.2
E3.8	Record all hazardous substances and dangerous goodsuse	1. Records of all hazardous substances and dangerous goods use are kept, including: • date of use • hazardous substances and dangerous goods used • quantity used • equipment and/or method used • name and signature of the person responsible for the use	E3.9.1

E4 Emergency response

E4.1	Manage spills to minimise environmental harm	1. The potential spill risks for wine, wastewater and hazardous substances and dangerous goods are assessed. 2. Spill control materials and equipment are adequate for containing spill risks and located in relevant areas. 3. Internal and external emergency contacts required in the event of a spill are documented and displayed in relevant areas. 4. Spill response procedures are documented and displayed in relevant areas. 5. Workers are trained in spill response procedures. 6. Spill response procedures are reviewed and verified/updated annually, or: • when there is a change in relevant legislation • when there are alterations to facilities affecting spill risk • following a spill 7. Spill response procedures are practiced at least annually. The activity is documented using a Corrective Action Record.	

Code element		Compliance criteria	Viticulture Criteria
E5	**Water**		
E5.1	Document a Water Management Program.	1. A Water Management Program is documented. The Program includes: • date developed • name of person documenting Program • method(s) and frequency of water consumption measurement • strategies used for minimising water use • method(s) and frequency of wastewater measurement • method(s) of wastewater treatment • wastewater reuse, recycling, treatment or disposal strategies • workers responsible 2. The Water Management Program is reviewed and verified/updated at least annually. The name and signature of the person completing the review and the date of the review are documented.	E5.1.1 E5.1.2
E5.2	Manage wastewater to minimise environmental harm.	1. Contaminated stormwater, winery wastewater, grape juice and wine from drains, pipes, sumps, tanks, retention basins or other facilities all drain into the wastewater capture and management system. 2. Wastewater capture and storage systems are: • separated from domestic septic systems • sized to manage peak volumes • monitored and maintained to minimise risk of leakage 3. Wastewater disposed to land via irrigation is assessed for risk of causing an increase in soil salinity, soil acidity, soil alkalinity or soil sodicity. 4. Wastewater used for irrigation that has the potential to increase soil salinity, soil acidity, soil alkalinity or soil sodicity is either treated before use or the land areas receiving the wastewater are monitored for changes. 5. Wastewater treatment systems are: • designed to treat wastewater to the irrigation or discharge standard required • verified as achieving the irrigation or discharge standard required • maintained and checked for effective operation. Maintenance records are kept.	E5.5.1 E5.5.2 E5.2.1 E5.2.2

Code element		Compliance criteria	Viticulture Criteria
		6. Land areas receiving irrigation from untreated wastewater are tested and monitored for changes to soil salinity, soil acidity, soil alkalinity or soil sodicity. Test results are kept, including: • date of testing • area and parameter(s) tested • testing result(s) and action recommended • name and signature of the person who carried out the testing	
		7. Irrigation records are kept for land areas irrigated with untreated wastewater, including: • date of irrigation(s) • areas irrigated • volume of water used or duration of irrigation • name of the person who managed the irrigation activity	E5.4.2
		8. Wastewater volume is measured and reviewed annually against the Water Management Program.	E5.4.3
		9. Water efficiency is considered in the selection and design of new irrigation systems.	E5.4.4
		10. Water run-off or discharge from the property is managed or treated to minimise environmental harm on and off-site.	E5.5.3
		11. Strategies are implemented to prevent contamination and sedimentation of water sources.	E5.5.4

E6 Biodiversity

E6.1	Manage biodiversity on the property.	1. A Biodiversity Management Program is established using strategies and practices to: • protect areas of biodiversity identified on the property map • manage feral animals, invasive species, pests, environmental weeds and diseases on the property	E6.1.1
		2. Strategies and practices are developed with consideration of regional biodiversity priorities.	E6.1.2

Code element		Compliance criteria	Viticulture Criteria
		3. The Biodiversity Management Program is documented. The Program includes: • date developed • name of person documenting the Program • biodiversity issues or values • strategies/practices • workers responsible	E6.1.3
		4. The Biodiversity Management Program is reviewed and verified/updated annually. The name and signature of the person completing the review and the date of the review are documented.	E6.1.4

E7 Waste

E7.1	Manage waste on the property.	1. A Waste Management Program is documented. The Program includes: • date developed • name of person documenting the Program • waste type • management methods • workers responsible	E7.1.1
		2. Waste that will not be reused or recycled is disposed of in approved off-site facilities.	E7.1.2
		3. Records of controlled waste transport and disposal are kept.	E7.1.3
		4. Waste stored on-site is managed to minimise the risk of contaminating on-site and off-site areas.	
		5. Packaging size, quantity and weight, and the potential to reuse or recycle input materials is considered in the selection.	
		6. The Waste Management Program is reviewed and verified/updated annually. The name and signature of the person completing the review and the date of the review are documented.	E7.1.4

Code element	Compliance criteria	Viticulture Criteria

E8 Air

E8.1	Manage air quality.	7. An Air Quality Management Program is documented. The Program includes: • date developed • name of person documenting the Program • issues to be addressed • areas • management methods • workers responsible	E8.1.1
		8. The Air Quality Management Program is reviewed and verified/updated annually. The name and signature of the person completing the review and the date of the review are documented.	E8.1.2

E9 Energy

E9.1	Energy efficiency is optimised throughout the system.	1. Electricity and fuel consumption is reviewed annually and a record of the review is kept.	E9.1.1
		2. Efficient operating practices for building management, machinery and equipment are identified and implemented.	E9.1.2
		3. Plant and equipment servicing and maintenance records are kept.	E9.1.3
		4. Energy efficiency is considered in the selection and design of new buildings, plant and equipment.	E9.1.4

E10 Fuel

E10.1	Bulk fuel is stored to minimise risk of environmental harm.	1. Bulk fuel storages are located, constructed and maintained to minimise the risk of environmental contamination and contain spillage.	E10.1.1
		2. A current Safety Data Sheet (SDS) is kept for all bulk fuel stored on the property.	E10.1.2



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Freshcare
Code of Practice

Environmental Viticulture

The National
On-Farm Assurance Program
For Australian Growers

2nd Edition – June 2011

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Preface

Acknowledgments

Many individuals and organisations have been involved in the development of the second edition of the Freshcare Code of Practice Environmental Viticulture. Their contribution and support is much appreciated.

Freshcare also acknowledge the support and commitment of Horticulture Australia Limited (HAL) and SPC Ardmona for the development of the second edition of the Freshcare Code of Practice Environmental Viticulture.

Appreciation is also expressed to the original contributors to the first edition of the Freshcare Code of Practice Environmental Viticulture.

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Code Review Process

The Freshcare Technical Committee (Environmental) in conjunction with the Winemakers' Federation of Australia is responsible for the review and amendment of this Code of Practice. Freshcare members are advised of all Code updates and should ensure that they are operating with the current edition of the Code of Practice at all times.

Suggestions for improvement to this Code of Practice are encouraged from all users. Suggestions should be submitted in writing to Freshcare Limited or the Winemakers' Federation of Australia.

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Introduction

Purpose and scope

The Freshcare Code of Practice Environmental Viticulture is an industry owned standard, describing the practices required on farm to provide assurance that produce has been grown and packed with care for the environment. This Code of Practice together with the Freshcare Code of Practice Environmental Winery, can be used to meet the certification requirements for Entwine Australia membership.

The program offers benefits to suppliers, customers and other interested parties. It provides verification that an industry recognised environmental assurance program is followed. Certification to the program is achieved through independent auditing to this Code of Practice.

Freshcare continues to work closely with key customer groups and industry stakeholders, maintaining a level of awareness of program developments and ensuring continued compliance with market requirements and community expectations.

How the Code was developed

A team of quality, food safety and environmental facilitators, experienced in developing management systems, developed the original Freshcare Code of Practice Environmental. A risk assessment approach was used to identify environmental impacts in farm management and, where potential environmental harm may occur, the practices needed to minimise the impact.

The second edition Freshcare Code of Practice Environmental was developed in consideration of industry and wider stakeholder feedback, to ensure the Freshcare Code remains at the forefront of Environmental Assurance on farm.

The Freshcare Code of Practice Environmental Viticulture was developed from the Freshcare Code of Practice Environmental in collaboration with winegrape growers and the wine industry sector through the Wine Industry National Environment Committee (WINEC); the Code was trialled with winegrape growers across Australia.

The second edition of the Freshcare Code of Practice Environmental Viticulture has been developed in consideration of the changes to the Freshcare Code of Practice Environmental and incorporates feedback from both WINEC, trainers and winegrape growers directly.

The Freshcare Code of Practice Environmental Viticulture incorporates all elements of the Freshcare Code of Practice Environmental, excluding those not relevant to viticulture.

This publication has been produced in part with the assistance of the “Guidelines for Environmental Assurance in Australian Horticulture” from the Horticulture for Tomorrow program. Horticulture for Tomorrow was supported by the Australia Government through the Natural Heritage Trust Pathways to Industry EMS Program and the National Landcare Program Sustainable Industries Initiative. Its development and ongoing management is conducted by Horticulture Australia Limited (HAL) in partnership with industry.

The following publications were referenced when determining the practices required:

- Environmental Management Systems [ISO14001:2004]
- GlobalGAP Integrated Farm Assurance Fruit and Vegetables [2009]
- Freshcare Food Safety and Quality Code of Practice – 3rd Edition [2009]
- Environmental Assurance Recognition Framework for Australian Horticulture [2010]

An important criterion in developing the Freshcare Code of Practice Environmental Viticulture was the need for consistency, where possible, with the Freshcare Code of Practice Food Safety and Quality. This has been achieved through adopting a similar structure and some elements in common with this program. This consistency enables a single on farm audit to cover more than one program, where applicable.

This Code of Practice document indicates when elements are the same or similar to elements from the Freshcare Code of Practice Food Safety and Quality. This will help growers that are implementing both Codes of Practice avoid duplication.

Using the Code

The requirements of the Freshcare Code of Practice Environmental Viticulture, called elements, are grouped into two sections. The two sections of Freshcare Environmental Viticulture are Management and Environment. Some elements are common between Freshcare Environmental Viticulture and Freshcare Food Safety and Quality.

Each element describes the outcomes required and the practices necessary to ensure compliance.

More information on compliance is provided in the Freshcare Environmental Viticulture Compliance Criteria, a document which forms the basis of Freshcare Environmental Viticulture training. The Freshcare Environmental Viticulture Compliance Criteria together with the Freshcare Forms, provides the foundations for the effective implementation of the Freshcare Environmental Viticulture Program on farm.

Meeting the requirements of Freshcare Environmental Viticulture does not guarantee compliance with local, state or national legislation. Producers are responsible for ensuring that they comply with all applicable laws.

Freshcare structure

Freshcare is the horticultural industry's own on farm assurance program, developed by industry, for industry and operated as a 'not for profit' organisation.

Freshcare is 'owned' by twenty peak industry bodies:

- Apple & Pear Australia
- Australian Banana Growers Council
- Australian Chamber of Fruit & Vegetable Industries
- Australian Custard Apple Growers Association
- Australian Lychee Growers Association
- Australian Mango Industry Association
- Australian Melon Association
- Australian Mushroom Growers Association
- Australian Passionfruit Industry Association
- AUSVEG
- Avocados Australia
- Canned Fruits Industry Council of Australia
- Chestnuts Australia
- Growcom
- NSW Chamber of Fruit & Vegetable Industries
- NSW Farmers Association
- Potato Processors Association Australia
- South Australia Farmers Federation
- Summerfruit Australia
- Victorian Farmers Federation - Horticulture Group

The owner organisations provide a vital link and conduit for communications between Freshcare and their individual members.

Representatives from the owner organisations (both producer and non-producer groups) comprise the Board of Freshcare Ltd.

The Freshcare Office undertakes the day-to-day management of the Freshcare Program.

Definitions

Adjacent	Immediately adjoining, neighbouring, lying near or close by.
APVMA	Australian Pesticides and Veterinary Medicines Authority. Australian government authority responsible for the assessment and registration of agricultural and veterinary chemical products.
Audit	A systematic examination of compliance, to determine whether practices that have been introduced are being followed and to ensure that the system achieves its aims.
Beneficial organism	Any organism that benefits the growing process, including insects, arachnids, other animals, plants, bacteria, fungi, viruses, and nematodes. Benefits include pest control, pollination, and maintenance of soil health. The opposite of beneficial organisms are pests, which are organisms deemed detrimental to the growing process.
Biodiversity	The variety of species of plants, animals and microorganisms, their genes, and the ecosystems they comprise, often considered in relation to a particular area.
Business enterprise	An undertaking occurring on the property that may cause environmental harm. May include, but is not limited to, horticulture, broad acre, livestock and dairy operations.
Chemical	Products such as insecticides, acaricides, herbicides, fungicides, growth regulators, pheromones and other organic treatments applied on or around property, production areas and on harvested produce to control pest, disease, weeds and growth. It also includes other products used on-farm such as fruit waxes, sanitisers, cleaning agents and grease.
Chemical handling	Includes measuring and mixing chemicals.
Competent	Demonstration of knowledge and skills to complete tasks to specified performance criteria.
Conservation	The preservation, protection and management of the environment and natural resources.
Contamination	The introduction or occurrence of a hazard in the environment. In the case of soils, contamination may include, but is not limited to, persistent chemicals and heavy metals.
Controlled waste	A waste that, unless properly managed, can harm human health and the environment. It is the most hazardous category of waste and disposal of controlled wastes is closely regulated. Types of controlled waste include agricultural chemicals, chemical containers, tyres and oil.
Corrective Action Record (CAR)	A written record of an issue, or issues, which must be addressed to demonstrate compliance with this Code of Practice or Certification Rules. They may be raised during self-assessment, at initial assessment/annual audit, or during routine farm activities.
Customer	A commercial packer, marketing group, wholesaler, exporter, processor, retailer or consumer who receives produce from a supplier.
Ecological Communities	A unique group of plants, animals and micro-organisms that occupy, and interact within, the same geographical space. Each ecological community is adapted to occur in a particular habitat type, usually determined by factors such as soil type, position in the landscape, climate and water availability.
Environment	Surroundings in which an organisation or property operates, including landscape, soil, air, water, flora, fauna, humans and their interrelation.
Environmental harm of significance	Significant adverse (negative) change to the environment, wholly or partially resulting from the organisation/property's activities, products or services.
Environmental issue	The result of the negative impacts of human activity on the natural environment.

Environmental management	The management of the environment, particularly in relation to the balancing of the often conflicting requirements of natural and human-made resources, so that the maximum use of the land can be achieved without causing environmental harm of significance.
Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Australian Government legislation relating to the protection of the environment and the conservation of biodiversity. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places.
Environmental value	Worth that a community or society places on environmental resources or services for their life sustaining, recreational, aesthetic or intrinsic ecological aspects.
Environmental weeds	A plant that requires some form of action to reduce its effect on the environment. They can be an exotic or a native species that colonises and persists in an ecosystem in which it did not previously exist.
Feral animals	An introduced animal, formerly in domestication, with an established, self-supporting population in the wild.
Fertiliser and soil additives	Products that are added to the soil to improve fertility and structure and control weeds. Examples are inorganic (chemical) fertilisers, lime, gypsum and those of organic origin such as animal manure, sawdust, compost, compost tea, seaweed, fish-based products and other biological compounds.
Fuel	Petrol, diesel, LPG, kerosene, ethanol, oil, or any other gaseous, liquid or solid resource combusted for power or heat.
Hazard	A source of potential environmental harm or a situation with the potential to cause harm.
Heavy metal	Metals, such as lead and cadmium, having more than five times the weight of water.
Highly degraded soil	Soil with three or more degradation factors (see soil degradation).
Integrated pest management (IPM)	Combines several pest management strategies to provide effective, economical control of pests while minimising damage to the environment. An understanding of the lifecycle and biology of pests underpins the IPM approach. A pest can be an insect, mite, vertebrate (such as birds), disease, or weed.
Invasive species	A species occurring, as a result of human activities, beyond its accepted normal distribution and which threatens environmental or other resources by the damage it causes.
Irrigation	The application of water to cultivated land or open space, to promote the growth of vegetation.
Irrigation program	An approach to irrigation developed in consideration of the water resources available, crop water requirements, soil or substrate water holding capacity, soil moisture monitoring methods, irrigation system delivery efficiency and uniformity, nutrient management and potential off-target impacts from water use.
Material Safety Data Sheet (MSDS)	A reference document for chemicals, fuels and other hazardous products that includes information on the products: physical and chemical properties; safe handling, storage, transport and disposal procedures; first aid; health hazards; impacts on the environment; and what to do in accidents and emergencies.
Monitoring	A planned sequence of observations and measurements to assess whether control measures are effective.
Non compliance	A failure to comply with the requirements of the Freshcare Code of Practice Environmental Viticulture or Certification Rules.

Off-target	Any misplacement or movement away from the target to which the property activity is directed (for example, spray drift on to neighbouring area/crop or nutrient run-off into sensitive areas).
Persistent chemicals	Organochlorine pesticides and other chemicals that remain in the soil, water and surrounding environment form a significant time.
Phytosanitary specifications	The plant health status of products and compliance requirements for approved treatment protocols to control crop pest and disease for market access.
Property	The whole property/farm and/or areas leased from other landholders for the purpose of agricultural production. It includes all houses, buildings, paddocks, production areas, roads, fauna and flora, watercourses, etc, within the surveyed boundaries of the property title and/or leased areas specified.
Property activity	Movement, development, commercial cropping, stock management, residential and maintenance activities conducted within and around the surveyed boundaries of the property and/or other leased sites.
Property map	Aerial photographs, topographical maps, cadastral maps, self-drawn maps or overlays that document the required features, infrastructure and natural resources on or adjacent to the property.
Ramsar	A term adopted following an international conference, held in 1971 in Ramsar in Iran, to identify wetland sites of international importance.
Record	Documentary evidence to support compliance with this Code of Practice. The medium can be paper, photographic, magnetic and electronic or optical disc or any combination thereof.
Riparian vegetation	Vegetation on or near the banks of a waterway (creeks, streams, rivers, wetlands).
Risk	The chance of something happening that will have an impact upon objectives. It is measured in terms of likelihood and severity.
Salinity	The presence and level of soluble salts in soil or water. Salinity occurs both naturally and as a result of human activity. Its use here is taken to mean salinity increase, caused by property (human) activity.
Sensitive areas	Areas at high risk of environmental harm, caused by property activity. Sensitive areas may include, but are not limited to: Regionally Significant Vegetation, National Parks, World Heritage-listed areas, Ramsar-listed wetlands, biodiverse areas, other crops, livestock, watercourses, marine areas, wetlands, remnant native bushland, soils, neighbouring properties and public areas.
Sodicity	A relatively high proportion of Sodium ions adsorbed to clay particles in the soil. This causes soil structure decline and soil instability on wetting.
Soil	Ground or earth. Environmental harm to soil means the degradation of soil chemical, biological and physical characteristics in response to an additive or activity.
Soil acidity	Increasing the acidity of soil. This can occur naturally or be increased through prolonged heavy use of some nitrogenous fertilisers, the removal of alkaline soil materials and the leaching of calcium and magnesium. Soil acidity development can reduce soil productivity, soil biology and run-off water quality.
Soil carbon	Organic carbon stored within soil that is part of the soil organic matter (SOM). SOM is made up of plant and animal materials in various stages of decay and includes other important elements such as calcium, hydrogen, oxygen, and nitrogen. Materials on the surface of the soil, such as leaf litter, are not part of the organic matter until they start to decompose.

Soil degradation	Loss of soil structure or function. Degraded soil has poor structure and/or organic carbon, salinity, pH and nutrient levels that are outside the acceptable range for producing healthy crops in an economically and environmentally sustainable manner.
Soil fertility	A measure of the ability of soil to provide plants with sufficient amount of nutrients and water, and a suitable medium for root development to assure proper plant growth and maturity.
Target	The item or site to which property activity is directed. For example, the application of a chemical to a target crop for control of a target pest/disease or the application of a fertiliser to a target paddock for target crop nutrition.
Threatened species	Any native species (including animals, plants, fungi) that is listed as vulnerable, endangered or critically endangered under the *Environment Protection and Biodiversity Conservation Act 1999*. Threatened species are also listed and recognised on a State by State basis under relevant State or Territory legislation.
Training	Provision of knowledge and skills to perform tasks to a specified competency. Training can be delivered on-the-job or through qualified external providers.
Verification	A set of procedures, processes and tests designed to ensure the system is working effectively.
Weed of National Significance (WONS)	Weeds that have been identified by Australian governments because of their invasiveness, impacts on primary production and the environment, potential for spread and socioeconomic impacts.
Workers	All people working in the business, including family members and contractors working on the property or in the business.
World Heritage listed	Properties forming part of the cultural and natural heritage which the World Heritage Committee considers as having outstanding universal value.

Freshcare Code of Practice Environmental Viticulture

Management

Code element		Compliance criteria	Food Safety and Quality element
M1	**Scope and commitment**		
M1.1	Define the business scope and the scope of Freshcare Environmental Viticulture Certification.	1. The business enterprises undertaken on the property are documented. 2. Flow charts are completed to identify the activities for which certification is required.	M1.1.2
M1.2	Identify property areas, infrastructure and neighbouring areas on a property map.	1. A property map is established that identifies: • property boundaries • production areas • farm houses, buildings, sheds, on-farm roads and access points • neighbouring public roads, public places (schools, sports fields, etc) and production areas • sensitive areas adjacent to the property boundary such as National Parks, World Heritage-listed areas, Ramsar-listed wetland areas, wildlife sanctuaries/corridors or other specified conservation areas • bulk fuel storage, including underground tanks • chemical storage areas, mixing areas, equipment clean-down areas • storage sites for controlled wastes, such as empty chemical containers awaiting collection • storage sites for other wastes, such as treated timber • fertiliser and soil additive storage areas • composting/ageing and mixing/loading areas • water sources and extraction points • drainage lines and discharge points • natural waterways, wetlands, riparian areas and lakes • areas that are, or are at risk of being, highly degraded, eroded or contaminated • significant stands of remnant native vegetation • threatened species • other sensitive areas with high conservation value	

Code element		Compliance criteria	Food Safety and Quality element
M1.3	Document the business commitment to the Freshcare Code of Practice Environmental Viticulture.	1. The owner or appropriate senior manager signs a commitment statement to support and comply with the Freshcare Code of Practice Environmental Viticulture, Freshcare Certification Rules and Environmental Action Plan (E1).	M1.2.1
		2. The commitment statement is communicated to all workers.	M1.2.2
		3. The commitment statement is reviewed annually in conjunction with the Environmental Action Plan (E1).	
		4. Entry to the property is granted to persons who are authorised for the purposes of auditing for Freshcare Environmental Viticulture certification.	M1.2.3

M2 Documentation

M2.1	Verify compliance to this Code of Practice through relevant documents and records.	1. The current editions of the Freshcare Code of Practice Environmental Viticulture and the Freshcare Certification Rules are kept.	M2.1.1
		2. Legible records and documentation required to verify compliance are kept.	M2.1.2
		3. Documents and records are identified by a version number or date of issue.	M2.1.3
		4. As documents and records change, out-of-date versions are replaced with the new version.	M2.1.4
		5. All records are signed and dated by the person completing the record.	M2.1.5
		6. All records are kept for a minimum of four (4) years (or longer if required by legislation, customers or this Code of Practice).	M2.1.6

M3 Training

M3.1	Train all workers who complete tasks relevant to this Code of Practice.	1. A management representative completes approved training for the Freshcare Code of Practice Environmental Viticulture.	M3.1.1
		2. Training is provided for workers who complete tasks relevant to the Freshcare Code of Practice Environmental Viticulture.	M3.1.2
		3. Training is provided in the relevant language or pictorially.	M3.1.3
		4. A record of training is kept and includes: • name of the worker trained • title or topic of the training • signature of the worker trained and date of the training • signature of the trainer (not required for external training)	M3.1.4 M3.1.5

Code element		Compliance criteria	Food Safety and Quality element
M4	**Internal audit and corrective action**		
M4.1	Conduct internal audits to verify on-going compliance with this Code of Practice.	1. An internal audit of all activities and records relevant to the Freshcare Code of Practice Environmental Viticulture is conducted at least annually. A record is kept. 2. Workers responsible for completing sections of the internal audit are identified and, where possible, independent of the practices being assessed.	M4.1.1 M4.1.2
M4.2	Complete corrective actions for any non-compliance or deficiency.	1. A Corrective Action Record (CAR) is completed when: • the requirements of the Freshcare Code of Practice Environmental Viticulture or Freshcare Certification Rules are not being met, as identified during internal audits, external audits, or routine property activities • a complaint relevant to the Freshcare Code of Practice Environmental Viticulture or Freshcare Certification Rules is received from a neighbour, customer or regulatory authority • environmental harm has occurred/may occur as a result of property activity, neighbouring activity or a natural event 2. A Corrective Action Record (CAR) includes: • description of the problem • cause of the problem • whether or not the problem has occurred before • short term fix (action taken to fix the problem) • long term fix (action taken to prevent the problem recurring) • date action completed and name and signature of the person responsible • verification that action has been effective • name and signature of the person reviewing that short term and long term actions are completed and effective • date of the review 3. A new Corrective Action Record (CAR) is implemented if short term or long term fixes have not been effective in addressing the problem. 4. Corrective Action Records (CARs) are retained for a minimum period of five (5) years (or longer if required by legislation or customers).	M4.2.1 M4.2.2

Environmental

Code element		Compliance criteria	Food Safety and Quality element
E1	**Environmental action planning**		
E1.1	Establish an Environmental Action Plan to identify actions completed and planned for improving the property's environmental values.	1. An Environmental Action Plan is established that documents the actions planned for improving the property's environmental values. The Plan includes: • date of Plan development • positive environmental actions already undertaken on the property • location on property of environmental issue or value • environmental issue or value being addressed • actions proposed to address the issue or value • estimated date of completion for each action • date when action was completed or reason for the action not being completed • name and signature of the person verifying action has been completed 2. The Environmental Action Plan is reviewed and updated at least annually. The name and signature of the person completing the review and the date of the review are documented.	
E2	**Land and soil**		
E2.1	Manage land and soil, and minimise degradation, erosion and contamination.	1. Soil conservation and crop production practices are chosen to: • minimise soil degradation, erosion and contamination • optimise soil organic matter and fertility relevant to the particular business enterprise. Records of these practices are kept.	
E2.2	Manage areas with highly degraded, eroded or contaminated soil.	1. Areas identified as being highly degraded, eroded or contaminated are: • managed to minimise further degradation, erosion or contamination • contained to minimise movement of contaminated soil, on and off-site 2. Remediation activities for areas identified in E2.2.1 are documented in the Environmental Action Plan.	

Code element		Compliance criteria	Food Safety and Quality element
E3	**Chemicals**		
E3.1	Select pest and disease control strategies to minimise risk to the environment.	1. Consideration is given to all available methods of pest and disease control (for example mechanical, biological, cultural and chemical) before a control program is chosen. A record of control methods used is kept. 2. When necessary to apply agricultural chemicals, those which are less hazardous to beneficial organisms and/or have a lower environmental impact are considered. 3. The decision to use agricultural chemicals is based on a combination of the following: • Crop and/or weather monitoring for pest and disease pressure. Records include: ▪ date ▪ area/crop and/or weather parameters monitored ▪ monitoring result and action recommended ▪ name of the person who carried out the monitoring activity • External agency pest and disease alerts. Records include: ▪ evidence of subscription alerts ▪ date of alert ▪ pest or disease the alert is issued for ▪ source/agency that issued the alert • Documented preventive pest and disease control programs. Records include: ▪ date the program was documented ▪ crop or area to be treated ▪ target pest/disease/weed ▪ chemical to be used ▪ frequency of use (including any limitations on the frequency of chemical use per crop/season) or the stage of crop development ▪ name of the worker/person/organisation that documented the control program • Industry preventive control programs or phytosanitary specifications. An up-to-date copy of the industry program or phytosanitary specification is kept.	
E3.2	Obtain chemicals.	1. Chemicals are purchased from Agsafe accredited suppliers (or similar). 2. Chemical containers, on receival, are adequately labelled and in acceptable condition.	F4.1.1 F4.1.2

Code element		Compliance criteria	Food Safety and Quality element
E3.3	Store, manage and dispose of chemicals to minimise the risk of environmental harm.	1. Chemical storage areas are: • located and constructed to minimise the risk of contaminating the site and surrounding environment • structurally sound, adequately lit and constructed to protect chemicals from direct sunlight and weather exposure • equipped with a spill kit to contain and manage chemical spills • secure, with access restricted to authorised workers	F4.2.1
		2. Chemicals are stored in designated separate areas for each category of chemical, and for chemicals awaiting disposal.	F4.2.2
		3. A current Material Safety Data Sheet (MSDS) is kept, for all chemicals stored in the chemical storage area.	
		4. Chemicals are stored in original containers according to directions on the container label. If a chemical is transferred to another container for storage purposes, the new container is a clean chemical container and a copy of the chemical label is transferred to the new container.	F4.2.3
		5. Deteriorating chemical labels are replaced immediately with a legible copy.	F4.1.3
		6. A check is conducted at least annually to identify and segregate chemicals for disposal that have: • exceeded the label expiry date • exceeded the permit expiry date • had their registration withdrawn • containers that are leaking or corroded or have illegible labels	F4.2.4
		7. A record of the check is kept, including: • date of the check • name and quantity of chemicals awaiting disposal	F4.2.5
		8. Unusable chemicals and empty chemical containers are legally disposed of i.e. through registered collection agencies or in approved off farm disposal areas.	F4.2.6

Code element		Compliance criteria	Food Safety and Quality element
E3.4	Train and authorise workers who store, handle, apply and/or dispose of chemicals.	1. Workers involved in the supervision of storage, handling, application and disposal of chemicals: • have successfully completed a recognised chemical users course or equivalent; and • are able to demonstrate competency in chemical storage, handling, application and disposal as specified by the Freshcare Code of Practice Environmental Viticulture. 2. Workers authorised to store, handle, apply and/or dispose of chemicals are trained in practices that minimise the risk of environmental contamination from chemicals and in actions to be taken in the event of potential contamination. 3. A register of workers authorised to store, handle, apply and/or dispose of chemicals is maintained and displayed in the chemical storage area.	F4.3.1 F4.3.2 F4.3.3
E3.5	Use chemicals according to regulatory and label requirements.	1. Chemicals are used and applied: • according to label directions; or • under 'off label permits' issued by the Australian Pesticides and Veterinary Medicines Authority (APVMA), with a current copy of the permit kept; or • in accordance with relevant state legislation for 'off label use'	F4.4.1
E3.6	Avoid potential for spray drift.	1. Chemical application is avoided when the risk of contaminating off-target areas with spray drift is high.	F4.5.1
E3.7	Maintain and calibrate chemical application equipment.	1. Chemical application equipment is maintained and checked for effective operation before and during each use. 2. Equipment is calibrated at least annually or as per manufacturer's instructions and immediately after spray nozzles are replaced. Equipment is calibrated using a recognised method and a record of calibration is kept, including: • description of method and calibration results • date of calibration • name and signature of person calibrating the equipment	F4.6.1 F4.6.2
E3.8	Manage mixing and disposal of chemical solutions to minimise risk to the environment.	1. Chemical mixing areas are located, constructed and equipped to minimise the risk of contaminating the site and surrounding environment. 2. Leftover chemical solutions are disposed of according to label directions where specified, or in a manner that minimises environmental harm.	F4.6.3 F4.6.4

Code element		Compliance criteria	Food Safety and Quality element
E3.9	Record all chemical applications.	1. Records of all pre-harvest chemical applications are kept, including: • application date • start and finish times, where required • location and crop • chemical used; including batch number if available • rate of application and/or quantity applied • equipment and/or method used to apply the chemical • wind speed and direction • method of disposal of leftover chemical solutions • name and signature of the person who carried out the application	F4.7.1

E4 Fertiliser and soil additives

E4.1	Select fertilisers and soil additives to minimise risk to the environment.	1. The decision to use fertilisers and soil additives is based on a combination of the following: • results of soil/leaf/sap testing • crop monitoring with monitoring records kept • a recognised nutrition program 2. Workers responsible for crop nutrition are competent to make recommendations relevant to the crops under their management. 3. Fertilisers and soil additives used have low or zero levels of heavy metals.	F5.1.2
E4.2	Store and manage fertilisers and soil additives to minimise risk to the environment.	1. Storage sites for fertilisers and soil additives are located, constructed and maintained to minimise harm to off-target and sensitive areas from nutrient run-off or leaching. 2. A current Material Safety Data Sheet (MSDS) (where available) is kept, for fertilisers stored on the property. 3. Workers are trained in practices that minimise the risk of environmental contamination from fertilisers and soil additives.	F5.1.3
E4.3	Maintain and calibrate fertiliser and soil additive application equipment.	1. Equipment used to apply fertilisers and soil additives is maintained and checked for effective operation before and during each use. 2. Equipment used to apply fertilisers and soil additives is calibrated at least annually or as per manufacturer's instructions. A record of calibration is kept, including: • description of method and calibration results • date of calibration • name and signature of person calibrating the equipment	F5.1.10 F5.1.11

Code element		Compliance criteria	Food Safety and Quality element
E4.4	Record all fertiliser and soil additive applications.	1. Records of all fertiliser and soil additive applications are kept, including: • application date • location and crop • product used • rate of application • wind speed and direction • method of application/incorporation • name and signature of the person applying the fertilisers and soil additives	F5.1.13

E5 Water

E5.1	Document a Water Management Program.	1. A Water Management Program is documented. The Program includes: • date developed • name of person documenting Program • water resources available • crop water requirements • water budget • irrigation method • irrigation program including crop water needs and schedule • contingency plans if water resources are unavailable 2. The Water Management Program is reviewed and updated at least annually. The name and signature of the person completing the review and the date of the review are documented.	
E5.2	Water harvesting, extraction, storage, use and discharge occur in accordance with licenses and permits.	1. Applicable licences and permits for infrastructure and activities in water harvesting, extraction, storage, use and discharge are current. 2. Water licences and permits are adhered to.	
E5.3	Measure crop water needs before irrigation.	1. Irrigation requirements are determined using soil/growing medium, crop or weather monitoring methods, or a combination thereof.	
E5.4	Measure and review water use.	1. Irrigation systems are checked and maintained for operational efficiency. 2. Irrigation records are kept for each crop and include: • date of irrigation • areas irrigated • volume of water used or duration of irrigation • name of the person who managed the irrigation activity	

Code element		Compliance criteria	Food Safety and Quality element
		3. Water use is measured and reviewed annually against the Water Management Program. 4. Water efficiency is considered in the selection and design of new irrigation systems.	
E5.5	Manage water to minimise environmental harm.	1. Water used for irrigation is assessed for risk of causing soil degradation by increasing soil salinity, soil acidity, soil alkalinity or soil sodicity. 2. Water that may cause soil degradation is, where possible, treated before use or managed to avoid soil degradation. 3. Water run-off or water discharge from property activities is managed or treated to minimise environmental harm on and off site. 4. Strategies are implemented to prevent contamination and sedimentation of water sources.	

E6 Biodiversity

E6.1	Manage biodiversity on the property.	1. A Biodiversity Management Program is established using strategies and practices to: • protect areas of biodiversity identified on the property map • manage feral animals, invasive species, pests, environmental weeds and diseases on the property 2. Strategies and practices are developed with consideration of regional biodiversity priorities. 3. The Biodiversity Management Program is documented. The Program includes: • date developed • name of person documenting the Program • biodiversity issues or values • strategies/practices • workers responsible 4. The Biodiversity Management Program is reviewed and updated annually. The name and signature of the person completing the review and the date of the review are documented.	

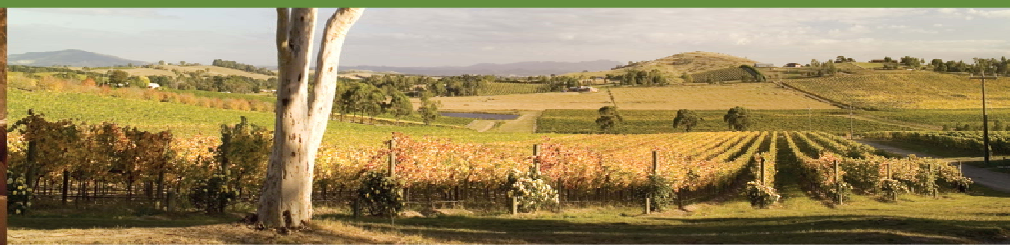
Code element		Compliance criteria	Food Safety and Quality element
E7	**Waste**		
E7.1	Manage waste on the property.	1. A Waste Management Program is documented. The Program includes: • date developed • name of person documenting the Program • waste type and location • management methods • workers responsible 2. Waste that will not be reused or recycled is disposed of in approved off-site facilities. 3. Records of disposal of controlled wastes are kept. 4. The Waste Management Program is reviewed and updated annually. The name and signature of the person completing the review and the date of the review are documented.	
E8	**Air**		
E8.1	Manage air quality.	1. An Air Quality Management Program is documented. The Program includes: • date developed • name of person documenting the Program • issues to be addressed • areas • management methods • workers responsible 2. The Air Quality Management Program is reviewed and updated annually. The name and signature of the person completing the review and the date of the review are documented.	
E9	**Energy**		
E9.1	Energy efficiency is optimised throughout the production system.	1. Electricity and fuel consumption is reviewed. 2. Efficient operating practices for machinery and equipment are identified and implemented. 3. Machinery and equipment servicing and maintenance records are kept. 4. Energy efficiency is considered in the selection and design of new machinery and equipment.	

Code element		Compliance criteria	Food Safety and Quality element
E10 Fuel			
E10.1	Bulk fuel is stored to minimise environmental harm.	1. Bulk fuel storages are located, constructed and maintained to minimise the risk of environmental contamination and contain spillage 2. A current Material Safety Data Sheet (MSDS) is kept for all bulk fuel stored on the property.	



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Australian Wine Industry Stewardship
2009 NATIONAL REPORT

Introduction

The Australian Wine Industry Stewardship project (AWIS) commenced in 2004, in response to emerging trends towards environmental assurance in markets and governments. Between 2007 and 2009 inclusive vignerons across the country reported on their environmental stewardship practices in the national AWIS survey.

The 2009 vintage marked the third and final industry-wide roll out of the AWIS grower survey. The survey was issued by participating wine companies to their contract and company growers. The AWIS report provides a snapshot of environmental stewardship practices and approaches across the country. Significantly, even though 2009 can be characterised as another dry, hot year with falling market expectations, participation and engagement in stewardship practices and training remained strong.

AWIS was the precursor to EntWine Australia, the new national environmental assurance scheme, officially launched in December 2009. EntWine Australia addresses both vineyard and winery production processes, through a combination of environmental practices certification and resource use monitoring and reporting. From 2010 a new National Report will be provided using data collected from EntWine Australia participants.

2009 AWIS Participants

In 2009, participating companies have collated and returned results for 1839 growers. This is compared to 2,361 in 2008 and 2610 participating growers in 2007. Slightly declining numbers can be accounted for as 2009 is the final year of AWIS hence some operators have moved away from AWIS focused their attention on EntWine Australia.

Although, the large number of respondents is a good statistical representation of the industry (roughly 20%) it should be noted that there may be some variation between those participating. Additionally regional differences may be significant and will not be reflected in national reporting. Therefore, this data should only be used as a broadly indicative snapshot of the industry. In the table below (results snapshot) a percentage change of 3% or less is considered to be negligible. A regional report is available on request to WFA and EntWine Australia members.

The AWIS Survey

With 157,290 hectares of wine-grape vines (ABS, 2009), wine grapes are grown in 34 of Australia's 56 natural resource management regions. This means that there are 34 natural resource plans relevant to the industry.

Survey responses are used by wine companies to provide a snapshot of sustainable land management practices used by their growers. The results can assist in identifying training needs, accessing support for infrastructure improvement and for tracking changes in behaviour over time.

The most common method of distribution of the 2009 AWIS survey was as a one page insert in company spray diaries. Smaller companies accessed the AWIS survey from the WFA website and submitted their survey directly to the WFA for use in national reporting. Several large companies also collected the data of their contract growers and submitted it to the WFA.

AWIS Survey Results Snapshot

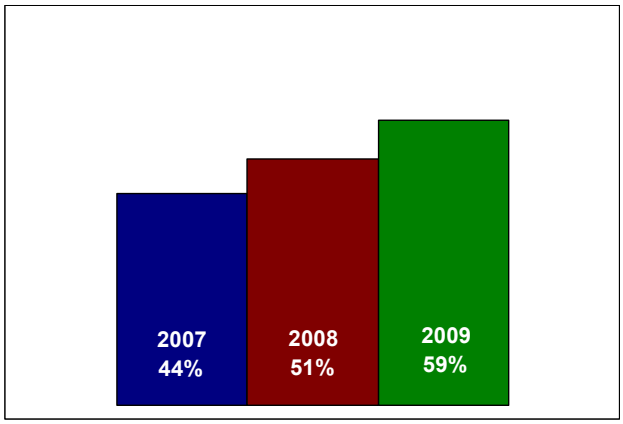
Indicator	2007	2008	2009	% Change
Participation in sustainable vineyard management training	44%	51%	59%	+8%
Growers with property management plans	59%	64%	69%	+5%
Use of current recommended practices	59%	58%	61%	+3%
Pest exotic weed control	94%	90%	93%	+3%
Pest feral animal control	79%	76%	78%	+2%
Participation in on-farm natural conservation programs	21%	22%	22%	0%
Mid-row vegetation for all/part year	98%	80%	85%	+5%
Mid-row vegetation is native plants	17%	60%	53%	-7%
Native trees/shrubs maintained along waterways	68%	77%	72%	-5%
Soil moisture monitoring	69%	67%	64%	-3%
Drip irrigation	62%	70%	79%	+9%
Soil/petiole analysis informs fertiliser use	60%	70%	68%	-2%
Renewable energy sources used on-farm	25%	22%	29%	+7%

2007/2008/2009 AWIS Survey Results

Minor changes to survey questions were made between 2007 and 2008. This was mainly to resolve confusion around some ambiguous questions, to simplify data entry and to make the survey more user friendly. The 2009 survey questions have not been altered.

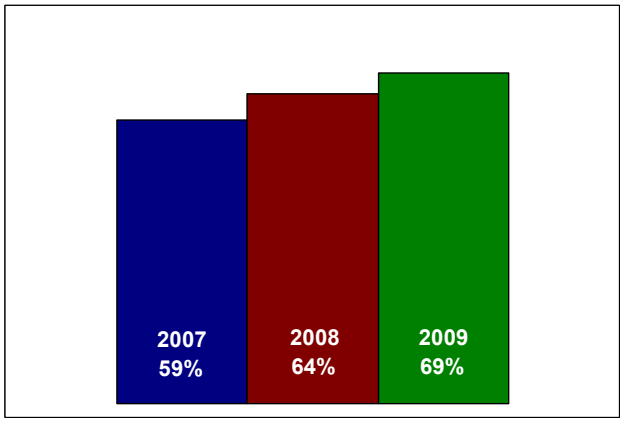
A comparison between each year's results is outlined below and enables the WFA to compare AWIS data and provide feedback to the industry on some of the observed trends.

Participation in sustainable vineyard management or environmental management training



It is hoped that with the introduction of the EntWine Australia program will result in even greater numbers participating in this form of training in the future.

Vineyards covered by property management plans



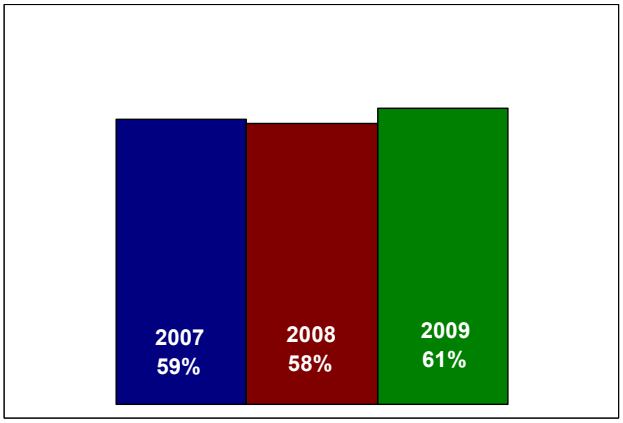
The clear trend of increasing use of property management plans highlights growing acknowledgement of the importance of these plans across industry. This has no doubt been assisted by promotion from state governments and would be related to the management training figure presented above.

Property plans provide documented evidence that a grower is aware of the natural resources of their property and has given due consideration to property management options. These include the location of agrochemical storage areas, identification of sensitive areas and required buffer zones, location and management of remnant vegetation and controlled traffic and access points across the vineyard.

In some regions, property management plans can be 'accredited' by state government agencies, NRM Boards/CMAs or irrigation boards. This can then provide growers with enhanced access to funding assistance and financial incentives for sustainability and land management projects.

Environmental practices certification is required for EntWine Australia membership, generally this requires participants to develop an in depth property management plan, for example using the Freshcare Environmental Viticulture code – A code which outlines all of the potential risks involved with viticulture and requires participants to develop an Environmental Action Plan.

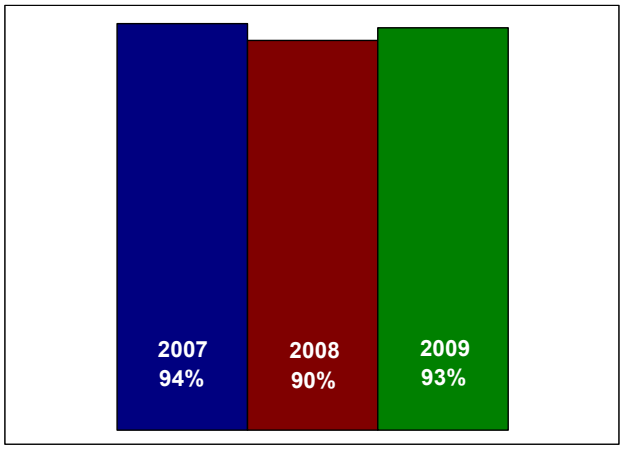
Using current recommended practices issued or endorsed by the local natural resource management board/catchment management authority or wine/ grapegrower industry association



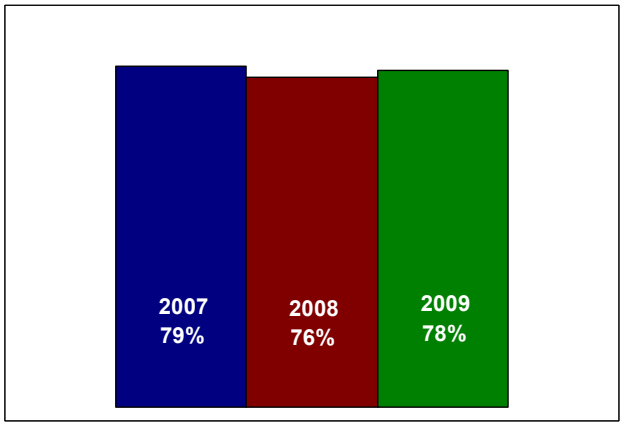
The number of operators using recommended best practice has had little movement between 2007 and 2009. Almost all regional CMAs and NRM Boards identify 'improving the adoption of Best Management Practices (BMP's) as a recommendation in their regional environment plans. Some of these organisations are hoping to achieve this by providing best management practice manuals or guidelines to land managers in their regions. Not all regions have published current recommended practice documents in place, however national recommendations are available through groups such as the Australian Wine Research Institute, who also hold the resources developed by the defunct Cooperative Research Centre for Viticulture (CRCV).

Regional wine and horticultural industries also have developed best management practice documents that are suitable for use in the wine industry. Existing resources are listed at the end of this document and are available from the publishing organisations.

Pest exotic weeds are actively controlled



Pest feral animals are actively controlled



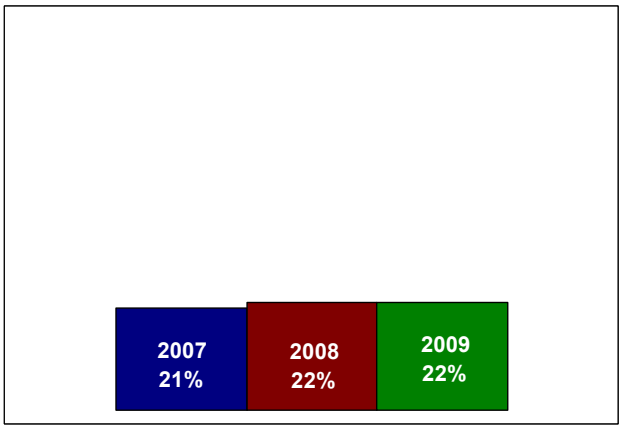
Pest animal and weed control is an essential part of agricultural production and is already a widespread practice in the vineyard. On-farm control activities can make an even bigger impact if they are carried out as part of a strategic broader regional control program, which might be managed by the CMA/NRM Board, local council or rural lands protection board.

An excellent example of the potential of strategic pest control has been documented for the management of starlings and feral olives in McLaren Vale. Historic starling control methods have been to hire shooters or use scare machines preceding harvest, however a more cost-effective and strategic approach would be to minimise starling numbers before veraison through a coordinated effort to cull starlings during their breeding phase earlier in the season and to remove feral olive trees that compliment the starlings' diet (Paton, 2005).

Landholders have a legal obligation to control declared weeds on their properties. Declared weed lists are available from state primary industry departments and CMAs/NRM Boards. Pest animals very between regions but include feral animals such as starlings, rabbits, and foxes. Feral animal pests are both a problem for viticulture, and have an impact on the broader Australian environment, especially biodiversity.

The consistently high level of engagement in this area suggests a good appreciation of its importance within the industry.

Participation in on-farm nature conservation programs



The percentage of operators participating in on-farm nature conservation programs has remained static since the 2007 AWIS survey. These low numbers may be a result of lack of financial incentive and other perceived negative aspects associated with increasing on-farm biodiversity (e.g. increased pest or disease pressures). Some growers may not have areas of remnant vegetation, or not be aware of opportunities to include biodiversity considerations within the vineyard.

There are several very positive aspects of being involved in on farm nature conservation and improving the sites biodiversity. Increased native species can provide:

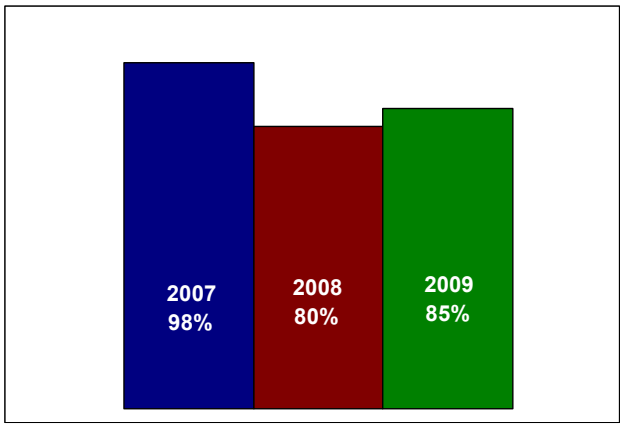
- Greater erosion control
- Wind breaks
- Habitat for beneficial bird and insect species
- Improved soil health
- Increased soil biological matter
- Salinity control
- Nature corridors and landscape linkages
- Aesthetic appeal

These low numbers are disappointing and highlight an area that should be given greater consideration in the future.

Programs such as *Land for Wildlife, Heritage Hectares* and *Voluntary Conservation Agreements* all promote the protection of remnant natural areas on the farm. Participation in these programs is an important way to contribute to protecting the biodiversity of the region. These programs often have financial incentives attached and signage is usually provided for easy identification of participating growers.

On-farm conservation focusing on areas of native trees is not possible in all vineyards, because either there are no vegetation remnants on the property, or because existing farm infrastructure leaves no room for tree planting. However, biodiversity - the variety of native plants, animals and their habitats - can still be integrated into the vineyard because soils and the vineyard floor can also be managed to promote native flora and fauna. Biodiversity is present at different scales – the variety of soil organisms is generally higher in soils with high organic matter content, the variety of grasses and native groundcover species on the vineyard floor, and the protection of natural vegetation along waterways and other areas not suited to vine planting. All vineyard managers could contribute to biodiversity protection in at least one of these ways.

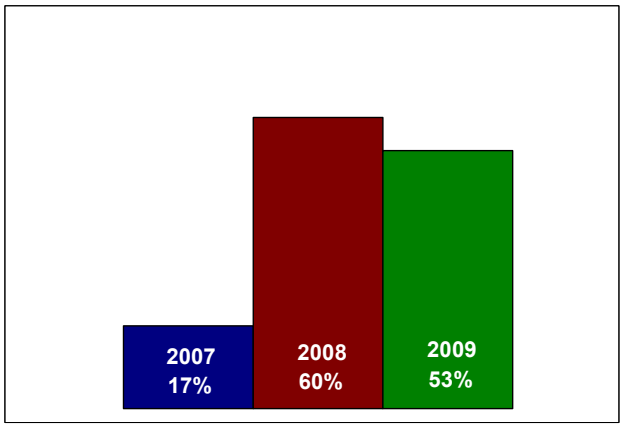
Mid-row vegetation maintained in the vineyard for all or part of the year



The vineyard inter-row, or mid-row, is important for a number of reasons. Mid-row groundcover can prevent soil erosion by wind and water, reduce vineyard temperatures, provide habitat for beneficial insects, increase soil organic matter, add to the aesthetic appeal of the vineyard, and also incorporate native plants into the vineyard as a biodiversity conservation measure. Where mid-row vegetation is only maintained for part of the year, it is usually sprayed out, plowed in, or annual crops are allowed to die as the vine's growing season commences. Whilst this practice reduces the biodiversity value of the mid-row, it does retain protection against soil erosion and increases soil organic matter.

The high use of mid-row vegetation indicated is an excellent sign that growers are aware of the benefits this vegetation provides. The decrease in number of growers between 2007 and 2008 who indicated that they retain mid-row vegetation could be attributed to drought conditions across many of Australia's grape growing regions.

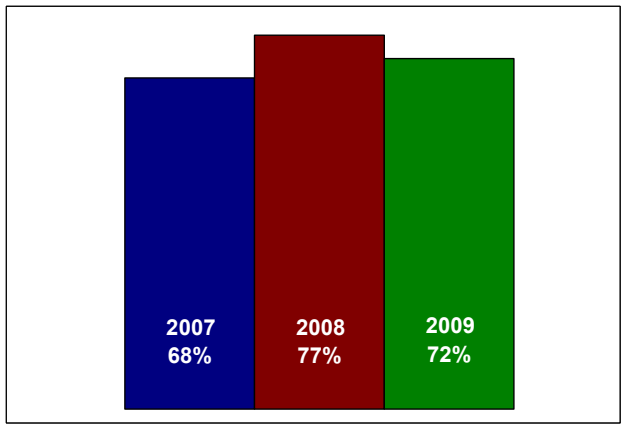
Mid-row vegetation is made up of native grasses and other native plants



In 2008 the majority of growers indicating that they retain mid-row vegetation also indicated that the mid-row vegetation was made up of native grasses and groundcovers. The 43% increase from 2007 to 2008 is a significant improvement, however it is acknowledged that there may be some confusion between native species and the opportunistic sward that grows in the vineyard without being sown.

Increasing the use of native species in vineyard floor management is an important contribution that growers can make to protecting native biodiversity.

Native trees and shrubs are maintained along natural waterways flowing through vineyard properties



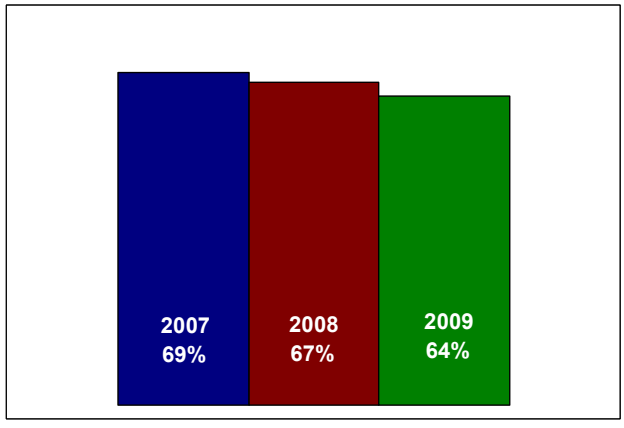
This survey question was changed slightly after the 2007 rollout because there was some confusion as to whether or not irrigation supply channels were included, hence the reference to natural waterways.

Generally high levels of native vegetation levels on waterways is a good sign, however there is still room for improvement in this area.

Sustainable waterway management practices such as protecting/replanting native vegetation and maintaining grassy buffer zones are less problematic on properties that don't carry livestock. This negates the need for fencing the waterway to control stock access, although some growers have also suggested that fencing is useful in keeping people and vehicles out of sensitive areas.

Native vegetation along waterways, in addition to controlling erosion, is also a valuable way of improving biodiversity on vineyard properties. Waterways may require ongoing management, such as exotic weed control, to maximise the native biodiversity values of these areas.

Soil moisture monitoring used to decide when to irrigate



Excessive applications of irrigation water can cause soil erosion and transport nutrients out of the vineyard and into waterways, resulting in reduced water quality. Excessive irrigation can also lead to poor quality fruit. Avoiding waterlogging of soils can reduce emissions of nitrous oxide, a significant greenhouse gas. These emissions typically occur just prior to soil saturation.

The drop in use of soil moisture monitoring use may actually reflect a response to drier conditions during 2008 and 09, where the decision whether or not to irrigate may have been more straightforward.

Type of irrigation system	2007	2008	2009
Drip	62%	70%	79%
Under-vine sprinkler	22%	23%	26%
Overhead sprinkler	19%	15%	15%
Furrow/Flood	16%	12%	5%
No irrigation or alternative method	4%	2%	3%

Over all years a large number of growers indicated that they use multiple irrigation methods on their property, and hence the percentages reported add up to more than 100%. Further, growers often use overhead sprinklers for frost control, and a separate method for irrigation.

Water use efficiency is important in Australia's dry climate. Figures from the Australian Bureau of Statistics (2008) indicate that 83.7%, or 157,401 ha, of Australia's vineyard area receives supplementary water (2009 ABS statistics not available at time of publication).

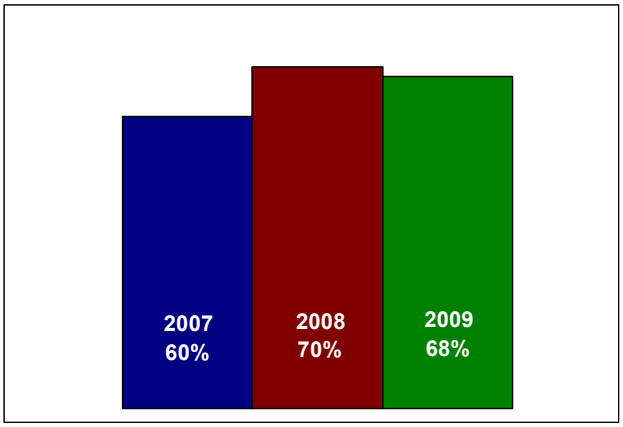
Best practice irrigation method will vary between regions and against different varietal requirements. This is reflected in the variety of irrigation methods used within the Australian wine

Industry Innovations in irrigation management mean that irrigation efficiencies of over 80% can be achieved for all types of irrigation used in vineyards.

Furrow/flood irrigation is a declining yet still common practice in the Murrumbidgee Irrigation Area in the NSW Riverina. However, sophisticated sub-surface tile drain systems are used to prevent irrigation water from seeping into groundwater, improving the efficiency of this method.

A reduction in the percentage of vineyard operators using flood/furrow irrigation (considered to be one of the lease efficient methods) and an increase in drip irrigation for 2009 are clear indicators of operator's response to scarce water availability and a changing climate. In addition this technique can support improved fruit quality. These irrigation trends are very positive and highlight an industry that is conscious of the need to reduce water use and increase efficiency.

Fertiliser is applied in response to soil testing and/or petiole analysis



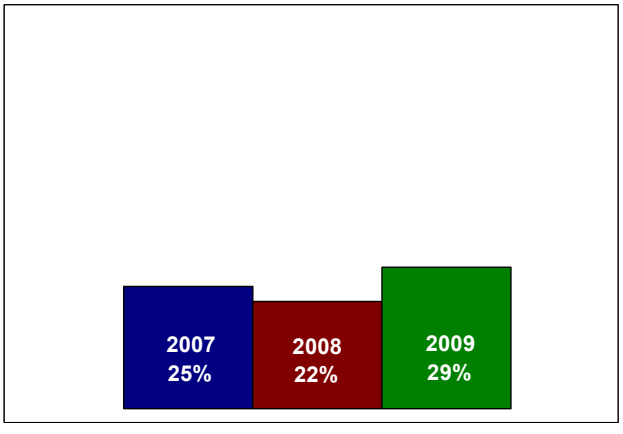
As a greenhouse gas, nitrous oxide has a global warming potential 310 times greater than carbon dioxide. Nitrous oxide is produced within soils naturally through nitrification and denitrification processes. The release of nitrous oxides from the soil is increased by the addition of nitrogenous fertilisers (FIVS, 2008) and through waterlogging.

Fertilizer applications over and above the grape vine's needs can be avoided by applying fertilizers in response to soil and/or petiole analysis – i.e. when the plant has an identified need for additional nutrients. This is particularly the case where a history of soil or petiole analyses is used to develop a nutrient management plan or nutrient budget, as test results are not always returned in time to inform fertiliser application decisions.

Routine applications mean that nutrients are added whether or not the vine actually requires them, and there is an increased likelihood that these will remain in the soil instead of being taken up by the plant.

Excess nutrients not only increase the likelihood of greenhouse gas emissions from the soil, but also increase the likelihood of nutrient-rich runoff moving off the vineyard and into adjacent waterways. This can lead to water quality problems in the waterway, including promoting algal blooms.

Renewable energy sources are used on the property



Renewable energy sources can be used on-farm in a number of ways. These include the use of biodiesel, solar

panels, small wind turbines or purchasing 'green energy' from electricity providers.

The use of renewable energy sources is one way that wineries and growers can contribute to reducing greenhouse gas emissions arising from the use of fossil fuels. Other methods include identifying opportunities for energy use efficiencies, such as minimising vineyard agrochemical treatments and investigating 'multi-row' application methods to reduce vehicle use in the vineyard.

Government subsidies (focusing on providing renewable energy at low cost) coupled with increased consumer and grower awareness of the importance of reducing greenhouse emissions could be a contributor to the gradual increase in participants using renewable energy sources. Often these forms of energy are seen to be very cost effective once the initial start up costs have been recouped. It is expected that these numbers will increase further in the following years as the technology improves.

AWIS In The Future

The 2009 AWIS National Report is the final report for this program. AWIS has now been replaced with EntWine Australia, a program that encapsulates much of the practices assessed as part of the AWIS surveys into requirements for independent environmental certification and resource use reporting.

EntWine Australia and was officially launched in December 2009. The Wine Industry National Environment Committee (WINEC) continues to work on EntWine Australia, which is founded on the development of environmental management plans by grapegrowers and winemakers.

EntWine Australia will require the collection of similar data now referred to as EntWine Australia Indicator questions as well as carbon footprint data. It will also expand to include winery operations as well as vineyards.

All industry operators wanting to be involved in EntWine Australia in 2010 should visit the website for more information - www.wfa.org.au/entwineaustralia

Resources

- The Green Book: A guide to managing the environment for perennial horticulture in the Murrumbidgee Irrigation Area *(Murrumbidgee Horticulture Council*). Available for purchase from Murrumbidgee Horticulture Council.
- Guidelines for Environmental Assurance in Australian Horticulture *(Horticulture Australia Ltd)*. Available for purchase from Horticulture Australia Ltd.
- Regional Environmental Best Practices for Viticulture – Yarra Valley *(VIC Dept of Primary Industries & Yarra Valley Wine Growers Association)*. Available for purchase.
- Regional Code of Environmental Best Practice – Sunraysia Region *(VIC Dept of Primary Industries)*. Available free of charge at www.dpi.vic.gov.au
- Good Environmental Management (GEM) Guidelines *(CRC for Viticulture)*. Available free of charge at www.crcv.com.au/resources/Environment/

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Ecology and Management of the Common Starling (*Sturnus vulgaris)* in the McLaren Vale Region. Paton, D, Sinclair, R. and Bentz, C (2005). GWRDC research

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WFA Natural Resource Management Strategy - Summary

Background

The Winemakers' Federation of Australia's (WFA) NRM strategy was created in August 2011 through broad consultation with industry stakeholders, government and independent advisors. It was created in order to guide the NRM activities of the WFA and the Wine Industry National Environment Committee (WINEC).

This document is a summary version of the WFA NRM strategy which, highlights the key tasks identified within the strategy and seeks to support WFA Environmental policies.

Role:

Outputs of the tasks within this document may already be underway in some capacity within industry. It is the role of WFA and WINEC to identify and assist where possible these outputs and where no outputs exist undertake action to drive implementation of the tasks. WINEC will ensure that WFA's environmental policies, standards and practices enhance the wine sector's sustainability.

Responsibilities:

WINEC will advise WFA on environmental matters and on emerging issues which could impact on the sustainability of the sector.

WINEC will work closely with the WFA Board, its other committees, sector bodies and regional groups to ensure efficiency and effectiveness in the development and delivery of best environmental practices.

WINEC's members will strive to communicate and implement WFA's policy, standards and practices in their companies, regions, and spheres of influence.

Strategic themes

1. Water use is optimised
2. Land and biodiversity are maintained for future generations
3. The impact of climate change on the sector and regional areas is understood
4. Energy is used in an effective and efficient manner, with a focus on green energy and emerging efficiency enhancing technologies
5. Waste is reduced and managed sustainably
6. Communication and extension is undertaken to continually improve environmental performance
7. Entwine Australia is promoted and maintained as a key vehicle to provide leadership on environmentally sustainable practices

1. Water use is optimised

Water is essential to the viability of our businesses, therefore the WFA believes that all members of the wine sector must demonstrate good water stewardship and ensure that their practices maintain water as a sustainable resource. In particular the WFA will promote efficient irrigation and an awareness of the sector's impact whilst seeking secure, fair and equitable access to water.

WINEC will encourage the optimisation of water use within the sector, in particular through implementation of practices based on relevant water use efficiency research.

Tasks:

1	Strenuously promote policies to protect the long term health of water resources and access to sufficient water within the wine sector, and to government and the media. Encourage regional winemaking bodies to work with local NRM authorities such as CMA's to 'optimise' regional outcomes
2	Establish data on water usage (including source), reuse and recycling within the sector across wine regions and climates, develop appropriate KPI's (such as behavioural) and place in context with other water users
3	Identify gaps between water management research outcomes and uptake within the sector. Define optimisation of water use for the wine sector and promote the approach.
4	Estimate future water needs (in respect to both market demand and resource management), and the capacity of the sector to meet water challenges.
5	Understand and monitor market initiatives relevant to water such as the carbon footprint of irrigation and water recycling practices and water footprints

2. Land management practices maintain or enhance environmental values and biodiversity for future generations

The WFA believes all members of the wine sector should strive to enhance and maintain the quality of the environment in which they operate by recognising and mitigating any operational impacts and practicing good stewardship of natural values and landscapes on their properties and within wine regions generally.

WINEC will assist the sector to develop a common understanding of appropriate and straightforward land management actions, ranging from everyday production-related activities through to specific actions to preserve or restore natural values such as biodiversity habitat. It will also encourage interaction between regional wine industry associations and their natural resource management boards and catchment management authorities.

Tasks:

1	Define biodiversity and other key land management terms and their implications for the sector, investigate performance benchmarking options.
2	Understand the roles and responsibilities of relevant government agencies and authorities to ensure appropriate connections, up-to-date information and possible shared funding of people and activities
3	Encourage the involvement of regional wine sector associations with their local natural resource management boards and catchment management authorities
4	Maintain a watching brief on issues associated with natural resource management including biosecurity

3. The impact of climate change and government carbon policy on the sector and regional areas is understood

The WFA believes the wine sector must continue preparing for impacts associated with climate change, through the inclusion of climate change considerations in all business decision-making processes.

To the extent that this is possible WINEC will seek to understand the likely impact of climate change on regions and support the extension of related problem solving capability to members and regions. WINEC will maintain a watching brief on any pending regulations associated with the reduction of greenhouse gas emissions. It will advise WFA members of the possible costs of doing business in an economy that seeks to reduce greenhouse gas emissions.

Tasks:

1	Promote appropriate research that will provide practical guidance to the sector on potential impacts of climate challenge and carbon policy and how to manage them.
2	Seek fair and reasonable processes for members to gain recognition for GHG emission management
3	Maintain relationships with key policy areas of government on climate change to ensure that the views of the sector are sought and taken into account when developing policy and regulations
4	Develop policy responses to government carbon management policies and opportunities that may affect the sector
5	Work with relevant groups to maintain and where possible improve the Australian wine carbon calculator

4. Energy is used in an effective and efficient manner, with a focus on green energy and emerging technologies

The WFA believes all members of the wine sector should support the transition to reduced greenhouse gas emissions by addressing energy efficiencies and by incorporating alternative energy opportunities in their operations.

WINEC will promote the containment of non-renewable energy through operational change and its substitution with renewable sources of energy. This may be achieved through access to new technologies that offer opportunities for efficiencies.

Tasks:

1	Undertake data collection to establish energy usage (including source) within the sector and supply chain
2	Maintain contact with alternative energy advisers about emerging trends and new technologies. Provide this information to the sector highlighting opportunities.
3	Develop tools including a cost-benefit analysis which enable companies to compare options for alternative energy sources and new technologies.
4	Identify barriers to the adoption of clean energy by wine sector members and relevant electricity and water supply utilities

5. Waste is reduced and managed sustainably

The WFA believes members of the wine sector must take advantage of all opportunities to utilise materials and resources (including energy) in such a way that waste is minimised.

WINEC will seek to ensure that waste management practices are continually improved across the sector, primarily to reduce the impact on landfills and the financial cost associated with creating waste and removing it from the property/facility. The waste management hierarchy of: avoid, reduce, reuse, recycle and recover must apply in the sector's policies and standards and in its approach to managing its businesses.

Tasks:

1	Develop a definition of waste which reinforces the waste management hierarchy
2	Develop priorities for waste reduction which encourage continuous improvement and include key performance indicators for both solid and liquid waste
3	Ensure input into the proposed national product stewardship policy and when appropriate, develop policies, standards and key performance indictors for the sector

6. Communication and extension is undertaken to continually improve environmental performance

The WFA believes good communication about the opportunities and benefits of sustainable practices will enhance the sector's engagement with sustainable production and hence the sustainability of the sector as a whole.

WINEC's value lies in both increasing the knowledge of environmental sustainability amongst the sector and encouraging groups to improve their environmental management. Relevant and timely extension activities will be undertaken to provide information that is effective and efficient and reaches people through appropriate channels.

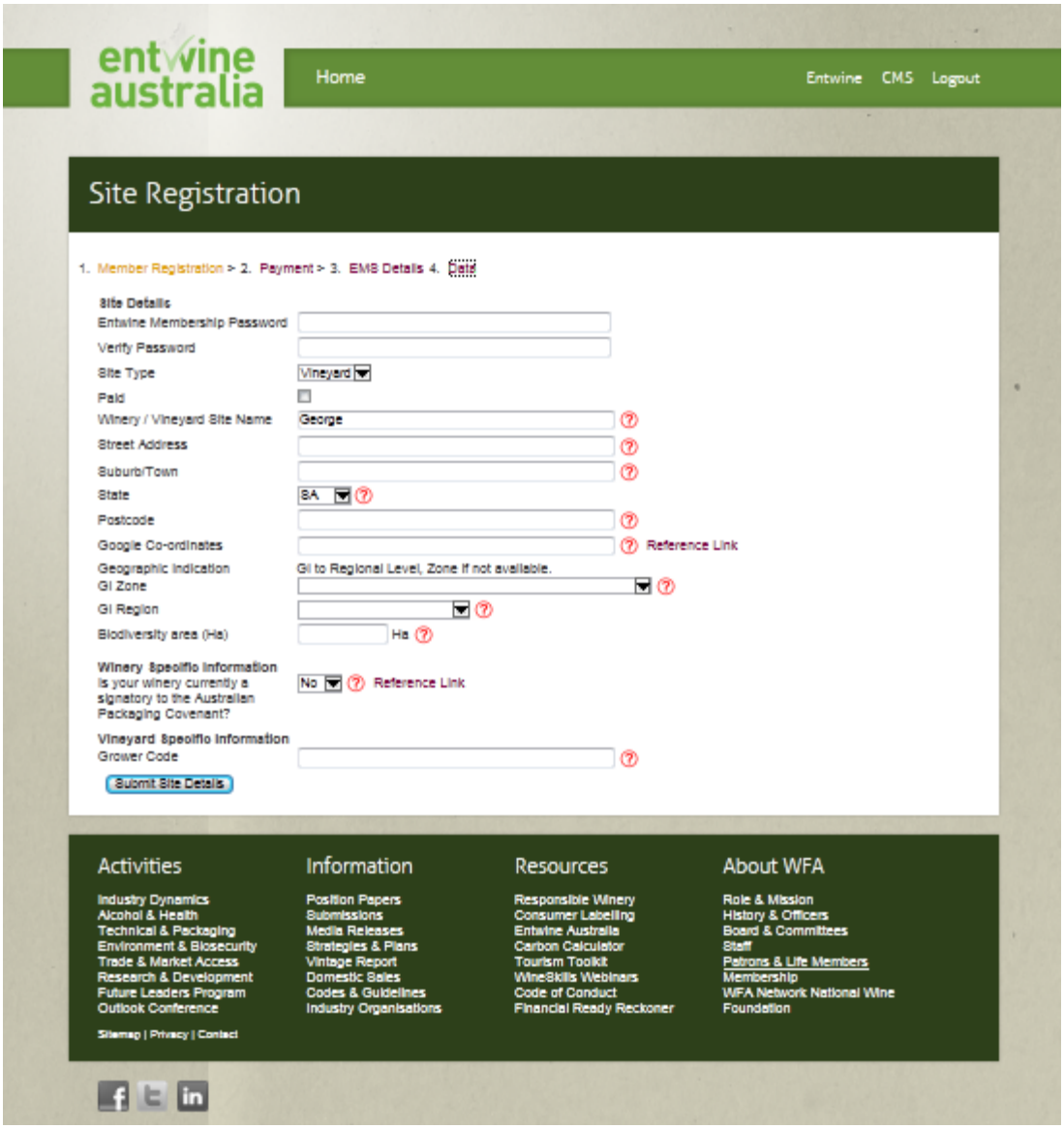
Tasks:

1	Encourage communication between committees to ensure that all groups understand their role in environmental stewardship, are taking action and are liaising with other groups for the best environmental outcomes
2	Develop a comprehensive communications strategy which takes into account all forms of media including social media to ensure dissemination of information to sector participants, consumers and the community, and which includes detailed information on the website. The strategy is to include mechanisms to assess and monitor communication performance.
3	Take opportunities to increase communication between WFA and state/regional associations on environmental matters. Seek to ensure that lines of communication are established between associations and local NRM or CMA authorities, so that these authorities can utilise regional wine sector associations effectively in their consultation and identification of funding opportunities.

7. Entwine Australia is promoted and maintained as a key vehicle to provide leadership on environmentally sustainable practices	
The WFA believes that the environmental sustainability of the Australian wine sector can be enhanced and promoted by backing membership of the environmental sustainability program Entwine Australia. WINEC will seek to ensure that the Entwine Australia program is successful by promoting the program and providing guidance to ensure that the program is effective and meets the needs of stakeholders. Tasks:	
1	Ensure the industry understands the relationship between Entwine Australia and certification systems and values the credentialing benefit of Entwine
2	Seek the addition of Entwine Australia membership to export approvals requirements by amendment to the Wine Australia Corporation Regulations
3	Review the Entwine Australia program, membership obligations and fees annually to ensure the financial viability of the scheme, consistency with membership needs, retailer and consumer needs and the inclusion of information on improved practices.
4	Compare the Entwine program to international sustainability schemes to provide guidance on equivalency
5	Ensure that existing extension networks within and associated to the sector understand and have the capacity to support and promote Entwine membership

Entwine web and online database content screenshots





Data Input - Vineyard

1. Member Registration > 2. Payment > 3. EMS Details 4. Data

Financial Year Reporting	2012/2013	
Tonnes grapes harvested (T)		T
Vineyard area		Ha
Electricity (kWh)		kWh
Total Water Used (ML)		ML
Nitrogen (kg)		Kg
Fuel Used		
Petrol (L)		L
Diesel (L)		L
LPG (L)		L
Biodiesel (L)		L
Vineyard Floor Management		
Permanent Cover Crop Native (Ha)		Ha
Permanent Cover Crop Non Native (Ha)		Ha
Permanent Cover Crop Volunteer Sward (Ha)		Ha
Annual Cover Crop (Ha)		Ha
Bare soil (Ha)		Ha
Irrigation Types		
Irrigation type - Dripper (Ha)		Ha
Irrigation type - Undervine Sprinkler (Ha)		Ha
Irrigation type - Overhead Sprinkler (Ha)		Ha
Irrigation type - Flood (Ha)		Ha
Irrigation type - Non-Irrigated (Ha)		Ha
Water Used		
River Water (ML)		ML
Groundwater (ML)		ML
Surface water dam (ML)		ML
Recycled water from winery (ML)		ML
Recycled water from other source (ML)		ML
Mains water (ML)		ML
Other Water (ML)		ML

Submit data

Data Input - Winery

1. Member Registration > 2. Payment > 3. EMS Details 4. Data

Financial Year Reporting	2012/2013
Note	Please estimate the amount of grapes and wine processed in the last financial year for each activity listed below, including contracted winemaking and bottling activities. One kilolitre is the same volume as 1000 litres or a cubic metre (m3).
Tonnes Crushed (T)	T
Winemaking Volumes	
Full Winemaking (kL)	kL
First Stage Winemaking (kL)	kL
Final Stage Winemaking (kL)	kL
Packaging Volumes	
Package on site (kL)	kL
Package off site (kL)	kL
Water use (kL)	kL
Wastewater produced	
Wastewater (kL)	kL
Wastewater recycled (kL)	kL
Solid Waste	
Total Waste (T)	T
Waste to landfill (T)	T
Energy	
Electricity (kWh)	kWh
Natural Gas (GJ)	GJ
Petrol (L)	L
Diesel (L)	L
LPG (L)	L
Biodiesel (L)	L
Purchased CO2 (T)	T

Submit data









Australian Wine Carbon Calculator v1.5 August 2012

USER GUIDE

The Australian Wine Carbon Calculator is adapted from the International Wine Carbon Calculator Version 1.2 and uses the Australian National Greenhouse Accounts Factors, July 2012

wfa Winemakers' Federation of Australia
For the Industry by the Industry

SOUTH AUSTRALIAN WINE INDUSTRY ASSOCIATION INCORPORATED

Wine Grape Council SA

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A Key Changes from IWCC to AWCC

B AWCC v1.5 Spreadsheet Model

C IWCP v1.2 Data Quality System

D International Wine Carbon Protocol (v1.2)

E National Greenhouse Accounts Factors

Acknowledgments

The Winemakers' Federation of Australia and the South Australian Wine Industry Association would like to thank the following for their contribution to the development of the Australian Wine Carbon Calculator:

- Mark Foletta, Wine Masters candidate, University of Melbourne
- Russell Johnstone, Pernod Ricard Pacific
- Suzanne McLoughlin, Foster's Group
- Jodie Pain, SAWIA
- Gioia Small, Foster's Group

Introduction

Background

URS Australia Pty Ltd (URS) was commissioned by the Winemakers' Federation of Australia and the South Australian Wine Industry Association to extract an Australian Wine Carbon Calculator (AWCC) from version 1.2 of the existing International Wine Carbon Calculator (IWCC). Key changes made in the development of the AWCC from the IWCC are provided as Appendix A.

The AWCC is a spreadsheet model designed to assist members of the Australian wine industry compute and assess their carbon emissions at a site or facility level. The calculator has been adapted from the International Wine Carbon Protocol (IWCP) v1.2 to meet Australian legislative requirements. It is intended as a guidance tool only, and does not provide for full reporting to relevant statutory requirements. Specialist advice is recommended where reporting compliant with the National Greenhouse and Energy Reporting (NGER) Act 2007 is desired.

This document is intended as a companion to the spreadsheet model. In general, user instructions and calculation notes are given within the spreadsheet with the intention that a user guide should not be needed. However, key summary information is provided herein to assist the user to complete the model for their site or facility. Each section is numbered to coincide with the number of the relevant tab in the spreadsheet, and provides:

1) a brief overview of the purpose or intention of the worksheet

2) how to enter data

3) the calculation methodology used

4) main assumptions or notes

Where further detail is required, the user is referred to the IWCP v1.2 provided as Appendix D, which forms the basis for much of the calculator.

Overview

This tool estimates total emissions of carbon dioxide produced as a result of the activities related to Australian wine industry businesses, such as vineyards, wineries and transport companies. Coverage of the tool (e.g. fuel types and business activities) has been selected as being specific to the Australian wine industry. Where the user considers key activities to have been incorrectly excluded from the calculator, the Administrator should be contacted for resolution[1].

Emissions are covered for the six Kyoto Protocol gases:

1) Carbon dioxide (CO_2)

2) Methane (CH_4)

[1] The AWCC Administrator is the Winemakers' Federation of Australia, (08) 8222 9255, wfa@wfa.org.au

3) Nitrous Oxide (N_2O)

4) HFCs (hydrofluorocarbons)

5) PFCs (perfluorocarbons)

6) SF6 (sulphur hexafluoride)

A general rule of thumb is also applied to exclude any items, processes or activities that make up less than a nominal 1% of the total mass of emissions, or less than 1% of the mass of the product.

The methodologies of calculation are based on the IWCP v1.2, with changes made where Australia-specific methodology exists (refer Appendix A).

Methodology

While the form of the tool has been adapted from the IWCC, the key technical references for development of the calculator are:

- National Greenhouse Accounts (NGA) Factors, July 2012
- NGER Act, 2007 (and associated regulations and technical guidelines)

Where the above documents do not provide technical guidance on activities covered by the calculator, accepted international best practice greenhouse gas (GHG) accounting protocol methodology is used[2].

As a key reference, the NGA Factors document has been included in this user guide as Appendix E for information.

Basic principles of greenhouse gas accounting

The basic concept behind GHG accounting is to calculate an overall quantity of GHG emission as a result of a given activity or at a particular facility. The calculation method used is to apply an emission factor to any prescribed activity to convert it to CO_2 equivalent (CO_2-e) emissions (for example, 2.39 tonnes of CO_2 emitted for every 1 tonne of black coal burnt). This methodology is explained in detail by the World Resources Institute GHG Accounting Protocol[3].

Emissions are considered direct or indirect.

Direct emissions are produced from sources within the boundary of an organisation and as a result of that organisation's activities. These emissions mainly arise from the following activities:

- generation of energy, heat, steam and electricity (such as burning gas or wood);
- manufacturing processes (such as in cement production, or soil emissions in agriculture);

[2] Intergovernmental Panel on Climate Change (2006) *2006 IPCC Guidelines for National Greenhouse Gas Inventories,* prepared by the National Greenhouse Gas Inventories Programme, Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). Published: IGES, Japan

[3] World Resources Institute (2004) *The Greenhouse Gas Accounting Protocol.* Washington, DC: World Business Council for Sustainable Development.

- transportation of materials, products, waste and people (i.e. vehicle fuel combustion);
- fugitive emissions (such as methane emissions from coal mines, gas leaks from joints and seals);
- emissions from purchased carbon dioxide used in the winery; and
- on-site waste management (such as emissions from landfill sites).

Direct (or point-source) emission factors give a weight of CO_2-e emitted per unit of activity at the point of emission release (i.e. fuel use, manufacturing process activity, mining activity, on-site waste disposal, etc.). Direct emissions are categorised as Scope 1.

Indirect emissions are emissions generated in the wider economy as a consequence of an organisation's activities, but which are physically produced by the activities of another organisation. The most important category of indirect emissions is from the consumption of electricity. Indirect emissions from electricity consumption are categorised as Scope 2.

Other indirect emissions, such as 'upstream' emissions generated in the extraction and processing of raw materials, freight of goods and materials, employee travel and off-site waste treatment are categorised as Scope 3. The addition of Scope 3 emissions provides what is called a lifecycle analysis (LCA) for a given activity or product. Note that the accuracy of this calculator is not sufficient to provide an independently verifiable LCA.

Under the NGER Act 2007, only Scope 1 and 2 emissions are reportable under the currently proposed emissions trading system.

A more detailed explanation of GHG accounting can be found in the IWCP v1.2 provided as Appendix D.

Using the Australian Wine Carbon Calculator

The AWCC tool has been developed specifically for wine industry members. Therefore, there are expected to be three main categories of model user:

1) Vineyard

2) Winery

3) Packaging/distribution

The model is configured such that it can estimate emissions for a user who falls under one, two, or all of these categories. Typical process boundaries for the above categories are illustrated in Appendix H of the IWCP v1.2 (refer to Appendix D of this user guide).

Typical wine industry activities expected to be covered by the calculator are:

- **Scope 1:** company-owned vehicles (cars, trucks, forklifts or tractors), fuel use in on-site generators or heaters, fertiliser use, composting, purchased carbon dioxide
- **Scope 2:** electricity use
- **Scope 3:** packaging materials, freight transport, purchased wine products, waste disposal

Getting started

It is recommended to go through the following steps in completing the AWCC:

1) Identify your reporting requirements

   a) reporting period (annual? calendar year? financial year? quarterly? other?)

   b) organisational boundaries (the company may have several sites or facilities, in which case several separate versions of the calculator may be used, and the total emissions estimate summed)

   c) operational boundaries (defining the site or facility)

   d) drivers (for internal information, for an approximate check against NGER Act 2007 reporting thresholds, aspiration towards a verifiable product LCA or 'green marketing')

2) Collect data

3) Enter data into tabs 1 through 13

4) Check and assess summary tables and graphs

5) Save and/or print and file as necessary

Calculator use and navigation

It is assumed that the user has basic computer literacy. Detailed spreadsheet knowledge should not be required. The user simply enters data into colour coded cells, selects input options from colour coded drop-down lists, clicks between separate input tabs, and views various output tables and graphs.

Start by opening the spreadsheet model in Microsoft Excel. Some users may initially need to click 'Enable Macros' if a security warning window appears (this depends on the user's computer security settings).

It is intended that the user start from the Introduction tab at the bottom of the program window, and work from left to right through the tabs to fill in data in a logical sequence (although note that the user can navigate to any tab at any time). A brief instruction is provided at the top of each tab to assist with correct data entry and where appropriate, notes are also included below the main table of data on assumptions, calculation details or other relevant information. Cells within the tabs are colour coded to assist user input and navigation (a key is provided in the Introduction tab of the spreadsheet).

- Light green cells require user input
- Pink cells are drop-down lists for the user to select from a discrete range of available input options
- Yellow cells contain the total calculated emission per line item within each tab
- Maroon cells contain the summed emission total for each main activity/source category (one per tab)
- Cells with a red marker in the top right-hand corner contain comments that may be viewed by hovering the cursor over the marked cell

The Excel tabs at the bottom of the active window have also been colour coded according to emission categories (Scope 1, 2 and 3).

Note that individual tabs may be printed at any stage such that the user may keep a hardcopy record of entered data. After completion of the calculator for a given site or facility over a specified period, it may be useful to keep a hardcopy file of the full data set.

Example print outs of a blank calculator model have been included as Appendix B.

Data quality

Quality assurance, quality management and uncertainty assessment play an important role in GHG accounting, because there are many potential sources of error or data uncertainty to affect the final emissions estimate. This can range from impact of the number of significant figures used in an emission factor, to an inappropriate use of a default emission factor for a given process.

The calculator includes a data quality ranking for each itemised emission to indicate the level of reliability of emission estimates.

For the AWCC, where applicable, factors and methods have been used in accordance with the NGA Factors. In this case, a data quality ranking of 'NGA' is applied.

Where activities, processes or products do not have NGA factors or methods, the data quality ranking system from the IWCP v1.2 has been maintained. Details of this system are provided in Appendix C.

Future calculator revisions

As this user guide is in support of version 1.4 of the AWCC, it is anticipated that there will be future revisions of the tool that may incorporate:

- Updated emission factors and/or calculation methodologies;
- Error or 'bug' fixes;
- Ease of use improvements;
- Additional outputs (including formatted for Online System for Comprehensive Activity Reporting)
- More detailed user instruction and in-program help;
- Suggestions from wine industry user feedback; and/or
- Other upgrades as determined by the Administrator.

Any of the above revisions shall be at the sole discretion of the Administrator.

Site Details

The first worksheet in the calculator records the details of the site. The selection of the State carries through to calculations for other worksheets (For Example: emission factor for electricity transmission grid vary between States). If multiple sites or facilities are to be assessed a separate spreadsheet is required for each one, and a total 'carbon footprint' may be calculated by summing the totals from each of the separate spreadsheets.

This page also requires information regarding the site scope or type of operation which is being reported (For Example: winery, vineyard, cellar door, offices, etc.).

Section 1 - Mobile Quantity Based

This worksheet calculates emissions from fuels combusted due to transport at the site or by the site company-owned vehicles.

Data entry

Enter the volume of fuel used for each fuel type according to the units shown. The user is expected to add all separate accounts for the same fuel type. Note the user may also separate out post-2004 vehicles and/or Euro-design compliant heavy vehicles due to their improved catalytic conversion of exhaust methane and nitrous oxide. Comments or descriptions can be added for each fuel type (e.g. data sources, specific vehicle groups).

The following vehicle category definitions are applied:

- **Passenger vehicles:** Motor vehicles constructed primarily for the carriage of persons and containing up to nine seats (including the driver's seat). Included are cars, station wagons, four-wheel drive passenger vehicles, passenger vans or mini buses with fewer than 10 seats and campervans.
- **Light commercial vehicles:** Motor vehicles constructed for the carriage of goods and which are less than or equal to 3.5 tonnes GVM. Included are utilities, panel vans, cab-chassis and goods carrying vans (whether four-wheel drive or not).
- **Rigid trucks:** Motor vehicles exceeding 3.5 tonnes GVM, constructed with a load carrying area. Included are normal rigid trucks with a tow bar, draw bar or other non-articulated coupling on the rear of the vehicle.
- **Articulated trucks:** Motor vehicles constructed primarily for load carrying, consisting of a prime mover which has no significant load carrying area, but with a turntable device which is linked to a semitrailer.
- **Specialised trucks:** trucks other than those described by other categories.
- **Buses:** Motor vehicles constructed for the carriage of passengers. Included are all motor vehicles with 10 or more seats, including the driver's seat.
- **Motorcycles:** includes all two, three and four-wheeled road registered vehicles.

If fuel volume records are not kept, estimated fuel usage can be calculated by the distance-based method in tab 2: 'Mobile - Distance Based', but care should be taken not to double up on emissions by using both methods for the same vehicle(s).

Calculation methodology

Emissions estimates are based on NGA factors and methods.

Notes/assumptions

- Staff transport is not covered by this worksheet (except where vehicles are specifically owned by the facility or the company whose head office is at the site).
- Biofuels are not included in scope 1 transport emission calculations, as they are considered part of the short term carbon cycle under GHG accounting protocols.

- No transport factors are provided by NGA factors for vehicles not registered for road use; stationary energy factors should be used for this fuel consumption.
- All emission factors incorporate relevant oxidation factors from DCC's National Inventory Report.

Section 2 - Mobile Distance Based

This worksheet calculates emissions from fuels combusted due to transport at the site or by the site company-owned vehicles, specifically on a "vehicle kilometres travelled" basis (when the volumes of fuel consumed are not recorded).

Data entry

Enter the total vehicle kilometres travelled either by general vehicle category (the sum of all individual vehicles within that category), or by specific vehicle model using the drop-down menus. Note that for generic vehicle categories, the user may separate out post-2004 vehicles due to their improved catalytic conversion of exhaust methane and nitrous oxide.

Calculation methodology

Distance-based emissions estimates are not covered by NGA factors and methods, as this is considered a less accurate emission estimation technique.

Emissions are calculated by estimating fuel use by applying an assumed fuel consumption rate to the total vehicle kilometres travelled. The energy used in the estimated total fuel consumed is converted to CO_2 emissions using NGA factors for petrol, diesel and LPG fuels.

Vehicle categories are taken from "Vehicle Fuel Efficiency, Potential measures to encourage the uptake of more fuel efficient, low carbon emission vehicles", prepared by Australian Transport Council and Environment Protection and Heritage Council, September 2008.

Fuel efficiency data for individual car models are from http://www.greenvehiclesguide.gov.au.

Notes/assumptions

- If fuel volume records are kept, the user should calculate emissions by the quantity-based method in tab 1: 'Mobile - Quantity Based'. Again care should be taken not to double up on emissions by using both methods for the same vehicle(s).
- Staff transport is not covered by this worksheet (except where vehicles are specifically owned by the facility or the company whose head office is at the site).
- Biofuels are not included in scope 1 transport emission calculations, as they are considered part of the short term carbon cycle under GHG accounting protocols.
- No transport factors are provided by NGA factors for vehicles not registered for road use; stationary energy factors should be used for this fuel consumption.
- All emission factors incorporate relevant oxidation factors from Department of Climate Change's National Inventory Report.
- The spreadsheet returns car fuel type as 'LPG' if listed as LPG or petrol/LPG (dual fuel).

Section 3 - Stationary Combustion

This worksheet calculates emissions from fuels combusted for stationary energy purposes (e.g. boilers, generators etc.).

Data entry

Enter the volume of fuel used for each fuel type according to the units shown. The user is expected to add all separate accounts for the same fuel type.

Note that **in the case of gaseous fuels, two unit options are available to the user.** Gas quantity may be recorded and reported as energy (GJ) or volume (cu.m). This provides flexibility to the user to report as per how their fuel accounts are calculated/reported.

The user may create multiple line items of the same fuel type if desired. The use of the description/comment cell is recommended in this case to differentiate combustion sources.

Calculation methodology

Emissions estimates are based on NGA factors and methods.

Notes/assumptions

- None significant

Section 4 - Fugitive Emissions

This worksheet calculates emissions from synthetic gas leakage from airconditioning and other equipment.

Data entry

The user has two options available for data entry:

1) recording the known weight of gas used in the reporting period (as taken from equipment service/gas recharge records), or

2) recording the total amount of gas contained in the equipment and applying a default annual leakage rate.

Where default loss calculations are assumed, the user must specify the type of HFC gas used by their equipment (from the pink drop-down cells) to apply the correct global warming potential factor. For gas insulated switchgear, the default gas is SF6, and calculations are carried out independent of whether or not the user selects an HFC type from the pink drop-down cells.

Calculation methodology

Emissions estimates are based on NGA factors and methods.

Common refrigerant blends are based on Forster, P., et al, 2007: Changes in Atmospheric Constituents and in Radiative Forcing. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Notes/assumptions

- Methane loss from stationary combustion is not included (this item was included in the IWCC v1.2)
- Leakage from mobile air-conditioning units (i.e. vehicles) or fire extinguishers is not included as they are assumed to have an individual charge size of <100kg (NGERS reporting threshold).
- Take care not to double up on fugitive emissions by using both methods (known annual gas recharge quantity and default losses by equipment type) for the same leakage source(s), and ensure correct units are used for gas quantities
- R-22 is a commonly used refrigerant that is being phased out by the Montreal Protocol, an international treaty, and therefore does not need to be reported.

Section 5 - Winemaking Practices

This worksheet calculates emissions arising from direct carbon dioxide use in the winemaking process, including blanket tanks and pipe flushing.

Data entry

The user enters the quantity of purchased carbon dioxide in kilograms used in the reporting period. Several data entry lines are provided to allow for differentiation of carbon dioxide use categories if this is of value to the user.

Calculation methodology

It is assumed that there is zero carbon capture in the use of purchased carbon dioxide in the winery. Therefore, the amount of carbon dioxide used equals the reportable carbon dioxide emission

Notes/assumptions

- Carbon dioxide emissions during fermentation are not included because fermentation is considered part of the short term carbon cycle and is therefore not reportable.

Section 6 - Vineyard Practices

This worksheet provides a broad estimate of emissions related to nitrous oxide emissions from synthetic fertilizer use. Due to the complexity of agricultural systems and the variability of practices across vineyard sites, many activities/processes are not covered by this calculator (e.g. emissions from agricultural soils, manure application, nitrogen leaching and runoff, crop residues). The emission estimate given here is therefore indicative only, and may be improved in future revisions of the calculator.

Data entry

For synthetic fertiliser use, the user is prompted for the total mass of fertiliser applied to the soils, and if known, the nitrogen content of the fertiliser. If the fertiliser's nitrogen content is unknown, a default value is applied according to state-specific data. The emission factor also depends on if the vineyards are irrigated or not (selected by drop-down list).

Calculation methodology

NGA factors and methods only makes brief mention of agricultural system emissions, partly because the initial form of an Australian emissions trading system is not expected to include agriculture (for reasons of complexity and variability noted above).

Specific calculations for fertiliser addition have been included from the *Department of Climate Change, 2006, Australian Methodology for the Estimation of Greenhouse Gas Emissions and Sinks 2006: Agriculture*.

Notes/assumptions

- Direct emissions from crop residues, manure application or soil disturbance and indirect emissions from atmospheric deposition or leaching and runoff have not been included (as per International Wine Carbon Protocol v.1.2) for reasons of calculation complexity and data accuracy uncertainty. It is possible that these items may be included in future revisions of the AWCC.

Section 7 - Scope 1 Waste Treatment

This worksheet calculates emissions from on site waste treatment, including solid and liquid wastes.

Data entry

For solid waste treatment, the available waste processes: 1) composting, 2) anaerobic digestion and 3) incineration, may be selected from the pink drop-down menus, and the amount of waste entered in tonnes. Any recovered methane may also be recorded (also in tonnes).

For waste water treatment, emissions are included from methane and nitrous oxide generated in the anaerobic breakdown of waste, as well as in flaring any collected biogas.

Where site specific chemical oxygen demand (COD) values are known by the waste water treatment plant operators, this data should be used.

If site-specific COD data are not available, the user may use the default parameter calculation method.

- Where the total COD in wastewater is unknown, the default value of 1.5kg per tonne of winery wastewater can be used
- Where the COD of sludge removed from waste water is unknown, a default value of 15% can be used

If biological oxygen demand (BOD) is recorded instead of chemical oxygen demand, a conversion factor may be used:

- COD = 2.6 x BOD_5 (Note: BOD_5 is a 5 day BOD test result)

The calculator asks for the COD in sludge removed from waste water, and the COD in sludge removed from the winery site. This second value is to ensure that any emissions resulting from off-site treatment of sludge are not included here (off-site emissions are not included in the user's scope 1 total). This value cannot exceed the total % COD in sludge removed from waste water.

The % COD in sludge anaerobically treated is the critical input to emissions calculations. Methane is assumed to be only generated in anaerobic decomposition of winery waste, so if this value is 0%, the emission calculation will be zero.

Default values from IPCC are:

- Aerobic treatment plant: 0%
- Aerobic treatment plant (not well managed or overloaded): 30%
- Anaerobic digester for sludge: 80%
- Anaerobic reactor (e.g. UASB, Fixed Film Reactor): 80%
- Anaerobic shallow lagoon (less than 2 m): 20%
- Anaerobic deep lagoon (more than 2 m): 80%

Calculation methodology

Emissions estimates are based on NGA factors and methods by converting methane and nitrous oxide emissions to CO_2 equivalents.

Notes/assumptions

- CO_2 emissions from waste and waste water are not included, as these are considered part of the short term carbon cycle (NGA Factors 2012, p. 49).
- It is assumed that no wine industry sites carry out landfill activities
- Weight of waste for composting or digestion is measured in wet tonnes
- The default fraction of anaerobically treated wastewater treated by a wine industry plant is zero
- If the estimated total waste water is unknown, an industry default value of 23 KL per tonne of wine produced. It can be assumed that 1L of wine = 1kg of wine. Therefore the default value as provided by the Australian Government National Greenhouse Accounts Factors is 23L of waste water per litre of wine. This is an order of magnitude higher than industry studies indicate, and users are encouraged to measure their own waste water production to improve accuracy of results.
- If the biogas methane content is unknown, a default value of 70% is assumed
- Where the total COD in wastewater is unknown, the default value of 1.5kg per tonne of winery wastewater can be used
- Where the COD of sludge removed from waste water is unknown, a default value of 15% can be used
- Take care not to double up on emissions by using both methods for the same waste water

Section 8 - Scope 2 Power Use

This worksheet calculates Scope 2 emissions from the purchase of electricity for use at the site.

Data entry

Enter the total amount of electricity purchased for the period (in kWh), and the default emissions will be calculated using grid factors for the site's state.

In any case such as where a site is near a state border and a unique electricity source is known to be sourced from outside the site's state, the user may select the known external electricity provider's state using the pink drop-down boxes.

Calculation methodology

Emissions estimates are based on NGA factors and methods.

Notes/assumptions

- The use or purchase of GreenPower does not entitle a user to reduce or in any other way modify their reportable electricity consumption. The grid emission factor for each state incorporates the estimated proportion of low carbon intensity electricity generation technologies (e.g. hence Tasmania's low grid factor due to the prevalence of hydro power generation, and Victoria's high grid factor due to the prevalence of coal power generation).

Section 9 - Scope 3 Packaging

This worksheet calculates indirect emissions from the purchase of packaging materials.

Emissions calculated here are approximate only, because emissions for packaging items will vary from site to site and from item to item for different brands due to differences in location, raw material sources, manufacturing, handling and transport processes. Due to the absence of data, only a select range of packaging items are included.

Data entry

Enter the quantity of units bought for the period, and the corresponding unit weight (weighted average if necessary for differing unit sizes of the same product). Comments or descriptions may be useful to assist with differentiating separate subsets of glass or plastics.

Calculation methodology

NGA factors and methods do not provide information on scope 3 emissions for packaging materials.

A generic emission factor (in tonnes CO_2 per unit weight of packaging) from published data is applied to estimate emissions associated with a given item.

Notes/assumptions

- For some wine industry materials/items, insufficient research has been carried out to provide a reliable emission factor (e.g. synthetic corks, plastic pallets). It is anticipated that new emission factors will be developed and existing emission factors refined over time as research continues and subsequent calculator updates are made.

Section 10 - Scope 3 Contract Machinery

This worksheet calculates indirect emissions from combustion of fossil fuels by contract machinery (i.e. not scope 1 emissions because the machinery is not owned by the site company). Included machine types are helicopters and tractors. Other vehicles may be entered in tab 10, 'Transport'.

Data entry

For helicopters, choose the helicopter size from the pink drop-down boxes and enter the flight hours per aircraft. Helicopter classes available are:

- Small - max takeoff weight 840kg
- Medium - max takeoff weight 1050kg
- Large - max takeoff weight 2270kg
- Extra large - max takeoff weight 6800kg

For tractors (or harvesters or similar), the user may enter the horsepower rating of the machine (in power take off units), or select either large or small size from the pink drop-down boxes. Then the machine hours should be entered, and the fuel type selected (diesel or petrol). The size of the tractor may be assessed by the user.

Calculation methodology

NGA factors and methods do not provide information on scope 3 emissions for contract machinery. Therefore the methodology from the IWCP v1.2 has been carried over to the AWCC.

Notes/assumptions

- Take care not to double up on emissions by using both methods for the same machine(s).

Section 11 - Scope 3 Transport

This worksheet calculates emissions from goods freight, including by road, rail, sea and air. Due to the high degree of variability between freight vehicle types and practices, these emission estimates are indicative only, and calculation methodologies and accuracies are expected to be improved in future calculator revisions.

Data entry

There are two methods available to the user to estimate emissions:

1) by vehicle kilometres travelled where the vehicle type is known (as per tab 2 – Mobile – Distance Based); or

2) an emission per tonne of freight per kilometre travelled.

For the first method, enter the total vehicle kilometres travelled according to the general vehicle category. Note the user may separate out post-2004 vehicles due to their improved catalytic conversion of exhaust methane and nitrous oxide.

For the second method, use the pink drop-down menus to select the mode of freight (various options are available for land/sea/air), and then enter the total tonnes of freight, and the total distance travelled.

Calculation methodology

NGA factors and methods do not provide information on scope 3 emissions for freight transport. Therefore the methodology from the IWCP v1.2 has been carried over to the AWCC.

Notes/assumptions

- Take care not to double up on emissions by using both methods (known vehicle road freight distance and tonnage based) for the same freight.
- Biofuels are not included in scope 3 transport emission calculations, as they are considered part of the short term carbon cycle under GHG accounting protocols.
- Note that for the vehicle-distance based method, the total vehicle emissions are calculated regardless of what proportion of the vehicle's carrying capacity is occupied by the user's goods.

Section 12 - Scope 3 Purchased Wine Products

This worksheet calculates indirect emissions from the purchase of typical wine related products. Note that due to the wide range of products and the lack of sufficient 'life cycle analysis' data, many products are not covered by this calculator. Further, variance of 'embodied energy' between different brands of the same products means that generic emission factors may not provide suitably accurate emission estimates, and the estimates provided here should be interpreted as indicative only.

Data entry

Enter the quantity of products bought for the period, and the corresponding product weight (weighted average if necessary for differing unit sizes of the same product). A generic emission factor then estimates emissions associated with each item.

Calculation methodology

NGA factors and methods do not provide information on scope 3 emissions for purchased wine products.

A generic emission factor (in tonnes CO_2 per unit weight of purchased goods) from published data is applied to estimate emissions associated with a given item.

Notes/assumptions

- Emissions calculated here are approximate only. Actual emissions for purchased items will vary from site to site and brand to brand due to differences in location, raw material sources, manufacturing, handling and transport processes. For many typical industry products, insufficient research has been carried out to provide a reliable emission factor (e.g. barrels made from French oak compared to American oak). It is anticipated that new emission factors will be developed and existing emission factors refined over time as research continues and subsequent calculator updates are made.

Section 13 - Scope 3 Waste Treatment

This worksheet calculates emissions from off site waste treatment, including solid and liquid wastes.

Data entry

For solid waste treatment, three different calculation methods are available according to the degree of waste separation into category that occurs at the site.

1) The first, most detailed method allows the user to select the specific waste type by composition as one of nine categories (food, paper/cardboard, garden/green etc.) from the pink drop-down menus, and enter the amount of waste (in tonnes).

2) The second, more broad waste categorisation allows the user to select the broad waste type from pink drop-down menus, and enter the amount of waste disposed (in tonnes).

3) The third, most broad method allows the user to simply enter the total tonnage of waste removed from site.

For waste water treatment, emissions are included from methane and nitrous oxide generated in the anaerobic breakdown of waste, as well as in flaring any collected biogas. Where site specific chemical oxygen demand (COD) values are known by the waste water treatment plant operators, this data should be used. If site-specific COD data are not available, the user may use the default parameter calculation method.

Calculation methodology

Emissions estimates are based on NGA factors and methods.

Notes/assumptions

- Take care not to double up on emissions by using two methods for the same waste or waste water.
- If the COD of sludge removed from wastewater is unknown, a default value of 15% of the total COD of wastewater is used.
- If the methane content of biogas is unknown, calculations use a default value of 70%.

Section 14 - Scope 3 Power Use

This worksheet calculates indirect scope 3 emissions from purchased electricity. Emissions are calculated for two items:

1) Transmission and distribution losses

2) Fossil fuel extraction, production and transport

Data entry

The total amount of electricity use will be automatically copied over from tab 7 for calculation of transmission and distribution losses.

Data for fossil fuel extraction, production and transport must be manually copied from Scope 1 emission calculation sheets. The user should take care to correctly add up the total energy (in GJ) for each fuel type, and enter them into the relevant cells.

Calculation methodology

Emissions estimates are based on NGA factors and methods.

Notes/assumptions

- This worksheet calculates the emissions that arise through electricity use as a result of the extraction production and transport of the fuel being used.
- You will need to copy the existing data from *Tab 1 Mobile – Quantity Based, Tab 2 Mobile – Distance Based and Tab 3 Statutory Combustion* to the corresponding fuel type in *Tab 14 Scope 3 Power Use.*
- Be sure to copy the numbers (in tabs 1, 2 & 3) from the “Energy Consumed (GJ)” column.
- No scope 3 emission factor for biofuels (such as biodiesel or ethanol) provided by NGA due to highly variable nature of individual fuel characteristics
- Take care in copying fuel energy data from scope 1 tabs

Section 15 - Estimated Emission Outputs

After all relevant data has been entered into the available thirteen tabs, the estimated emissions are summarised in two main output tabs:

1) **General Summation:** this tab collates all emission estimates in one table, and also provides three small pie charts for illustration:
    a) A breakdown of scope 1 emissions
    b) A breakdown of scope 3 emissions
    c) A comparison of total scope 1, 2, and 3 emissions
2) **General Summation Chart:** This bar chart gives a graphical representation of individual emitting activity categories to give a simple overview of the total 'carbon footprint'.

Both tabs may be printed at any time.

After completion of the calculator, the user may go back to any tab to adjust values or enter additional data. The general summation table and charts will update automatically.

This ongoing data adjustment or addition can be useful to perform sensitivity analyses to see where changes in wine industry practices affect 'carbon footprint'. It is also anticipated that the process of completing the calculator for a given site or activity will give the opportunity for controlling organisations to understand and review their data collecting systems, with potential for upgrading systems to improve the ease of data collection, and ultimately greater data accuracy for refined emissions estimates.

Appendix A - Key Changes from the IWCC to AWCC

The following major changes were made to the International Wine Carbon Calculator version 1.2 in the extraction of the Australian Wine Carbon Calculator version 1.0.

- All navigation buttons and macros were removed for simplicity, including the use of a clickable map at the introduction. The main function of this map in the IWCC was to set calculations to output in local units of measurement and define the energy grid. This is now done in the AWCC by entering the site/facility details in a separate tab ('Site Details').
- A uniform format was applied to provide consistency, better ease of use, and the facility of initial user instructions followed by key notes and assumptions.
- A detailed user instruction was included in the 'Introduction' tab, which with extra instruction, notes and comments throughout the worksheets, was intended to provide the user enough information to not require a separate user guide to work through the calculator.
- Emission calculation methodologies were changed to meet NGER Act 2007 requirements for the following tabs:
    - 1 Mobile – Quantity Based
    - 2 Mobile – Distance Based
    - 3 Stationary Combustion
    - 4 Fugitive Emissions
    - 5 Winemaking Practices
    - 6 Vineyard Practices (for fertiliser use)
    - 7 Scope 1 Waste Treatment
    - 11 Transport (for distance-based road freight)
    - 13 Scope 3 Waste Treatment
    - 14 Scope 3 Power Use
- Where available, all emission factors were updated to those published in the Australian National Greenhouse Accounts Factors (July 2012).
- Cars specific to the Australian-market were added to the list of available vehicles to choose when entering data to the 'Mobile Equipment – Distance Based' tab.
- An additional summary chart was added showing a bar chart comparison of total emissions from each major activity category.
- A placeholder tab was added to provide a summary of all information required to enter data into the Department of Climate Change's OSCAR mechanism (currently undergoing a major revision).

- A placeholder ‘Help’ tab was added to provide in-calculator user assistance.

All emission factors were moved to central tabs (‘Data Sheet_Scope 1’ and ‘Data Sheet_Scope 3’) for ease of reference and potential future updating and/or addition by the Administrator.

Appendix B - AWCC v1.5 Spreadsheet Model

Welcome to the Australian Wine Carbon Calculator (AWCC)

INTRODUCTION

This spreadsheet model has been created by the Winemakers' Federation of Australia and the South Australian Wine Industry Association to assist members of the Australian wine industry calculate and assess their carbon emissions at a site or facility level. The calculator has been adapted from the International Wine Carbon Protocol v1.2 to meet Australian legislative requirements. It is intended as a guidance tool only, and does not provide for full reporting to relevant statuatory requirements.

This tool estimates total emissions of carbon dioxide produced as a result of the activities related to wine industry businesses, such as vineyards, wineries and transport companies. Coverage of the tool (e.g. fuel types and business activities) has been selected as being specific to the wine industry. Where the user considers key activities to have been incorrectly excluded from the calculator, the administrator should be contacted for resolution (see contact details below). While the form of the tool has been adapted from the International Wine Carbon Calculator, the key technical references for development of the calculator are:

- *National Greenhouse Accounts (NGA) Factors, June 2009*
- *National Greenhouse and Energy Reporting Act, 2007 (and associated regulations and technical guidelines)*

Where the above documents did not provide technical guidance on activities covered by the calculator, accepted best practice international greenhouse accounting protocol methodology is used.
2006 IPCC Guidelines for National Greenhouse Gas Inventories)

Note that whilst this calculator is a useful tool for use by wine industry members in understanding the general extent of their 'carbon footprint', it is not intended as a data collection and reporting tool for use under the NGER Act, 2007. The user should be aware that where NGER-compliant reporting is required, there are significant additional data (such as corporate details, specific data collection and measurement methodologies and complete material inventories) not covered by this tool. Specialist advice is recommended where NGER-compliant reporting is desired.

CALCULATOR USE AND NAVIGATION

It is intended that the user start from the Introduction tab at the bottom of the program window, and work from left to right through the tabs to fill in data in a logical sequence. Cells within the tabs are colour coded to assist user input and navigation, with the following key:

	Light green cells require user input
	Pink cells are drop-down lists for the user to select from a discrete range of available input options
	Yellow cells contain the total calculated emission per line item within each tab
0.00	Maroon cells contain the summed emission total for each main activity/source category (one per tab)
	Cells with a red marker in the top righthand corner contain comments that may be viewed by hovering the cursor over the marked cell

The Excel tabs at the bottom of the active window have also been colour coded:

Summary	Yellow tabs are for introductory and/or summary data
Scope 1	Blue tabs are for Scope 1 calculations
Scope 2	Red tabs are for Scope 2 calculations
Scope 3	Green tabs are for Scope 3 calculations

A brief instruction is provided at the top of each tab to assist with correct data entry. Where appropriate, notes are also included below the main table of data on assumptions, calculation details or other. Selected cells also have individual comments (shown with a red marker in the top righthand corner) with useful information for the user.

Note that individual tabs may be printed at any stage such that the user may keep a hardcopy record of entered data. After completion of the calculator for a given site or facility over a specified period, it may be useful to keep a hardcopy file of the full data set.

BASIC PRINCIPLES OF GREENHOUSE GAS ACCOUNTING

The basic concept behind GHG accounting is to calculate an overall quantity of GHG emission as a result of a given activity or at a particular facility. The calculation method used is to apply an emission factor (EF) to any prescribed activity to convert it to CO_2 equivalent (CO_2-e) emissions.

Emissions are considered direct or indirect.
Direct emissions are produced from sources within the boundary of an organisation and as a result of that organisation's activities. These emissions mainly arise from the following activities:
- generation of energy, heat, steam and electricity (such as burning gas or wood);
- manufacturing processes (such as in cement production, or soil emissions in agriculture);
- transportation of materials, products, waste and people (i.e. vehicle fuel combustion);
- fugitive emissions (such as methane emissions from coal mines, natural gas leaks from joints and seals); and
- on-site waste management (such as emissions from landfill sites).

Direct (or point-source) emission factors give a weight of CO_2-e emitted per unit of activity at the point of emission release (i.e. fuel use, energy use, manufacturing process activity, mining activity, on-site waste disposal, etc.). Direct emissions are categorised as Scope 1.

Indirect emissions are emissions generated in the wider economy as a consequence of an organisation's activities, but which are physically produced by the activities of another organisation. The most important category of indirect emissions is from the consumption of electricity. Indirect emissions from electricity consumption are categorised as Scope 2. Other indirect emissions, such as 'upstream' emissions generated in the extraction and processing of raw materials, freight of goods and materials, employee travel and off-site waste treatment are categorised as Scope 3.

Under the NGER Act 2007, only Scope 1 and 2 emissions are reportable under the proposed emissions trading system. The addition of Scope 3 emissions provides what is called a lifecycle analysis (LCA) for a given activity or product. Note that the accuracy of this calculator is not sufficient to provide an independently verifiable LCA.

CONTACT DETAILS

National Wine Centre
Botanic Road
PO Box 2414
Kent Town SA 5071
Telephone: (08) 8222 9255
Facsimile: (08) 8222 9250
Email: wfa@wfa.org.au

Site Details

User instructions

This initial worksheet records the details of the site or facility covered by this spreadsheet.
If multiple sites or facilities are to be assessed, a separate spreadsheet is required for each one, and a total 'carbon footprint' may be calculated by summing the totals from each of the separate spreadsheets.
Note the selection of the site or facility state in this worksheet carries through to calculations for other worksheets (such as emission factor for electricity transmission grid).

SITE DETAILS	
Name	Example winery
Owner	OzWines
Operator	ACME Wine Contractors
Street	Lot 1, Vineyard Rd
Suburb/Locality	Barossa Valley
State	South Australia
Post Code	5500

Other comments

Mobile Equipment - Fuel Quantity Based Scope 1

User instructions
This worksheet calculates emissions from fuels combusted due to transport at the site or by the site company-owned vehicles.
Enter the volume of fuel used for each fuel type according to the units shown. The user is expected to add all separate accounts for the same fuel type.
Note the user may separate out post-2004 vehicles and/or Euro design compliant heavy vehicles due to their improved catalytic conversion of exhaust methane and nitrous oxide.
If fuel volume records are not kept, estimated fuel usage can be calculated by the distance-based method in tab 2: 'Mobile - Distance Based'.
Take care not to double up on emissions by using both methods for the same vehicle(s).

Fuel data				Energy used		Emissions Factors (kg CO_2-e/GJ)			Total Emissions	
Fuel type	Description/comment	Qty	Units	Energy Content Factor (GJ/unit)	Energy Consumed (GJ)	CO_2	CH_4	N_2O	tonnes CO_2-e	Quality Rank
General transport										
Gasoline			kL	34.2	0.0	66.7	0.60	2.3		NGA
Diesel oil			kL	38.6	0.0	69.2	0.20	0.5		NGA
Gasoline for use as fuel in an aircraft			kL	33.1	0.0	66.3	0.04	0.7		NGA
Kerosene for use as fuel in an aircraft			kL	36.8	0.0	68.9	0.01	0.7		NGA
Fuel oil			kL	39.7	0.0	72.9	0.06	0.6		NGA
Liquefied petroleum gas			kL	26.2	0.0	59.6	0.60	0.6		NGA
Biodiesel			kL	34.6	0.0	0	1.20	2.2		NGA
Ethanol for use as fuel in an internal combustion engine			kL	23.4	0.0	0	1.20	2.2		NGA
Biofuels other than those mentioned in the above items			kL	23.4	0.0	0	1.20	2.2		NGA
Natural gas (light duty vehicles)			cu.m	0.0393	0.0	51.2	5.50	0.3		NGA
Natural gas (heavy duty vehicles)			cu.m	0.0393	0.0	51.2	2.10	0.3		NGA
Post-2004 vehicles										
Gasoline (other than for use as fuel in an aircraft)			kL	34.2	0.0	66.7	0.02	0.2		NGA
Diesel oil			kL	38.6	0.0	69.2	0.01	0.6		NGA
Liquefied petroleum gas			kL	26.2	0.0	59.6	0.30	0.3		NGA
Ethanol for use as fuel in an internal combustion engine			kL	23.4	0.0	0	0.20	0.2		NGA
Heavy vehicles conforming to Euro design standards										
Diesel oil (Euro iv)			kL	38.6	0.0	69.2	0.05	0.5		NGA
Diesel oil (Euro iii)			kL	38.6	0.0	69.2	0.10	0.5		NGA
Diesel oil (Euro i)			kL	38.6	0.0	69.2	0.20	0.5		NGA
Total					**0.00**				**0.00**	

NOTES
Take care not to double up on emissions by using both methods (fuel quantity based and distance based) for the same vehicle(s).
Please ensure correct units are used for fuel quantities.
Staff transport is not covered by this worksheet (except where vehicles are specifically owned by the facility or the company whose head office is at the site.
Biofuels are not included in scope 1 transport emission calculations, as they are considered part of the short term carbon cycle under GHG accounting protocols.
No transport factors are provided by NGA factors for vehicles not registered for road use; stationary energy factors should be used for this fuel consumption.
All emission factors incorporate relevant oxidation factors from Department of Climate Change's National Inventory Report.

Mobile Equipment - Distance Based

User instructions

This worksheet calculates emissions from fuels combusted due to transport at the site or by the site company-owned vehicles, specifically on a "vehicle kilometres travelled" basis (when the volumes of fuel consumed are not recorded).
Enter the total vehicle kilometres travelled either by general vehicle category, or by specific vehicle model using the drop-down menus.
Note the user may separate out post-2004 vehicles due to their improved catalytic conversion of exhaust methane and nitrous oxide.
If fuel volume records are kept, the user should calculate emissions by the quantity-based method in tab 1: 'Mobile - Quantity Based'.
Take care not to double up on emissions by using both methods for the same vehicle(s).

Fuel data						Energy Used		Emissions Factors (kg CO_2-e/GJ)			Direct CO_2 Emissions (g/km)	Total Emissions tonnes CO_2-e	Quality Rank
Description/comment	Vehicle Type	Fuel Type	Vehicle Distance (km)	Vehicle Fuel Efficiency (L/100 km)	Total Fuel Consumption (kL)	Energy Content Factor (GJ/unit)	Energy Consumed (GJ)	CO_2	CH_4	N_2O			
	Pre-2004 Vehicles												
	Passenger vehicles	Gasoline		11.1	0	34.2	0	66.7	0.6	2.3			
	Light commercial vehicles	Gasoline		13.2	0	34.2	0	66.7	0.6	2.3			
	Rigid trucks	Gasoline		21.9	0	34.2	0	66.7	0.6	2.3			
	Articulated trucks	Gasoline		37.9	0	34.2	0	66.7	0.6	2.3			
	Specialised trucks	Diesel oil		28	0	38.6	0	69.2	0.2	0.5			
	Buses	Diesel oil		29.2	0	38.6	0	69.2	0.2	0.5			
	Motorcycles	Gasoline		6.5	0	34.2	0	66.7	0.6	2.3			
	Post-2004 Vehicles												
	Passenger vehicles	Gasoline		11.1	0	34.2	0	66.7	0.02	0.2			
	Light commercial vehicles	Diesel oil		12.5	0	38.6	0	69.2	0.01	0.6			
	Rigid trucks	Diesel oil		28.6	0	38.6	0	69.2	0.01	0.6			
	Articulated trucks	Gasoline		37.9	0	34.2	0	66.7	0.02	0.2			
	Specialised trucks	Diesel oil		28	0	38.6	0	69.2	0.01	0.6			
	Buses	Diesel oil		29.2	0	38.6	0	69.2	0.01	0.6			
	Motorcycles	Gasoline		6.5	0	34.2	0	66.7	0.02	0.2			
	Select below for specific post-2004 vehicle types												
	Holden Commodore Omega Sedan 3.6L Auto (Petrol 91RON)	Gasoline		10.6	0	34.2	0		0.02	0.2	252		
	Toyota Corolla Hatch 1.8L Auto (Petrol 91RON)	Gasoline		7.7	0	34.2	0		0.02	0.2	180		
	Nissan Navara Dual Cab 4WD Utility 2.5L Manual (Diesel)	Diesel oil		9.8	0	38.6	0		0.01	0.6	264		
	Ford Falcon Futura Wagon 4L Auto (LPG)	LPG		15.9	0	25.2	0		0.3	0.3	258		
	Mitsubishi Pajero GLS Wagon 3.8L Auto (Petrol 91RON)	Gasoline		13.5	0	34.2	0		0.02	0.2	322		
	Mercedes-Benz Vito 111CDI Compact Van 2.2L Manual (Diesel)	Diesel oil		8.1	0	38.6	0		0.01	0.6	215		
Total							**0.00**					**0.00**	

NOTES

Take care not to double up on emissions by using both methods (fuel quantity based and distance based) for the same vehicle(s).
Staff transport is not covered by this worksheet (except where vehicles are specifically owned by the facility or the company whose head office is at the site.
Biofuels are not included in scope 1 transport emission calculations, as they are considered part of the short term carbon cycle under GHG accounting protocols.
No transport factors are provided by NGA factors for vehicles not registered for road use; stationary energy factors should be used for this fuel consumption.
All emission factors incorporate relevant oxidation factors from Department of Climate Change's National Inventory Report.
Spreadsheet returns car fuel type as 'LPG' if listed as LPG or petrol/LPG (dual fuel

Stationary Combustion - Fuel Quantity Based

User instructions
This worksheet calculates emissions from fuels combusted for stationary energy purposes (e.g. boilers, generators etc.).
Enter the volume of fuel used for each fuel type according to the units shown. The user is expected to add all separate accounts for the same fuel type.
Note that **in the case of liquid fuels, two unit options are available to the user** - quantity reported as energy (GJ) or volume (cu.m). This provides flexibility to the user to report as per how their fuel accounts are calculated/reported.
The user may create multiple line items of the same fuel type if desired. The use of the description/comment cell is recommended in this case to differentiate combustion sources.

Fuel data				Energy Used		Emissions Factors (kg CO_2-e/GJ)			Total Emissions	
Description / comment	Fuel type	Qty	Units	Energy Content Factor (GJ/unit)	Energy Consumed (GJ)	CO_2	CH_4	N_2O	tonnes CO_2-e	Quality Rank
	Natural gas distributed in a pipeline (m3)		cu.m	0.04	0.0	51.20	0.10	0.03		
	Natural gas distributed in a pipeline (GJ)		GJ	1.00	0.0	51.20	0.10	0.03		
	Diesel oil		kL	38.60	0.0	69.20	0.10	0.20		
	Dry wood		t	16.20	0.0	0.00	0.08	1.20		
Total									**0.00**	

NOTES
Take care to record the fuel quantity in the correct units (especially cu.m versus GJ for gaseous fuels)
Unleaded petrol is classified as 'gasoline'

Fugitive Emissions - Gas Leakage

User instructions

This worksheet calculates emissions from synthetic gas leakage from airconditioning and other equipment.
The user has two options available for data entry: (1) recording the known weight of gas used in the reporting period (as taken from equipment service/gas recharge records), or (2) recording the total amount of gas contained in the equipment and applying a default annual leakage rate.
Where default loss caculations are assumed, the user must specify the type of gas used by their equipment (from the pink drop-down cells) to apply the correct global warming potential factor. For gas insulated switchgear, the default gas is SF6, and calculations are carried out independent of whether or not the user selects an HFC type from the pink drop-down cells.

Gas details				Gas leakage					Total Emissions	Quality
	Description / comment	Annual recharge	Units	Default annual loss	Gas type		Leakage	GWP	tonnes CO_2-e	Rank
Known refrigerant usage										
HFC-23			kg					11700		
HFC-32			kg					650		
HFC-41			kg					150		
HFC-43-10mee			kg					1300		
HFC-125			kg					2800		
HFC-134			kg					1000		
HFC-134a			kg					1300		
HFC-152a			kg					140		
HFC-143			kg					300		
HFC-143a			kg					3800		
HFC-227ea			kg					2900		
HFC-236fa			kg					6300		
HFC-245ca			kg					560		
SF6			kg					23900		
Default losses by equipment type		Total charge size								
Commercial air conditioning			kg	9.0%	select HFC -->		0			
Commercial refrigeration			kg	23.0%	select HFC -->		0			
Industrial refrigeration			kg	16.0%	select HFC -->		0			
Gas insulated switchgear			kg	0.5%	SF6		0	23900		
Total									0.00	

NOTES

Take care not to double up on fugitive emissions by using both methods (known annual gas recharge quantity and default losses by equipment type) for the same leakage source(s).
Please ensure correct units are used for gas quantities.
Methane loss from stationary combustion is not included (this item is included in the International Wine Carbon Calculator).
Leakage from mobile airconditioning units (i.e. vehicles) or fire extinguishers is not included as they are assumed to have an individual charge size of <100kg (NGERS threshold).

Wine Making Practices

User instructions

This worksheet calculates emissions from direct carbon dioxide use in the wine making process (e.g. blanket tanks or pipe flushing). The user simply enters the quantity of carbon dioxide use for the reporting period (in kg). The calculator assumes zero carbon capture or storage, such that the amount of carbon dioxide used is directly allocated as reportable CO_2 emissions.

Several lines have been provided to allow some differentiation of carbon dioxide use categories if relevant or useful. The use of a description or comment is recommended in this case.

Carbon dioxide use				
Description / comment	**CO_2 Purchased**	**Units**	**Total Emissions** tonnes CO_2-e	Quality Rank
		kg		
		kg		
		kg		
		kg		
		kg		
Total			**0.00**	

NOTES

Carbon dioxide emissions due to fermenation are not included because fermentation is considered part of the short term carbon cycle.

Vineyard Practices

User instructions

This worksheet provides a broad estimate of emissions related to selected agricultural processes: nitrous oxide emissions from synthetic fertilizer use, and soil management (disturbance).
Due to the complexity of agricultural systems and variability of practices across sites, many activities are not covered by this calculator (e.g. manure application, nitrogen leaching and runoff, crop residues).
The emission estimate given here is therefore indicative only, and may be improved in future revisions of the calculator.
For synthetic fertiliser use, the user is prompted for the total mass of fertiliser applied to the soils, and if known, the nitrogen content of the fertiliser.
If the fertiliser's nitrogen content is unknown, a default value is applied according to state-specific data. The emission factor also depends on if the vineyards are irrigated or not (selected by drop-down list).
For managed soil emissions, the user simply enters the total area of vines (in hectares), and a generic emission factor is applied.

Synthetic fertiliser addition

Description / comment	Fertiliser Applied	Units	Known Fertiliser N Content (%)	Crop Irrigation?	Default fertiliser N content (%)	Total N applied (kg)	Emission Factor (kg N_2O-N/kg N)	N_2O-N Emissions (kg)	Total Emissions tonnes CO_2-e	Quality Rank
		kg								F
		kg								F
		kg								F
		kg								F
		kg								F

Managed soils

Description / comment	Vineyard Area	Units					Emission Factor (kg N_2O-N/ha/yr)	N_2O-N Emissions (kg)	Total Emissions tonnes CO_2-e	
		ha								F
		ha								F
		ha								F
										F
										F
Total									0.00	

NOTES

The calculation method used above is as per the general IPCC methodology for managed soils, and as used in the IWCC v1.2. However, specific calculations for fertiliser addition within the IPCC methodology have been taken from the Department of Climate Change, 2006, Australian Methodology for the Estimation of Greenhouse Gas Emissions and Sinks 2006: Agriculture.
Direct emissions from crop residues,manure application or soil disturbance and indirect emissions from atmospheric deposition or leaching and runoff have not been included (as per International Wine Carbon Protocol v.1.2) for reasons of calculation complexity and data accuracy uncertainty.

Onsite waste treatment

User instructions
This worksheet calculates emissions from on site waste treatment, including solid and liquid wastes.
For solid waste treatment, the available waste processes may be selected from the pink drop-down menus, and the amount of waste entered in tonnes. Any recovered methane may also be recorded.
For waste water treatment, emissions are included from methane and nitrous oxide generated in the anaerobic breakdown of waste, as well as in flaring any collected biogas.
Where site specific chemical oxygen demand (COD) values are known by the waste water treatment plant operators, this data should be used.
If site-specific COD data are not available, the user may use the default parameter calculation method.
Take care not to double up on emissions by using both methods for the same waste water.

Solid waste

Description / comments	Treatment type	Disposal Amount	Units					CH_4 emissions (tonnes CO_2-e)	N_2O emissions (tonnes CO_2-e)	Recovered methane (t)	Total Emissions (tonnes CO_2-e)	Quality Rank
	Composting		tonnes					0	0		0.00	
	Anaerobic digestion		tonnes					0	0		0.00	
	Incineration		tonnes					0	0		0.00	
			tonnes									
			tonnes									
			tonnes									
										SUBTOTAL	0.00	

Waste water - site specific treatment plant data

Description / comments	Source of waste water	Volume of waste water	Units		Total COD in waste water (tCOD)	COD in sludge removed from wastewater (tCOD)	COD in sludge removed from site (tCOD)	% COD in waste water anaerobically treated	% COD in sludge anaerobically treated	Recovered methane (cu.m)	Total Emissions tonnes CO_2-e	
			kL									
			kL									
			kL									
										SUBTOTAL	0.00	

Waste water - default treatment values

Description / comments	Source of waste water	Total wine production	Units	Estimated total waste water (kL)	Total COD in waste water (tCOD)	COD in sludge removed from wastewater (tCOD)	COD in sludge removed from site (tCOD)		% COD in sludge anaerobically treated	Recovered methane (cu.m)	Total Emissions tonnes CO_2-e	
			tonnes									
			tonnes									
			tonnes									
										SUBTOTAL	0.00	

Waste Water - Flaring of methane in sludge biogas

Description / comments	Source of sludge	Total biogas flared	Units	Biogas methane content (known %)	Biogas methane content (default %)			CH_4 emissions (tonnes CO_2-e)	N_2O emissions (tonnes CO_2-e)		Total Emissions tonnes CO_2-e	
			cu.m		70%							
			cu.m		70%							
			cu.m		70%							
										SUBTOTAL	0.00	
Total											0.00	

NOTES
CO_2 emissions from waste and waste water are not included, as these are considered part of the short term carbon cycle
It is assumed that no wine industry sites carry out landfill activities
Default fraction of anaerobically treated wastewater treated by a wine industry plant is zero

Scope 2: Purchased Electricity

User instructions

This worksheet calculates Scope 2 emissions from the purchase of electricity for use at the site.
Enter the total amount of electricity purchased for the period (in kWh), and the default emissions will be calculated using grid factors for site's state.
In any case such as where a site is near a state border and a unique electricity source is known to be sourced from outside the site's state, the user may select the known external electricity provider's state using the pink drop-down boxes.

Purchased electricity data				Emission Factors kg CO_2/kWh	Total Emissions tonnes CO_2-e	Quality Rank
Electrical Grid	Description / comment / facility / supplier / meter ID	Electricity Consumption	Units	Scope 2	Scope 2	
South Australia			kWh			
South Australia			kWh			
South Australia			kWh			
South Australia			kWh			
South Australia			kWh			
South Australia			kWh			
South Australia			kWh			
South Australia			kWh			
South Australia			kWh			
South Australia			kWh			
Default parameters, where electricity known to come from interstate						
			kWh			
			kWh			
			kWh			
			kWh			
			kWh			
Total		**0**			**0.00**	

NOTES

The use or purchase of GreenPower does not entitle a user to reduce or in any other way modify their reportable electricity consumption. The grid emission factor for each state incorporates the estimated proportion of low carbon intensity electricity generation technologies (e.g. hence Tasmania's low grid factor due to the prevalence of hydro power generation, and Victoria's high grid factor due to the prevalence of coal power generation).

Scope 3 Packaging Emissions

User instructions
This worksheet calculates indirect emissions from the purchase of packaging materials.
Enter the quantity of units bought for the period, and the corresponding unit weight (weighted average if necessary for differing unit sizes of the same product).
A generic emission factor then estimates emissions associated with each item.

	Packaging Materials	Description / Comments	Quantity	Weight per unit	Units	**Emission Factors** t CO_2/ t product	**Total Emissions** tonnes CO_2-e	Quality Rank
Bottles / Containers	Glass				kg	2.200	0.0	F
	Glass				kg	2.200	0.0	F
	Glass				kg	2.200	0.0	F
	Glass				kg	2.200	0.0	F
	Glass				kg	2.200	0.0	F
	PET				kg	3.224	0.0	E
	PET				kg	3.224	0.0	E
	PET				kg	3.224	0.0	E
	Tetra Brik (1ltr)				kg	2.255	0.0	F
	Tetra Prisma (1ltr)				kg	2.311	0.0	F
	Aluminium Cans					none available	PH	X
Wine Bags	Aluminium Bag				kg	15.040	0.0	F
	Plastic Tap				kg	1.235	0.0	F
	Paper / Cardboard box				kg	1.792	0.0	F
Closures	Aluminium Screw Caps (35% recycled)				kg	10.633	0.0	F
	Natural Cork & PVC Capsule				kg	2.490	0.0	F
	Agglomerate Cork & PVC Capsule				kg	4.253	0.0	F
	Agglomerate Cork & Aluminium Capsule				kg	4.863	0.0	F
	Glass Stoppers					none available	PH	X
	Synthetic Cork					none available	PH	X
	ZORK					none available	PH	X
	Sparkling Cork					none available	PH	X
	Sparkling Muselet hood and wire					none available	PH	X
Fibre Packaging	Pallet Pads / Layer Boards				kg	1.792	0.0	F
	6 Pack Cartons				kg	1.792	0.0	F
	12 Pack Cartons				kg	1.792	0.0	F
	6 Pack Dividers				kg	1.792	0.0	F
	12 Pack Dividers				kg	1.792	0.0	F
Pallets	wooden pallets, returnable				kg	0.000	0.0	F
	wooden pallets, non-returnable				kg	0.679	0.0	F
	plastic pallets					none available	PH	X
Total							**0.00**	

NOTES
Emissions calculated here are approximate only. Actual emissions for packaging items will vary from site to site due to differences in location, raw material sources, process, handling and transport processes.
For some materials/items, insufficient research has been carried out to provide a reliable emission factor (e.g. synthetic corks, plastic pallets). It is anticipated that new emission factors will be developed and existing emission factors refined over time as research continues and subsequent calculator updates are made.
PH = place holder

Contract Machinery

User instructions

This worksheet calculates indirect emissions from combustion of fossil fuels by contract machinery (i.e. not scope 1 emissions because the machinery is not owned by the site company).
Included machine types are helicopters and tractors.
For helicopters, choose the helicopter size from the pink drop-down boxes and enter the flight hours per aircraft.
For tractors (or similar), the user may enter the power rating of the machine (in PTO HP), or select either large or small size from the pink drop-down boxes. Then the machine hours should be entered, and the fuel type selected (diesel or petrol).
Take care not to double up on emissions by using both methods for the same machine(s).

Machinery data							Emissions Factor	Total Emissions	Quality
Machine Type	Description / comments	Flight hours	Fuel Type		Fuel efficiency (L/hr)	Fuel use (L)	kg CO2-e/L	tonnes CO_2-e	Rank
Helicopter									
Small Helicopter			Aviation gasoline		87.17		2.3726		D
Medium Helicopter			Aviation gasoline		151.60		2.3726		D
Large Helicopter			Aviation gasoline		200.00		2.3726		D
Extra Large Helicopter			Aviation gasoline		606.40		2.3726		D
			Aviation gasoline				2.3726		D
Tractor/harverster of known power rating									
PTO horsepower		Machine hours	Fuel Type	Tractor Factor	Fuel efficiency (L/hr)	Fuel use (L)			
			Diesel	0.16676			2.74577		D
			Gasoline/Petrol	0.2274			2.3822		D
									D
									D
									D
Tractor/harverster of unknown power rating		Machine hours	Fuel Type	Tractor Factor	Fuel efficiency (L/hr)	Fuel use (L)			
Small Tractor			Diesel	0.16676	11.37		2.74577		D
Large Tractor			Diesel	0.16676	22.74		2.74577		D
									D
									D
									D
Total								0.00	

NOTES
Calculation methodology has been carried over from the International Wine Carbon Calculator
PTO = power take off

Scope 3 transport

User instructions
This worksheet calculates emissions from goods freight.
There are two methods available to the user to estimate emissions: 1) by vehicle kilometres travelled where the vehicle type is known (as per tab 2), or 2) an emission per tonne of freight per kilometre travelled.
For the first method, enter the total vehicle kilometres travelled according to the general vehicle category. Note the user may separate out post-2004 vehicles due to their improved catalytic conversion of exhaust methane and nitrous oxide.
For the second method, use the pink drop-down menus to select the mode of freight (various options are available for land/sea/air), and then enter the total tonnes of freight, and the total distance travelled.
Take care not to double up on emissions by using both methods for the same freight.

ROAD FREIGHT: KNOWN VEHICLE FLEET (DISTANCE-BASED)

Vehicle Data						Energy Used		Emissions Factors (kg CO_2-e/GJ)			Direct CO_2 Emissions (g/km)	Total Emissions tonnes CO_2-e	Quality Rank
Description/comment	Vehicle Type	Fuel Type	Vehicle Distance (km)	Vehicle Fuel Efficiency (L/100 km)	Total Fuel Consumption (kL)	Energy Content Factor (GJ/unit)	Energy Consumed (GJ)	CO_2	CH_4	N_2O			
	Pre-2004 Vehicles												
	Passenger vehicles	Gasoline		11.1	0	34.2	0	66.7	0.6	2.3			
	Light commercial vehicles	Diesel oil		12.5	0	38.6	0	69.2	0.2	0.5			
	Rigid trucks	Diesel oil		28.6	0	38.6	0	69.2	0.2	0.5			
	Articulated trucks	Gasoline		37.9	0	34.2	0	66.7	0.6	2.3			
	Specialised trucks	Diesel oil		28	0	38.6	0	69.2	0.2	0.5			
	Buses	Diesel oil		29.2	0	38.6	0	69.2	0.2	0.5			
	Motorcycles	Gasoline		6.5	0	34.2	0	66.7	0.6	2.3			
	Post-2004 Vehicles												
	Passenger vehicles	Gasoline		11.1	0	34.2	0	66.7	0.02	0.2			
	Light commercial vehicles	Diesel oil		12.5	0	38.6	0	69.2	0.01	0.6			
	Rigid trucks	Diesel oil		28.6	0	38.6	0	69.2	0.01	0.6			
	Articulated trucks	Gasoline		37.9	0	34.2	0	66.7	0.02	0.2			
	Specialised trucks	Diesel oil		28	0	38.6	0	69.2	0.01	0.6			
	Buses	Diesel oil		29.2	0	38.6	0	69.2	0.01	0.6			
	Motorcycles	Gasoline		6.5	0	34.2	0	66.7	0.02	0.2			
Total							0.00					0.00	

ALL OTHER FREIGHT: TONNAGE BASED

Fuel data								Emissions Factors (t CO_2/ tonne km)		Total Emissions tonnes CO_2-e	Quality Rank
Description/comment	Freight mode	Total Freight (tonnes)	Freight Distance (km)								
	Light commercial vehicle							1.80E-03			C
	Medium weight rigid truck							1.78E-04			C
	Heavy articulated vehicle							1.15E-04			C
	Rail (diesel locomotive)							2.65E-05			D
	LNG tanker							3.96E-05			D
	Bulk dry							4.53E-06			D
	Container							1.45E-05			D
	Refrigerated cargo							7.41E-05			D
	RoRo cargo (small)							5.66E-05			D
	RoRo cargo (large)							2.00E-05			D
	Short haul flight (<500km)							5.70E-04			E
	Long haul flight (>500km)							1.58E-03			E
Total										0.00	

NOTES
Take care not to double up on emissions by using both methods (known vehicle road freight distance and tonnage based) for the same freight.
Biofuels are not included in scope 3 transport emission calculations, as they are considered part of the short term carbon cycle under GHG accounting protocols.
Calculation method for all tonnage-based freight carried over from International Wine Carbon Calculator.
Note that for the vehicle-distance based method, the total vehicle emissions are calculated regardless of what proportion of the vehicle's carrying capacity is occupied by the user's goods.
These emissions estimates are indicative only, and calculation methodologies and accuracies are expected to be improved in future calculator revisions.

Purchased Wine Related Products

User instructions

This worksheet calculates indirect emissions from the purchase of typical wine related products.
Enter the quantity of products bought for the period, and the corresponding product weight (weighted average if necessary for differing unit sizes of the same product).
A generic emission factor then estimates emissions associated with each item.
Note that due to the wide range of products and the lack of sufficient 'life cycle analysis' data, many products are not covered by this calculator.
Further, variance of 'embodied energy' between different brands of the same products means that generic emission factors may not provide suitably accurate emission estimates, and the estimates provided here should be interpreted as indicative only.

Product data				Emissions Factor	Total Emissions	Quality Rank
Product Type	Description	Quantity used	Weight Unit	kg CO2-e/kg	tonnes CO_2-e	
Barrels			kg	0.68		X
Bentonite			kg	2.00		X
Purchased Grapes			kg	2.00		X
Purchased Juice			kg	2.10		X
Purchased Spirit			kg	3.50		X
Purchased Wine			kg	2.70		X
Tartaric Acid			kg	2.00		X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
			kg			X
Total					**0.00**	

NOTES

Emissions calculated here are approximate only. Actual emissions for purchased items will vary from site to site and brand to brand due to differences in location, raw material sources, manufacturing, handling and transport processes. For many typical industry products, insufficient research has been carried out to provide a reliable emission factor (e.g. barrels made from French oak compared to American oak). It is anticipated that new emission factors will be developed and existing emission factors refined over time as research continues and subsequent calculator updates are made.

Scope 3 Waste

User instructions
This worksheet calculates emissions from off site waste treatment, including solid and liquid wastes.
For solid waste treatment, three different calculation methods are available according to the degree of waste separation into category that occurs at the site.
The first, most detailed method allows the user to select the specific waste type by composition as one of nine categories (food, paper/cardboard, garden/green etc.) from the pink drop-down menus, and enter the amount of waste (in tonnes).
The second, more broad waste categorisation allows the user to select the broad waste type from pink drop-down menus, and enter the amount of waste disposed (in tonnes).
The third, most broad method allows the user to simply enter the total tonnage of waste removed from site.
For waste water treatment, emissions are included from methane and nitrous oxide generated in the anaerobic breakdown of waste, as well as in flaring any collected biogas.
Where site specific chemical oxygen demand (COD) values are known by the waste water treatment plant operators, this data should be used.
If site-specific COD data are not available, the user may use the default parameter calculation method.
Take care not to double up on emissions by using two methods for the same waste or waste water.

SOLID WASTE

Description / Comments	Waste type	Disposal Amount	Units	Emission Factor t CO2-e/t waste	Total Emissions tonnes CO_2-e	Quality Rank
Segregated waste stream						
	Food		tonnes	0.9		
	Paper and cardboard		tonnes	2.5		
	Garden and green		tonnes	1.3		
	Wood		tonnes	2.7		
	Textiles		tonnes	1.5		
	Sludge		tonnes	0.3		
	Nappies		tonnes	1.5		
	Rubber and leather		tonnes	2.5		
	Concrete, metal, plastic and glass		tonnes	0.0		
				SUBTOTAL	0.00	
Categorised waste stream						
	Municipal solid waste		tonnes	1.3		
	Commercial and industrial waste		tonnes	1.7		
	Construction and demolition waste		tonnes	0.3		
				SUBTOTAL	0.00	
Total waste stream only						
	Unsorted		tonnes	0.93		
				SUBTOTAL	0.00	
Total					**0.00**	

LIQUID WASTE

Waste water - site specific treatment plant data

Description / comments	Source of waste water	Volume of waste water	Units		Total COD in waste water (tCOD)	COD in sludge removed from wastewater (tCOD)	COD in sludge removed from site (tCOD)	% COD in waste water anaerobically treated	% COD in sludge anaerobically treated	Recovered methane (cu.m)	Total Emissions tonnes CO_2-e	Quality Rank
			kL									
			kL									
			kL									
										SUBTOTAL	0.00	

Waste water - default treatment values

Description / comments	Source of waste water	Total wine production	Units	Estimated total waste water (kL)	Total COD in waste water (tCOD)	COD in sludge removed from wastewater (tCOD)	COD in sludge removed from site (tCOD)		% COD in sludge anaerobically treated	Recovered methane (cu.m)	Total Emissions tonnes CO_2-e	
			tonnes									
			tonnes									
			tonnes									
										SUBTOTAL	0.00	

Waste Water - Flaring of methane in sludge biogas

Description / comments	Source of sludge	Total biogas flared	Units	Biogas methane content (known %)	Biogas methane content (default %)			CH_4 emissions (t)	NO_2 emissions (t)		Total Emissions tonnes CO_2-e	
			cu.m		70%							
			cu.m		70%							
			cu.m		70%							
										SUBTOTAL	0.00	
Total											**0.00**	

NOTES
Take care not to double up on emissions by using two methods for the same waste or waste water.

Scope 3: Purchased Electricity

User instructions
This worksheet calculates indirect scope 3 emissions from purchased electricity.
Data for transmission and distrubution losses are automatically carried over the Scope 2 emission calculation sheets.
Data for fossil fuel extraction, production and transport must be manually copied from Scope 1 emission calculation sheets.

TRANSMISSION AND DISTRIBUTION LOSSES

Purchased electricity data				Emission Factors kg CO2/kWh	Total Emissions tonnes CO_2-e	Quality Rank
Electrical Grid	Description / comment / facility / supplier	Electricity Consumption	Units	Scope 3	Scope 3	
South Australia			kWh			NGA
South Australia			kWh			NGA
South Australia			kWh			NGA
South Australia			kWh			NGA
South Australia			kWh			NGA
				SUBTOTAL	0.00	
Default parameters, where electricity known to come from interstate						
			kWh			
			kWh			
				SUBTOTAL	0.00	
Total		**0**			**0.00**	

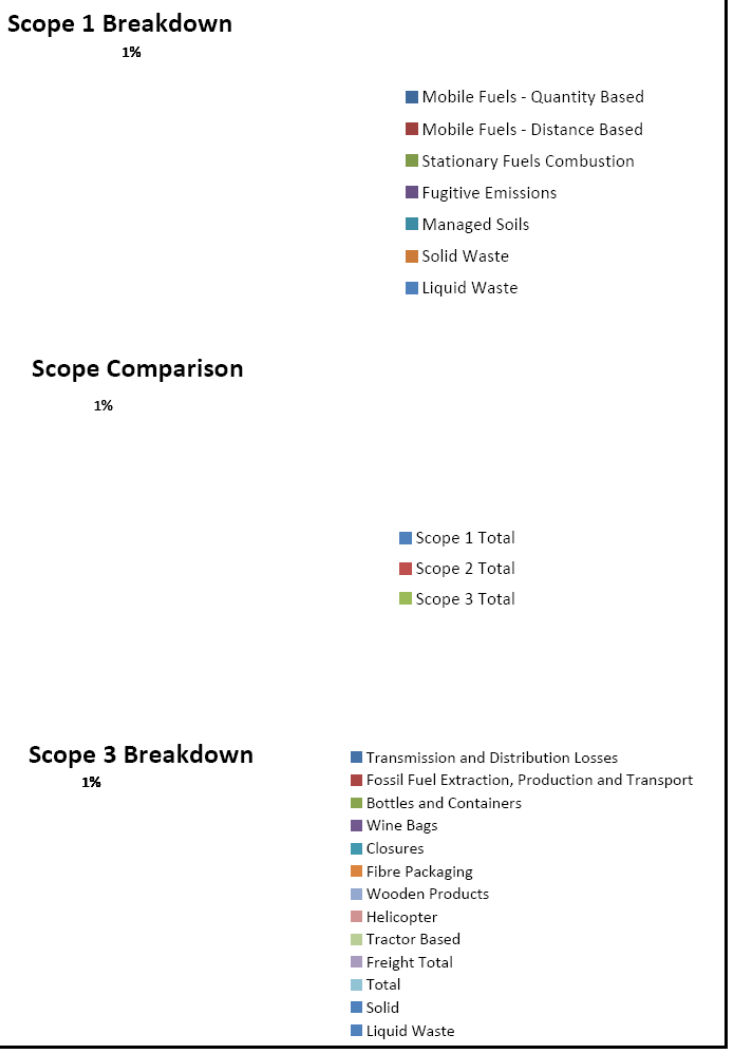
FOSSIL FUEL EXTRACTION, PRODUCTION AND TRANSPORT

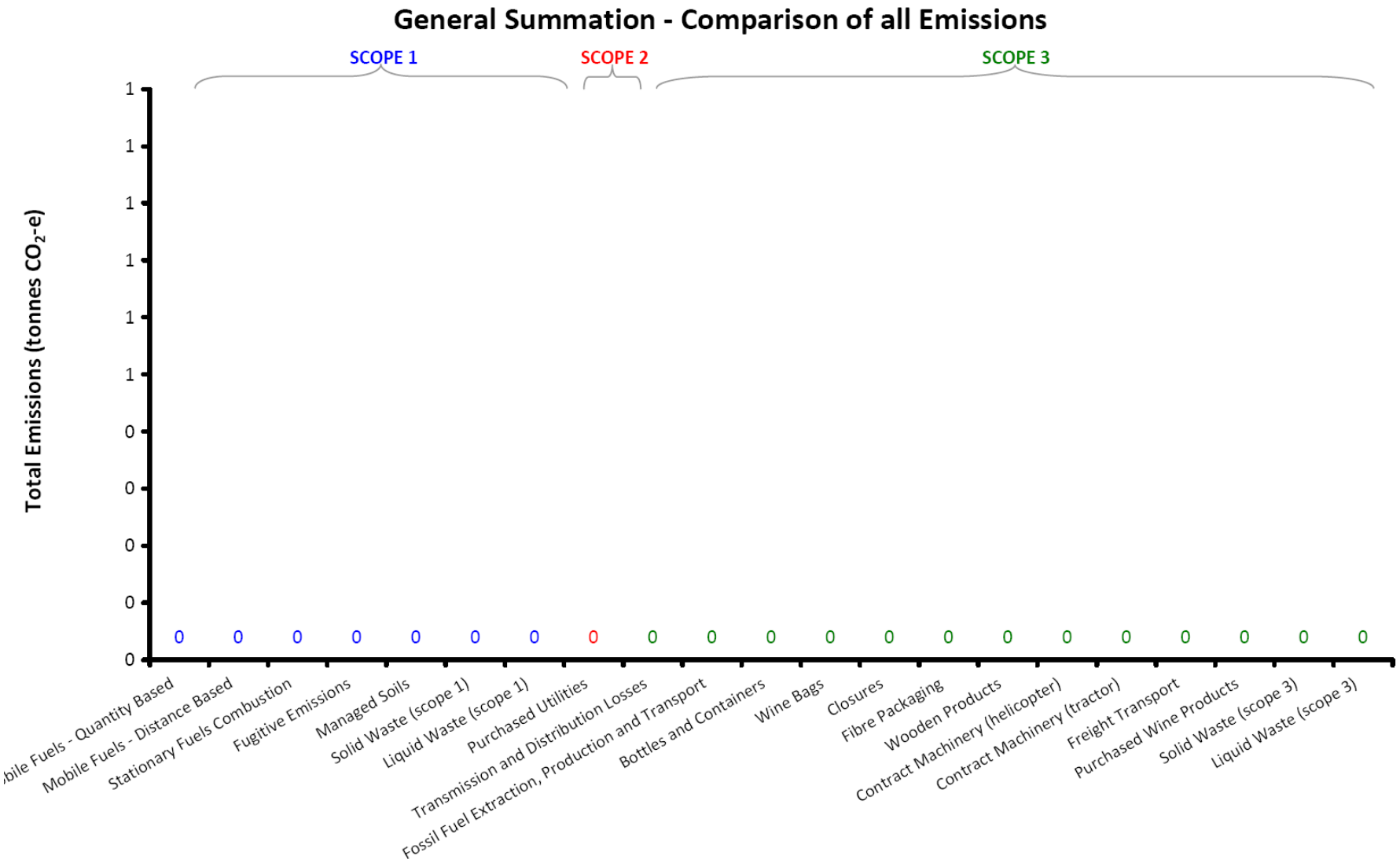
Fuel data			Emission Factors kg CO2/GJ	Total Emissions tonnes CO_2-e	Quality Rank
Fuel type	Energy Consumption	Units	Scope 3	Scope 3	
Solid fuels					
Black coal		GJ	4.60	0.0	
Brown coal		GJ	0.30	0.0	
Coking coal		GJ	20.70	0.0	
Brown coal briquettes		GJ	10.70	0.0	
Coke oven coal		GJ	8.30	0.0	
Gaseous fuels					
Natural gas		GJ	19.40	0.0	
Liquid fuels					
Petroleum based oils (other than petroleum based oil used as fuel, eg lubricants)		GJ	5.30	0.0	
Petroleum based greases		GJ	5.30	0.0	
Crude oil including crude oil condensates		GJ	5.30	0.0	
Other natural gas liquids		GJ	5.30	0.0	
Gasoline (other than for use as fuel in an aircraft)		GJ	5.30	0.0	
Gasoline for use in an aircraft (avgas)		GJ	5.30	0.0	
Kerosene (other than for use as fuel in an aircraft)		GJ	5.30	0.0	
Kerosene for use as fuel in an aircraft (avtur)		GJ	5.30	0.0	
Heating oil		GJ	5.30	0.0	
Diesel oil		GJ	5.30	0.0	
Fuel oil		GJ	5.30	0.0	
Liquefied aromatic hydrocarbons		GJ	5.30	0.0	
Solvents if mineral turpentine or white spirits		GJ	5.30	0.0	
Liquefied petroleum gas		GJ	5.30	0.0	
Naphtha		GJ	5.30	0.0	
Petroleum coke		GJ	5.30	0.0	
Refinery gas and liquids		GJ	5.30	0.0	
Refinery coke		GJ	5.30	0.0	
Petroleum based products other than mentioned in the items above		GJ	5.30	0.0	
Total				**0.00**	

NOTES
No scope 3 emission factor for biofuels (such as biodiesel or ethanol) provided by NGA due to highly variable nature of individual fuel characteristics
Take care in copying fuel energy data from scope 1 tabs

GHG Emissions Summary

Scope 1		Tonnes CO_2-e
	Mobile Fuels - Quantity Based	0
	Mobile Fuels - Distance Based	0
	Stationary Fuels Combustion	0
	Fugitive Emissions	0
Vineyard Practices	Managed Soils	0
Waste Treatment	Solid Waste	0
	Liquid Waste	0
	Scope 1 Total	**0**
Scope 2	**Scope 2 Total**	0
	Scope 3 Total	**0**
Scope 3		
Power Use	Transmission and Distribution Losses	0
	Fossil Fuel Extraction, Production and Transport	0
Packaging	Bottles and Containers	0
	Wine Bags	0
	Closures	0
	Fibre Packaging	0
	Wooden Products	0
Contract Machinery	Helicopter	0
	Tractor Based	0
Transportation / Freight	Freight Total	0
Purchased Wine Products	Total	PH
Scope 3 Waste Treatment	Solid	0
	Liquid Waste	0




General Summation - Comparison of all Emissions
SCOPE 1
SCOPE 2
SCOPE 3
Total Emissions (tonnes CO_2-e)
1
1
1
1
1
1
0
0
0
0
0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
obile Fuels - Quantity Based
Mobile Fuels - Distance Based
Stationary Fuels Combustion
Fugitive Emissions
Managed Soils
Solid Waste (scope 1)
Liquid Waste (scope 1)
Purchased Utilities
Transmission and Distribution Losses
Fossil Fuel Extraction, Production and Transport
Bottles and Containers
Wine Bags
Closures
Fibre Packaging
Wooden Products
Contract Machinery (helicopter)
Contract Machinery (tractor)
Freight Transport
Purchased Wine Products
Solid Waste (scope 3)
Liquid Waste (scope 3)

OSCAR input summary

This worksheet is a placeholder for an automated summary of compiled emissions data required for reporting through the Online System for Comprehensive Activity Reporting (OSCAR) under the National Greenhouse and Energy Reporting (NGER) Act 2007. It is intended that the format and automation of this worksheet be finalised when the details of the current revision of the OSCAR tool is completed by the Department of Climate Change. This summary is not intended to provide sufficient information to be a stand-alone submission for official reporting purposes.

SITE DETAILS	
Name	Example winery
Owner	OzWines
Operator	ACME Wine Contractors
Street	Lot 1, Vineyard Rd
Suburb/Locality	Barossa Valley
State	South Australia
Post Code	5500

Fuel/Process	Quantity	Unit	Period	NGA reference	Measurement method	Reporting requirements
Electricity		kWh				
Diesel		kL				
Automotive gasoline (petrol)		kL				
Aviation gasoline (AVGAS)		kL				
Aviation turbine fuel		kL				
Biodiesel		kL				
Fuel oil		kL				
Ethanol		kL				
Kerosene		kL				
LPG		kL				
Other petroleum products nec (including waste oils)		kL				
Natural Gas - coal mine waste gas		cu.m				
Natural Gas - non-transport		GJ				
Natural gas - Transport (heavy vehicles)		cu.m				
Landfill gas and biogas		cu.m				
Bagasse (Other primary solid biomass)		cu.m				
Black Coal - Uses other than for electricity and coking		t				
Brown coal		t				
Brown coal briquettes		t				
Coking Coal (metallurgical)		t				
Coke oven coke		t				
Industrial Waste (Tyres)		t				
Municipal materials recycled for energy (biomass) - Non-transport		t				
Municipal materials recycled for energy (non-biomass) - Non-transport		t				
Other Primary Solid Biomass (Other than Bagasse)		t				
Wood/Wood Waste - Non-Residential uses		t				
Methane (CH4) emissions		t				
Carbon dioxide (CO2) emissions		t				
Nitrous Oxide (N2O) emissions		t				
Sulphur Hexafluoride (SF6) emissions		t				
TOTAL						

Automated calculation of whether or not threshold is exceeded

Australian Wine Carbon Calculator HELP

INTRODUCTION

In this version of the AWCC, this 'help' tab has been included to demonstrate potential extended functionality and ease of use items that may be added to the calculator in subsequent revisions. Whilst several brief inclusions have been added below for indication, the user is encouraged to provide feedback to the administrator via the contact details below with feedback on suggested calculator improvements.

GLOSSARY

Scope 1 emissions	emissions resulting from direct combustion of fuels on a site or by company-owned vehicles for that site
Scope 2 emissions	emissions resulting from production of electricity for comsumption on the site
Scope 3 emissions	emissions resulting from associated but non-site activities e.g. goods freight, delivered materials, off site waste disposal.

ABBREVIATIONS

cu.m	cubic metres
GWP	global warming potential
IPCC	Intergovernmental Panel on Climate Change
NGERS	National Greenhouse and Energy Reporting Scheme
OSCAR	Online System for Comprehensive Activity Reporting

CONTACT DETAILS

National Wine Centre
Botanic Road
PO Box 2414
Kent Town SA 5071
Telephone: (08) 8222 9255
Facsimile: (08) 8222 9250
Email: wfa@wfa.org.au

Appendix C - IWCP v1.2 Data Quality System

Rank	Approx. range in data	Comment
A	± 5%	Excellent: Emission Factor (EF) or model based on sound, independent, detailed, and verified data. Underlying LCA thorough and independent. Data sourced from or validated on a range of randomly selected companies. Sourcing, sampling and model testing is adequate to minimise variability and uncertainty to very low levels.
B	± 20%	Very Good: EF or model based on sound, independent, detailed and verified data. Underlying LCA thorough and independent. Underlying LCA can be streamlined, but accounts for adequate detail. Data sourced from and validated on a “reasonable” range of companies. Sourcing, sampling and model testing is adequate to minimise variability to low levels.
C	± 50%	Good: (Minimum acceptable level in the long-term) EF or model based on “reasonable” and third party independently verified/certified data. Underlying LCA can be a streamlined LCA, but is independently reviewed. Sourcing, sampling and model testing is adequate to minimise variability to moderate levels.
D	± 100%	Poor: EF or model based on internal company data. LCA incomplete. Data not third party verified or fails third party verification. Model testing incomplete.
E	± 200%	Emission uncertain: LCA data available but basis not available, and/or potentially biased. Existing data/LCA suggest too great a range and a new model for calculation needs to be determined. No independent or third party reviewed data available. Existing data suggests a wide range of uncertainty. Data based on approximations from experts.
F	± > 200%	Emission very uncertain: No LCA data available to determine emission factor, or LCA data provides too great a range requiring a model to replace the EF. Data based on potentially biased source and not externally reviewed. Very limited data sources.
X	Unknown	Cannot be incorporated in model: Science uncertain, placeholder values used in model. No data available. Will benefit significantly from further investigation, analysis or review. Additional investigation required to rank effectively. Data available but from a single or potentially biased source – could be improved if third party reviewed and accredited.

Appendix D - International Wine Carbon Protocol (v1.2)

The International Wine Carbon Protocol (v1.2) can be downloaded from the FIVS website at http://fivs.org/index.php?newlang=english (Under the FIVS Strategic Initiatives Section)

Appendix E - National Greenhouse Accounts Factors

The National Greenhouse Accounts Factors can be downloaded from the Australian Government Department of Climate Change website at http://www.climatechange.gov.au/publications/greenhouse-acctg/national-greenhouse-factors.aspx

Entwine Review – SWOT Results Summary

Strengths

Issue	Votes
Provides a nationally relevant framework which gives regions a uniformed base to work with.	3
Has a mixture of systems underpinning the programme with appropriate audit structure.	1
Relatively simple program – growers have some of these records in place already	1
Identifiable national standard	10
Third party audited rigorous	2
Structure & credibility (in relation to management systems	1
Promotes better business practical via recording and reducing	3
Major retailors already recognise ISO14001 & Freshcare domestically	1

Weaknesses

Issue	Votes
Poor communication to users	3
Poorly resourced ($ & Personnel)	1
Lack of compelling business case for small grower (unless they have a big company contract)	4
Lack of linkage between market and grower	2
Poor communication to customers/consumers	2
Confusion about value of Freshcare/Entwine Australia → Is it a promotional programme or an assurance program?	3
Continuous improvement – needs regional BMP support	1
Disconnect in the supply chain	3
Resources to keep Entwine alive	2
No clear line of communication/training through to region from national level	2
Lack of regional ownership	1

Opportunities

Issue	Votes
Engage WFA/WGGA boards more actively	1
Standardised approach to operation & Data collection so cross regional benchmarking.	1
Common language on sustainability	1
Communication including stat reporting	8
Training/promotion/education	1
Embrace regional programmes	3
Broaden Entwine Australia to incorporate aspects of CSR → might also improve the individual business case	3
Take entwine actively to major retailors	1
Bring on board more wineries to influence growers	1
Rationalising of audit process for cost saving and rigour	1
Come up with coordinated national admin system with regional champions eg online reporting, certification	2
Improved communication to all stakeholders	1

Threats

Issue	Votes
Lack of mass	1
Failure to adequately link with regions	2
Failure to have s sustainably funded scheme	2
Lack of communication from regional programs recognising Entwine as umbrella – will result in Entwine imploding	3
Lack of business case – regarding drivers (and current business model wrong)	6
Cost (and current lack of profitability)	1
Regional Diversification – Loss of focus for peak bodies	3
Burden of audit – HACCP, Entwine Australia, Customer audits	1
Loss of Entwine Australia = loss of industry confidence – recovery time lengthy	3



New Goals

1. **Environmental Sustainability** – Provide an environmental sustainability framework that meets industry standards and encourages best practice.
2. **Business** – Provide a system that ensures environmental monitoring and encourages continuous improvement that results in business benefit.
3. **Market Access** – Provide a framework that will allow the wine sector to meet international environmental expectations and maintain competitiveness.
4. **Industry** – Provide environmental data to industry that allows an accurate representation of regional & national resource use & adds value to brand Australia.



What is stopping Entwine Australia from achieving these goals?

- low membership numbers across broad number of regions
- Highly reliant on 2 or 3 major companies for bulk of members
- Lack of brand awareness and value
- Very limited capacity to connect to individuals
- Funding & resources

Appendix 3 References

None

Appendix 4 Staff

Project Staff (WFA)
Amy Russell, WFA, Director, Natural Resources (former)
Andrew Wilsmore, WFA General Manager, Policy and Government Affairs (former)
Damien Griffante, WFA, Coordinator, Natural Resources
Jonathan Green, WFA, Manager, Natural Resources (former)
Nick Carne, WFA, Manager, Communications
Paul Evans, WFA, Chief Executive
Tony Battaglene, WFA, General Manager, Strategy & International Affairs
Steven Strachan, WFA, Chief Executive (former)

WINEC members as at May 2013

Evan Hiscock	Lion (Chair)
Damien Griffante	Winemakers' Federation of Australia
Gioia Small	Treasury Wine Estates
Lin Lin Low	Accolade Wines
Amanda Gerhardy	Pernod Ricard Pacific
David Sanderson	Wine Industry Tasmania (TAS)
Cathy Howard	Whicher Ridge (WA)
Rob Glastonbury	De Bortoli (NSW)
Phil Spencer	Queensland Wine Industry Association (Qld)
John Ide	Yalumba Wines (SA)
Chris Pfeiffer	Pfeiffer Wines (Vic)

Observers

Kyra Reznikov	Finlaysons (Invited Attendee)
Toby Bekkers	TBV (Invited Attendee)
Russell Johnstone	Winecycle (Invited Attendee)
Creina Stockley	Australian Wine Research Institute
Elise Heyes	Grape and Wine Research and Development Corporation
Annabel Mugford	Wine Australia Marketing
Carly Light	Wine Australia Compliance
Vic Patrick	Wine Grape Growers' Australia

Appendix 5

Extract from Progress report explaining achievement of output A (2010/11)

2010-11	Outputs	Target Dates dd/mm/yy	Activities
a	Endorsement of equivalence of EntWine Australia under the HAL Recognition Framework for environmental assurance, and therefore recognition by Australian retailers	07/10	Recognition framework due for completion by February 2010, after which individual schemes can be assessed for equivalence
Status (A,N,O,D)	Describe progress against this output or activity		
A	The recognition by Australian retailers of the sustainability claims of Entwine members is not contingent on meeting the HAL equivalency framework as the framework is aimed squarely at growers of fresh produce, with non-conforming growers potentially excluded from supplying the retailer. Nevertheless meetings have been held with representatives of Coles and sought with representatives of Woolworths, to discuss the Entwine scheme and seek support in promoting and acceptance of the sustainability standard. Additionally meetings have been held with all major UK and USA wine retailers. All of these meetings have been very positive, and we look forward to playing a role in setting an International standard for sustainable wine in partnership with these retailers. Such a standard could be based on or similar to the HAL recognition framework. The assessment of Entwine under the HAL equivalency process applies at the level of the certifications that are endorsed (by the Wine Industry National Environment Committee - WINEC) for use as part of an individual's Entwine membership application. The two endorsed certification systems are Freshcare Environmental (Viticulture or Winery) and ISO 14001. The **Freshcare** certification codes were assessed under the HAL Recognition Framework and passed, this means that the Entwine-specific Freshcare viticulture and winery codes would also meet equivalency requirements with one exception; the equivalency codes require an annual external audit and we currently require a three-yearly external audit. The three yearly audits are consistent with other international wine sector environmental assurance programs and allows for significantly lower certification costs. This approach has been endorsed by Freshcare on the basis of the other Entwine membership obligations, such as annual reporting to the WFA. Costs are already cited as a barrier to membership with the current system; hence the more costly annual audit cycle approach would represent a significant risk to the growing membership of the Entwine scheme, with little to be gained. The **ISO 14001** certification has been endorsed by WINEC as it is a robust and commonly used Environmental Management System in the wine sector is mainly used by larger wineries and only a few vineyard clusters across Australia. ISO 14001 requires an annual audit cycle and lengthy audits, making it robust and costly for those operators who hold this system. However the ISO 14001 certification as a stand alone certification is impossible to assess under the equivalency framework because ISO is a principles-based certification; therefore each individual company has a unique interpretation of the ISO certification tailored to their site and an assessment of equivalence would need to be conducted for each operation separately. Whilst we are fairly confident that most, if not all holders of an ISO 14001 certification would meet the HAL recognition framework, it would be impractical to require them to seek HAL endorsement prior to accepting their Entwine membership.		