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Australian Grape and Wine Authority

The Australian Wine Research Institute

AWRI management 2013-2017



FINAL REPORT to

AUSTRALIAN GRAPE AND WINE AUTHORITY

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Abstract

This Final report summarises the management, extension and capability enabling projects associated with AWR1306. It includes;

Project 2.2.1 Collecting and disseminating information regarding agrochemicals registered for use and maximum residue limits in Australian viticulture
Project 2.2.3 Informing Australia's wine consumers through understanding issues of wine consumption, health and nutrition
Project 2.2.4 Increasing Australia's influence in market access, safety, regulatory and technical trade issues
Project 3.2.5 Safeguarding and realising the potential of the Australian wine microbial germplasm collection
Project 4.1.1 The staging and conduct of extension programs
Project 4.1.2 Specialised technical troubleshooting and responsive helpdesk services for the Australian wine sector
Project 4.1.3 Library service
Project 4.1.4 Communication with stakeholders
Project 5.1.3 Efficient management and administration

Summary

Project 2.2.1 Collecting and disseminating information regarding agrochemicals registered for use and maximum residue limits in Australian viticulture

The aim of this project was to enable grape and wine producers to manage agrochemical residue levels in wine. This was achieved by collating and providing accurate and timely information on regulatory and technical aspects of chemicals registered for use in Australian viticulture, and the maximum residue limit (MRL) requirements of those chemicals in domestic and key export markets.

Project 2.2.3 Informing Australia's wine consumers through understanding issues of wine consumption, health and nutrition

This project was funded by Wine Australia from January 2015 to June 2017, and followed on from National Wine Foundation (NWF) projects funded between July 2013 and December 2014. The aim of this 30-month project was to generate and disseminate evidence-based and scientifically sound information regarding wine and health/nutrition to facilitate informed decision-making by the wine and associated industries, policy makers and consumers. Alcohol's place in society is being robustly debated, particularly in Australia. That debate has the potential to lead to major changes to the wine sector's trading environment, through increased regulation in areas such as taxation, pricing, advertising, dietary guidelines and associated public health policies and strategies. The project's approach to inform debate and decision-making was three-fold:

- generation and provision of scientific information such as reviews, reports, critiques and briefings;
- communication to stakeholders via publication of peer-review papers and industry articles; and
- provision of submissions to government on behalf of the WFA and ABA.

Project 2.2.4 Increasing Australia's influence in market access, safety, regulatory and technical trade issues

Maintaining market access or opening markets for Australian wine, nationally and internationally, is facilitated by managing and reducing current and potential barriers to trade. Accordingly, the Australian wine industry needs to anticipate, facilitate and influence regulation of wine composition, production, labelling and marketing. The purpose of this project was to identify and mitigate any impediments to market access. The approach taken has been two-fold:

- Provision of readily-accessible regulatory-related scientific and technical advice and assistance for the activities of key industry stakeholders; and
- Representation at national and international industry forums,

Project 3.2.5 Safeguarding and realising the potential of the Australian wine microbial germplasm collection

The AWRI wine microorganism culture collection (AWMCC) is the largest repository of wine-associated yeast and bacteria in the southern hemisphere. It provides the Australian wine industry with novel, non-commercially available yeast and bacterial winemaking strains for efficient and reliable fermentations and as a means to shape and diversify wine style. The AWMCC is also essential for capturing the value of Australia's investment in microbial strain isolation and development, especially given the current focus on bioprospecting and generating uniquely Australian isolates. It is also fundamental to the success of Wine Australia-funded biological research projects, which depend on ready access to correctly identified strains.
The collection contains:

- more than 3,000 natural yeast isolates and laboratory-modified yeast strains for research
- a wine yeast genome deletion library of more than 1,700 strains
- a laboratory yeast genome deletion library of around 4,800 strains
- more than 1,100 bacterial strains, the majority of which are malolactic bacteria.

Project 4.1.1 The staging and conduct of extension programs

The objective of this project was to provide a multifaceted and centralised extension platform to deliver research outcomes, innovations and practical solutions to Australian grape and wine producers. Face-to-face events were delivered through the long-standing Grape and Wine Roadshow program. Roadshow seminars delivered content prepared by researchers from the AWRI, affiliated WIC partners and other organisations. Relevant content was chosen by the local regional association on each occasion, giving an indication of which topics were most relevant in their region at that time. Similar content was also delivered electronically via a webinar platform. Roadshow workshops delivered tailored practical solutions to prevailing wine sector challenges with content prepared by AWRI viticulturists and winemakers. Written extension included preparation of *Technical Notes* and collation of articles for the bi-monthly AWRI *Technical Review,* preparation of articles for AWRI *eNews*, Wine Australia *R&D@Work* and *RD&E news*, *Ask the AWRI* columns and other channels, as well as preparation of content for the AWRI website. *eBulletins* were also prepared when required to provide the wine sector with rapid, early warnings of emerging trends and associated recommendations, based on observations from the AWRI helpdesk.

A total of 117 Roadshow events were delivered over the four years reaching 3,132 attendees, averaging 27 attendees per event. A total of 90 webinars were delivered to 1,463 attendees, averaging 16 attendees per event. A total of 237 articles and webpages were prepared and published.
A total of 97,923 webpage views/year and 20,993 downloads of fact sheets and other packaged material were recorded for the winemaking and viticulture areas of the AWRI website since the new AWRI website structure was updated in 2014, demonstrating the wide reach of this platform.

Project 4.1.2 Specialised technical troubleshooting and responsive helpdesk services for the Australian wine sector

The AWRI helpdesk provides timely and confidential support for technical problems encountered by Australian grapegrowers and winemakers. Services include identifying the root causes of problems, and providing research-based, practical, up-to-date remediation solutions, as well as future prevention strategies. The service also ensures that Australian grapegrowers and winemakers are competitive on the world stage, by having the latest technical information readily to hand.

Investigative services, including analysis of problem grapes or wine, are conducted when a problem cannot be solved through discussions with the producer.

Project 4.1.3 Library service

The AWRI helpdesk also provided an early warning system for emerging technical issues, generating information which was applied to prioritisation of research and extension activities. A number of the trends observed in helpdesk enquires during the investment period were related to extreme weather events or climate change and included issues such as earlier harvest dates, higher sugar levels and stuck fermentations, vintage compression, agrochemical issues and smoke taint. During the investment period helpdesk staff responded to and confidentially answered 7,647 queries, and performed 860 winemaking investigations.

Project 4.1.3 Library service

The John Fornachon Memorial Library (JFML) holds the largest knowledge base of grape and wine resources in the southern hemisphere and offers specialised information services and resources to the Australian grape and wine sector. Since 2013, most of the items sourced have been in digital format and the search tools that are offered are available online at all times via the AWRI website.

The library collection comprises 87,800 items covering 'vines to wines' and this valuable industry-owned resource is the backbone of a suite of information services available to the Australian grape and wine sector. More than 90% of the 9,569 articles delivered by the project over the investment term were provided from the library's own collection and the remaining requests were fulfilled via inter-library loans. Library services are used by levy payers as well as government, research organisations, students, suppliers and other participants working across the Australian wine sector.

Project 4.1.4 Communication with stakeholders

This project's primary purpose was to deliver timely and accurate communications to Australia's grape and wine producers in order to enhance awareness and adoption of R&D outcomes. It was designed to work closely with, and complement, the activities in Projects 4.1.1. (Extension), 4.1.2 (Helpdesk) and Project 4.3.1 (Regional nodes).

Activities in this project included production of a large range of electronic and hard-copy industry publications such as the AWRI website, Annual Report, *eNews* and *eBulletins*, *Technical Review*, the AWRI Report, 'Ask the AWRI' column, 'Alternative varieties' column and other trade articles. An active presence in social media, management of the AWRI's interactions with traditional media and promotion of the AWRI webinar program were also included.

Project 5.1.3 Efficient management and administration

The AWRI's research, development and extension activities are underpinned and enabled by leadership and essential services provided by the Corporate Services group. The group works closely with the AWRI Board to provide an appropriate mix of strategic, commercial and scientific leadership, guidance and support to all AWRI staff, and increases the efficiency of all Wine Australia investments at the AWRI by allowing operational staff to focus on their core activities with minimal administrative and commercial demands.

While predominantly supported by Wine Australia, the costs of delivering the Corporate Services function over the four-year agreement term were significantly defrayed by contributions made by the AWRI's Commercial Services group, projects not funded by Wine Australia, or otherwise underwritten by the AWRI, which together contributed more than $3.3 million.

Project 2.2.1– Collecting and disseminating information regarding agrochemicals registered for use and maximum residue limits in Australian viticulture

Executive summary

The aim of this project was to enable grape and wine producers to manage agrochemical residue levels in wine. This was achieved by collating and providing accurate and timely information on regulatory and technical aspects of chemicals registered for use in Australian viticulture, and the maximum residue limit (MRL) requirements of those chemicals in domestic and key export markets.

The main method of conveying information to industry and other stakeholders was through the booklet *Agrochemicals registered for use in Australian viticulture* (commonly known as the 'Dog book'). Over the course of the project, a new edition of the 'Dog book' was published and distributed each year, and significant changes were made to the size and structure of the publication in response to the changing demands of industry practitioners.

In addition to a hardcopy version of the 'Dog book', growers and winemakers can also access agrochemical information via a pdf version available from the AWRI website, or by interrogating the online agrochemical database. A mobile app was also introduced for the 2013/2014 growing season, permitting users to use their mobile devices to access relevant information and make decisions in the field.

The project team monitors potential pest, disease and agrochemical issues through regular communications with key industry and government stakeholder networks. Changes to product information and agrochemical use options were managed in consultation with chemical suppliers, and in accordance with the fortnightly gazettes issued by the Australian Pesticides and Veterinary Medicines Authority (APVMA). In response *eBulletins* were distributed to a database of ~3,300 stakeholders, in a timely manner, to allow industry to respond to regulatory changes.

Changes to established market MRLs, or the addition of new markets, required existing agrochemical practices to be frequently re-evaluated and reviewed. Any changes were discussed with and endorsed by the industry Agrochemical Reference Group, which includes representatives of regional-based grower organisations and major wine companies.

Highlights

- 850 sanitary and phytosanitary (SPS) notifications and 110 APVMA gazettes were reviewed for viticulture-relevant information, and the information was used to update the 'Dog book' and associated online resources.
- Over 30,000 'Dog books' were distributed to the Australian grape and wine community.
- As part of ongoing efforts to have an MRL established for phosphorous acid, a major dossier was submitted to the Food and Agriculture Organization/World Health Organization Joint Meeting on Pesticide Residues (JMPR).
- Following changes to the residue definition of captan in the European Union (EU), timely advice on its use and possible alternatives was provided, which averted potential trade issues.
- A 'Dog book' app was developed for Apple and Android devices. Since the launch of the app there have been more than 5,400 downloads.
- The following active constituents were reviewed and evaluated: amisulbrom; boscalid; captan; clothianidin; cyflufenamid; diuron; fenamifos; fenpyrazamine; fluazinam; flumioxazin; fluopyram; phosphorous acid; proquinazid.

Objectives

The objectives of this project are to:

- Develop and produce the annual publication *Agrochemicals registered for use in Australian viticulture* ('Dog book') for distribution to wine sector stakeholders.
- Develop and maintain up-to-date content concerning agrochemicals that is extended through email bulletins and web and mobile-based extension tools.
- Provide assistance to the Australian wine industry to achieve full compliance with agrochemical MRLs and compositional standards in grapes and wine for major export markets.
- Assist the Australian wine industry to use agrochemicals responsibly, in a cost effective, socially responsible manner and with minimal impact on the environment.
- Develop and maintain a skills base that can support the wine industry in the identification and resolution of agrochemical issues.
- Maintain and develop a database of information about APVMA registered products (insecticides, fungicides and herbicides) for viticulture.
- Maintain and develop a database of export market MRLs for the chemicals registered for use in Australian viticulture.
- Expand web and mobile extension tools to provide greater detail about active constituents and product information to stakeholders.

Outcome and conclusion

All objectives of the project have been met. Brief details are provided for each objective below.

- *Develop and produce the annual publication Agrochemicals registered for use in Australian viticulture ('Dog book') for distribution to wine sector stakeholders.*

A total of 850 SPS notifications and 110 APVMA gazettes were reviewed for viticulture-relevant information, which was used to update the 'Dog book' and associated online resources. The 'Dog book' was produced annually from 2013 to 2017. Table 1 summarises how the 'Dog book' was distributed to stakeholders over the investment period.

Table 1. Distribution of agrochemical information to stakeholders via different hard copy and electronic versions of the 'Dog book' over the four-year investment period

Agrochemical information source	**Distribution**
'Dog book' hard copy	>30,000 hard copies distributed
Online pdf	>8,300 downloads
Online search facility	>11,300 times accessed

- *Develop and maintain up-to-date content concerning agrochemicals that is extended through email bulletins and web and mobile-based extension tools.*

  Over the course of the project, 15 agrochemical *eBulletins* were issued to a distribution list of more than 3,000 email addresses and 13 active constituents were reviewed. All changes were reflected in updates to the 'Dog book' and associated electronic information sources.

- *Provide assistance to the Australian wine industry to achieve full compliance with agrochemical MRLs and compositional standards in grapes and wine for major export markets.*

  Approximately 450 specific enquiries about agrochemical and MRLs were addressed. In addition, the MRL webpage received around 13,000 queries. When the use of a particular chemical could pose a risk when exporting wine, advice was provided to mitigate that risk.

- *Assist the Australian wine industry to use agrochemicals responsibly, in a cost effective, socially responsible manner and with minimal impact on the environment.*

  The environmental and health and safety impacts of registered active constituents were considered and reflected in the recommendations section of the 'Dog book'. This resulted in the addition of re-entry-period information to the booklet, and the exclusion of broad-spectrum insecticides from the recommendations section.

- *Develop and maintain a skills base that can support the wine industry in the identification and resolution of agrochemical issues.*

  The number of staff members involved in the project was expanded, to ensure a suitably qualified staff cohort would always be available to respond to industry demand. Staff involved in the project included Mardi Longbottom, Creina Stockley, Anne Lord and Randell Taylor.

- *Maintain and develop a database of information about APVMA registered products (insecticides, fungicides and herbicides) for viticulture.*

  The MRL and Agrochemical databases were updated as required throughout the investment period to reflect information gathered from chemical suppliers, the APVMA and the Australian Government Department of Agriculture and Water Resources.

- *Expand web and mobile extension tools to provide greater detail about active constituents and product information to stakeholders.*

  The 'Dog book' was expanded from 2015/16 to include information about re-entry periods. Additionally, information about biosecurity was added in 2016/17 to make it easier for growers to identify and report exotic vineyard pests. Plans to include information about effects of active constituents on beneficial insects and livestock grazing were not able to be realised due to lack of sufficiently reliable information on which to base advice.

This project assists stakeholders to meet regulatory requirements, through the collation, distribution, and regular updating of MRL and other regulatory information and recommendations, related to agrochemical use. Information is disseminated chiefly via hard copy and electronic versions of the 'Dog book', online databases and associated extension materials, which include the

regulatory requirements of key export markets. The centralisation of these industry-wide activities under this project avoids duplication, and ensures that consistent and up-to-date information is available to all grapegrowers and wine producers.

The project team also works to avoid potential trade issues, such as those posed by changes in the EU to the residue definition for captan. Advice was provided to growers not to use this agrochemical on grapes destined for export to the EU, and advice on possible alternatives was provided.

Work by the team to establish an MRL for phosphorous acid continued, and included preparation of a submission to the Food and Agriculture Organization/World Health Organization Joint Meeting of Pesticide Residues in 2016. The submission is due to be assessed in late 2017.

Project 2.2.3– Informing Australia's wine consumers through understanding issues of wine consumption, health and nutrition

Executive summary

This project was funded by Wine Australia from January 2015 to June 2017, and followed on from National Wine Foundation (NWF) projects funded between July 2013 and December 2014. The aim of this 30-month project was to generate and disseminate evidence-based and scientifically sound information regarding wine and health/nutrition to facilitate informed decision-making by the wine and associated industries, policy makers and consumers. Alcohol's place in society is being robustly debated, particularly in Australia. That debate has the potential to lead to major changes to the wine sector's trading environment, through increased regulation in areas such as taxation, pricing, advertising, dietary guidelines and associated public health policies and strategies.

In June 2016, all project activities were reviewed. Proposed outputs and activities for 2016/2017 were generated through consultation and feedback from stakeholders including: the Winemakers' Federation of Australia (WFA); the Health and Nutrition Steering Committee; members of the National Wine Foundation; Alcohol Beverages Australia (ABA) (the pan-industry body with board representation from WFA, Accolade Wines, Pernod Ricard Winemakers and Treasury Wine Estates); and DrinkWise Australia (which has board representation from WFA, as well as representation by Accolade Wines, Pernod Ricard Winemakers and Treasury Wine Estates). A stop/go report incorporating a Project Variation was submitted to Wine Australia for review, and was approved.

Work undertaken in this project was required by the Australian wine industry to inform and support Wine Australia's *Strategic Plan 2015–2020*, and the WFA *Health & Social Responsibility Strategy 2011-2014*, and related *Responsible Winery Initiative* and *Action Plan*. The objective was to provide information about wine's role in a healthy diet and lifestyle, in accordance with the growing population and clinical data.

The project's approach to inform debate and decision-making was three-fold:

- generation and provision of scientific information such as reviews, reports, critiques and briefings;
- communication to stakeholders via publication of peer-review papers and industry articles; and
- provision of submissions to government on behalf of the WFA and ABA.

Additional project activities included the generation of content for consumers which can be accessed from the AWRI, ABA and WFA websites, and the provision of lectures and workshops.

Highlights

- Nine peer-reviewed papers, two book chapters and six articles were published on a range of wine and health/nutrition related issues.

- In May 2016, a paper authored by the AWRI and Italian collaborators titled 'The case for anthocyanin consumption to promote human health: a review' won a Tanner Award as the most-cited paper published in *Comprehensive Reviews in Food Science and Food Safety* in 2013, with 41 citations.

- Five industry fact sheets were produced on wine and cardiovascular diseases, cancers, cognitive decline/dementia, diabetes and obesity; and twelve complementary AWRI wine and health fact sheets and frequently asked questions were revised and disseminated via the AWRI website.

- A workshop entitled 'A comprehensive review of the wine and health landscape' was successfully staged at the 16th Australian Wine Industry Technical Conference on 24 July 2016.

Objective

This project will provide evidence-based material to enable the Australian wine sector and government stakeholders to make informed decisions on wine and health issues.

Outcomes and conclusions

The objective of the project has been met through delivery of the following activities and outcomes.

Submissions

Project staff participated in multiple workshops organised by the Australian Government Department of Health and subsequently prepared comprehensive scientific submissions to inform:

- the Intergovernmental Committee on Drugs responsible for drafting the *National Drug Strategy 2016-2025*
- the *National Alcohol Strategy 2016-2021*; the Senate Standing Committee on Economics (References Committee) on personal choice and community impacts;
- the Public Call for Evidence on the Health Effects of Alcohol Consumption, as part of the review of the National Health and Medical Research Council's (NHMRC) *Australian Guidelines to Reduce Health Risks from Drinking Alcohol* (2009).

Provision of scientific information

Critiques of a number of publications were prepared including:

- the Australian Bureau of Statistics alcohol consumption data and its alignment with Australian Institute of Health and Welfare data;
- the Foundation for Alcohol Research and Education's publication *Risky business–The alcohol industry's dependence on Australia's heaviest drinkers*;
- St Vincent's Health Australia's publication *Alcohol-related harm and violence policy*;
- the Legal and Constitutional Affairs References Committee's *Interim Report–Need for a nationally-consistent approach to alcohol-fuelled violence*;
- the Health Council of The Netherlands' *Guidelines for Healthy Eating* of 2015;
- the UK Chief Medical Officers' *Low Risk Drinking Guidelines* of 2016;
- the *Huffington Post's* article 'What your moderate drinking habit is doing to your health' (7 June 2017) and the *Australian Financial Review* article 'The silent damage from drinking moderately down the decades' (7 June 2017).

In addition, health policy papers on alcohol's impact on cardiovascular disease, cancer, cognitive dysfunction/dementia, diabetes, immunological disorders and obesity were drafted for WFA and ABA. Complementary to these policy papers, 12 AWRI wine and health fact sheets and frequently asked questions were revised and disseminated via the AWRI website.

In preparation for the May 2016 review of the NHMRC's *Australian Guidelines to Reduce Health Risks from Drinking Alcohol*, a summary and comparative review of international alcohol drinking guidelines and associated public health policy changes and directions was undertaken. A comprehensive literature review was also undertaken on aspects of wine consumption and human health, including wine consumption compared with other risk factors associated with death from chronic diseases. This was an extension of the project entitled *Analysis of the health and social benefits of wine in moderation* funded by the NWF from July 2013 to December 2014.

Because alcohol drinking guidelines form the basis for the development of government policies and community materials on the health effects of alcohol consumption, it is important that they are based on sound scientific evidence. When overall or all-cause mortality is considered, there is solid evidence that the risks of moderate consumption of wine (equivalent to no more than 20 g of alcohol per day, or two standard drinks) are lower than the risk of heavier consumption for the general population. There is also some evidence that moderate consumption of wine is lower risk than abstinence for the general population.

Peer-reviewed and industry papers
To ensure that the research community and the wine and associated industries and consumers were also fully informed about the evidence base for alcohol drinking guidelines, nine position papers and two book chapters were published after peer review, and another six articles were published in industry publications (see list below).

Committee
A Health and Nutrition Steering Committee was established in consultation with WFA, which is comprised of Australian clinical practitioners and university researchers. This committee is available to be called on if advice is required on alcohol and health research.

Additional project activities included the generation of content for consumers, which can be accessed from the AWRI, ABA and WFA websites, and the provision of lectures and workshops. For example, a workshop was held at the 16th Australian Wine Industry Technical Conference in July 2016, where project staff provided presentations entitled 'Evolving evidence for the role of wine in reducing the risk of four primary causes of death in Australia' and 'Things you need to know.'

Project staff also presented a keynote address entitled 'Changing the upper limits of moderate alcohol consumption - the need for a world-wide politic on alcohol consumption' at the WineHealth 2017 conference held in Logroño, Spain, and formed part of the moderating panel for a session titled 'Round table innovation and future'. Presentations on responsible alcohol consumption were also provided to Treasury Wine Estates personnel in Adelaide and Melbourne, as part of their global focus week on responsible alcohol consumption.

The collation and generation of evidence-based and scientifically sound information on the impact of wine consumption on human health outcomes has provided timely information to the Australian wine industry, government, consumers and other stakeholders, to enable informed decision-making.

The provision of balanced wine and health information has, for example:

- been used to fill identified knowledge-gaps such as the impact of the moderate consumption of alcoholic beverages such as wine on the risk of non-communicable diseases such as cardiovascular disease, diabetes, cognitive dysfunction/dementia and cancers;

- had a tangible impact on government guidelines, policy and strategies that continue to incorporate that health and social harms from alcohol consumption only arise from drinking risky amounts in risky patterns; and

- informed the *WFA Health & Social Responsibility Strategy 2011-2014*, and related *Responsible Winery Initiative and Action Plan* with its core policy and support strategies, communication and activities that position moderate wine consumption as an integral part of a healthy diet and lifestyle.

This information has enabled industry to continue to operate without significant societal, regulatory and economic imposts, and to demonstrate its duty of care to its consumers in enabling them to make informed decisions regarding their alcohol consumption and health.

Overall, the project and its associated communication activities has provided a strong foundation for the industry to continue to confidently interact with government and key stakeholders on alcohol and health issues.

The well-resourced 'anti-alcohol lobby' is increasing its campaign to impose the restrictive public health policies and strategies, similar to those which were effective in reducing tobacco use in Australia, in order to reduce per capita alcohol (and hence wine) consumption. Therefore, it is imperative that the industry continues to provide evidence-based recommendations of alternative, effective, tailored practices and strategies to reduce harmful alcohol consumption, while continuing to provide information about the potential health benefits from regular and moderate alcohol consumption for the majority of the adult Australian population. This can best be achieved by effectively communicating the key research findings of alcohol and health research to stakeholders, in order to forge and maintain good working relationships with government and allied government organisations, such as the National Health and Medical Research Council.

Articles published during the project

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Project 2.2.4– Increasing Australia's influence in market access, safety, regulatory and technical trade issues

Executive summary

Maintaining market access or opening markets for Australian wine, nationally and internationally, is facilitated by managing and reducing current and potential barriers to trade. Accordingly, the Australian wine industry needs to anticipate, facilitate and influence regulation of wine composition, production, labelling and marketing. The purpose of this project was to identify and mitigate any impediments to market access. The approach taken has been two-fold:

- Provision of readily-accessible regulatory-related scientific and technical advice and assistance for the activities of key industry stakeholders; and

- Representation at national and international industry forums, such as the Organisation International de la Vigne et du Vin (OIV) and the APEC Wine Regulatory Forum (APEC WRF), International Wine Technical Summit (IWTS), Federation International des Vins Spiritueux (FIVS), and participation on relevant working groups and committees. The timely identification and management of scientific and technical trade issues, via the collection, evaluation, generation and dissemination of data on these issues, has helped maintain market access for Australian wine, facilitating the trade of Australian wine nationally and internationally.

Highlights

- Tentative provisions for additives metatartaric acid and yeast mannoproteins have been developed by the WHO/FAO Joint Expert Committee on Food Additives (JECFA) based on submissions prepared by the project team and submitted on behalf of the WFA, WA, DAWR and OIV. Together with the toxicological evaluation, they will be presented next to the Codex Committee on Food Additives (CCFA) for its consideration and adoption.

- Following an AWRI submission, FSANZ provided permission for the use of specific enzyme processing aids, Aspergillopepsin I and II, in Australian winemaking.

- Potassium carbonate has been included in the *International Code of Oenological Practices* of the OIV, authorised for the reduction of the titratable acidity and the actual acidity in winemaking.

- Processing aids, dimethylpolysiloxane and *Aspergillopepsin* I and II (Proctase), have advanced to Step 5 in the 8-step resolution process of the OIV prior to inclusion in the *International Code of Oenological Practices.*

- Analytical and other supporting scientific data were provided which prevented the potential for establishment of an OIV maximum limit for phthalates in wine.

- Analytical and other supporting scientific data were provided which promoted the revoking of a maximum limit for manganese in wine internationally.

- The AWRI's online databases were expanded to contain information on *Analytical requirements for the export of Australian wine* specific to 44 individual countries as well as trading blocs, and

on *Permitted additives and Processing aids for winemaking and wine importing countries* for 28 individual countries.

- A workshop entitled 'The changing regulatory environment of Australian wine' was held at the 16th AWITC in conjunction with Wine Australia. Project staff provided a presentation at the workshop entitled 'Wine labelling - the growing influence of the anti-alcohol lobby on health warning labels'.

Objectives

- Wine Australia (WA), the Department of Agriculture and Water Resources (DAWR), the Winemakers' Federation of Australia (WFA) and Australian Vignerons (AV) receive regular reports on OIV deliberations and resolutions.

- WA, DAWR, WFA and AV receive the technical advice required to support policy development.

- Australian delegation to OIV able to participate in an informed manner on oenology practices, method of analysis, food safety and nutrition-related discussions at OIV meetings.

- Support communications to industry on market access and regulatory developments.

Outcomes and conclusions

The objectives of the project have been met through provision of the following outcomes and activities.

Scientific and technical support

Scientific and technical advice was provided to both national and international regulatory forums for numerous issues. An example is the occurrence of heavy metals such as arsenic, cadmium, copper, lead and manganese in Australian wine. In 2014, Wine Australia issued a warning to wine exporters regarding increased scrutiny of manganese, iron and copper levels in wine by Chinese authorities. Maximum regulatory levels of 2 mg/L for manganese, 1 mg/L for copper and 8 mg/L for iron were then being enforced in wines imported into China. While the regulatory levels set for copper and iron were consistent with other trading nations, the limit for manganese in wine caused concern across all wine-exporting countries. The AWRI analysed the manganese levels of more than 1,500 wines, where a significant number were found to exceed the 2 mg/L limit, but residual manganese was well below any regulatory limits established by other countries. In 2016, China revoked the maximum limit for manganese in wine.

The presence of phthalates in wine was investigated and the AWRI participated in OIV-led inter-laboratory ring tests that evaluated methods for the analysis of phthalates in wines. Phthalates were not detectable in any of the Australian wines analysed and this data was provided to Food Standards Australia New Zealand (FSANZ) following a call for submissions for *Proposal P1034 – Chemical Migration from Packaging into Food*.

Other market access issues investigated included adverse allergenic reactions to wine, and the analysis of proteinaceous and other allergens in wine and associated labelling in different export markets. The project team also presented an evaluation on the health and safety of consumers from phthalate concentrations observed in wine to the OIV's Commission IV Safety and Health, demonstrating that there is no toxicological justification for the maximum limits for phthalates in wine proposed by certain importing countries.

In addition, the project team also participated in a review of the Codex Alimentarius Commission's Proposals for New and/or Revision of Food Additive Provisions; the preparation of a product information declaration for wine industry suppliers; revisions of the Australian wine industry's policy and position statement on genetically modified organisms; the Australian wine industry crisis management plan; and a cost-benefit analysis for energy labelling on alcoholic beverages as well as an assessment of appropriate energy content calculations for the Wine Industry Technical Advisory Committee (WITAC).

A comprehensive report was prepared on the relevant definitions and legislation in place for OIV member countries in relation to nutrition, labelling and ingredient listing in preparation for pending legislative changes.

Submissions
An application to enable use of protease enzymes such as Aspergillopepsin I & II in Australian winemaking was successfully lodged with Food Standards Australia New Zealand and these enzymes are now approved processing aids for Australian wine.

Countries that do not have regulations for wine and winemaking (or only have limited regulations) often defer to the provisions of the Codex Alimentarius Commission (CAC). Metatartaric acid, oenological tannins and yeast mannoproteins have not been permitted for wine by the CAC. Comprehensive dossiers on these compounds were prepared by the project team for the Winemakers Federation of Australia (WFA), Wine Australia (WA), Department of Agriculture and Water Resources (DAWR) and OIV, and submitted to the Joint Expert Committee on Food Additives (JECFA) in 2016 for review in 2017. Additional information and assistance were also provided to JECFA during the six-month review period prior to evaluation at their 84th meeting in June 2017, when the safety assessment and draft specifications were provided. Tentative specifications for metatartaric acid and yeast mannoproteins were developed by JECFA at the evaluation and these evaluations will be presented next to the Codex Committee of Food Additives for its consideration and adoption and finally to the CAC.

In addition, a comprehensive technical and toxicological dossier on metatartaric acid was subsequently prepared for submission to the European Food Safety Authority (EFSA) by the OIV, and for the Japanese Ministry of Health, Labour and Welfare by the European Commission and Oenoppia.

AWRI databases
The AWRI's online databases have been continuously updated and complement Wine Australia's Export Market Grids. In addition to information for regional trading blocs, these databases have been expanded to contain information on *Analytical requirements for the export of Australian wine* specific to 44 individual countries, and information on *Permitted additives and Processing aids for winemaking and wine importing countries* in 28 individual countries.

International forums
Two of the four outputs and associated activities of this project related specifically to the OIV. The project team continued to participate at the OIV as members of the DAWR-led Australian delegation, together with representatives of the Winemakers' Federation of Australia (WFA).

The project team contributed to the OIV 'Taskforce on allergens' which coordinates analytical and clinical research on the potential for residual protein in protein-fined wine and its significance for human health, in Australia, France, Germany and Italy. The code *Good fining practice for wine to be applied after the use of proteinaceous [allergenic] wine fining agents [casein and egg white]* was adopted at the 2014 General Assembly and incorporated into European Commission regulations. This code supports the good winemaking practices of the Australian wine industry that advocate

further fining and filtration post protein-fining to reduce the risk of an allergic reaction to wine from residual egg, fish and milk protein.

The project team supported the passage of Australian-initiated draft resolutions and dossiers on agar, dimethylpolysiloxane, protease enzymes and potassium carbonate in the OIV expert groups as although these processing aids are permitted in Australia they were not yet permitted for winemaking under OIV regulations. Potassium carbonate was adopted at the 2017 General Assembly and has been added to the list of products authorised for the reduction of the titratable acidity and actual acidity, while the other resolutions have progressed to step 5 in the 8-step resolution process. In addition, numerous draft OIV proposals were reviewed through participation in the Microbiology, Technology, Specifications of Oenological Products, Food Safety, and Consumption and Nutrition and Health expert groups and the Methods of Analysis Sub-commission. Furthermore, the project team provided analytical and other data on manganese and other heavy metal levels in Australian and international wine to demonstrate their natural variability and that they are below any toxicologically relevant levels, and also provided a toxicological justification for not establishing maximum limits for phthalates in wine.

The project team was also represented at the IWTS where APEC wine-importing nations workshopped the standardisation of analytical testing for wine-importing countries. The objective was to promote standardised testing of wine protocols for those countries importing (Australian) wines. It is expected that this will assist to reduce trade barriers for Australian wine producers and limit the impact of incorrect testing on wine trade. One significant vehicle for this has been the APEC WRF and associated Enhanced Risk Controls working group, which is chaired by the AWRI. A major initiative has been an international ring test program for international regulatory laboratories to monitor their performance in testing wine analytes, which is now in its third year. Since its initiation, the correlation of results from laboratories has improved significantly, helping to reduce disputes between export and import markets. Another initiative has been the development of a compendium of the standard analytical methods used for wine testing in different countries as well as initiating a database of typical levels of wine components, which will be curated by the AWRI. Besides chairing this working group, the project team is also represented on APEC WRF working groups looking at standardised export certificates, pesticide MRLs and good regulatory practice, all contributing to ease of trade in the Asia Pacific region.

Through the IWTS, the project team has been a major contributor to papers on the low risk nature of methanol in wine, the need for consistent definitions of sugar and methods for it measurement, issues with the use of sugar free extract in the assessment of wine for adulteration and the inherently low food safety risk of wine from a microbiological standpoint.

The project team also has membership of FIVS and serves on its Scientific and Technical and Sustainability Committees, where work tabled includes papers outlining the lack of correlation between data required for analytical export certificates and actual food safety risks, and the need for international acceptance of results from laboratories accredited to the ISO 17025 standard.

The timely identification and management of scientific and technical trade issues, via the collection, evaluation, generation and dissemination of data on these issues, has helped maintain market access for Australian wine, facilitating the trade of Australian wine nationally and internationally.

Examples include enabling the:

- export of wine which is fully compliant with international provisions for manganese (and other heavy metal) maximum levels in wine (where 25% of all Australian wines contain manganese in excess of the arbitrary 2 mg/L maximum limit previously petitioned by China);

- export of wine (bottled and bulk transported) which is fully compliant with international provisions for phthalate maximum levels in wine; and

- export of Australian wine which is fully compliant with the changing provisions and regulations of its export markets.

The regular involvement of the AWRI with the OIV Expert Groups has ensured that OIV provisions and regulations for wine and winemaking, which are reflected in the complementary European Union provisions and regulations for wine and winemaking, are consistent with, and not more restrictive than, the provisions and regulations to which Australian wine must comply.

A proactive approach is required to continue to maintain market access or open markets for Australian wine. Changes to the regulatory environment of wine composition and production, labelling and marketing need to be anticipated, facilitated and influenced in national and international forums to maintain market access and reduce the potential for regulatory and economic imposts on industry. This can best be facilitated by maintaining and expanding the established effective relationships with key regulatory stakeholders in export markets, such as the OIV, FIVS, Asia-Pacific Economic Cooperation (APEC) Regulatory Forum, International Wine Technical Summit (IWTS), World Wine Trade Group (WWTG), and working with these organisations to provide scientific and technical advice and assistance on relevant issues.

Overall, the project and its associated activities has provided a strong foundation for the industry to continue to confidently export wine which is compliant with the provisions and regulations of its domestic and export markets.

Project 3.2.5– Safeguarding and realising the potential of the Australian wine microbial germplasm collection

Executive summary

The AWRI wine microorganism culture collection (AWMCC) is the largest repository of wine-associated yeast and bacteria in the southern hemisphere. It provides the Australian wine industry with novel, non-commercially available yeast and bacterial winemaking strains for efficient and reliable fermentations and as a means to shape and diversify wine style. The AWMCC is also essential for capturing the value of Australia's investment in microbial strain isolation and development, especially given the current focus on bioprospecting and generating uniquely Australian isolates. It is also fundamental to the success of Wine Australia-funded biological research projects, which depend on ready access to correctly identified strains.

Newly isolated and generated microbial strains are continuously being identified and added to the AWMCC, together with relevant supporting information. From 2013 to 2017, 1,301 new strains sourced from researchers and industry were added to the collection. The AWMCC now contains more than 10,000 wine-related microorganisms with some isolates dating back almost 80 years.

The collection contains:

- more than 3,000 natural yeast isolates and laboratory-modified yeast strains for research
- a wine yeast genome deletion library of more than 1,700 strains
- a laboratory yeast genome deletion library of around 4,800 strains
- more than 1,100 bacterial strains, the majority of which are malolactic bacteria.

The AWMCC is a member of the World Federation of Culture Collections and is part of the Atlas of Living Australia.

Highlights

- During the investment period, the AWMCC received 1,301 microorganisms from industry and researchers (1,012 yeast and 289 bacterial strains) and 2,423 microorganisms were supplied to industry and researchers (1,804 yeast and 619 bacterial strains).
- A back-up collection was established at a secure offsite facility to ensure the ongoing integrity of the collection in the event of a catastrophic failure of the storage facilities at AWRI.
- A total of 1,763 deletion strains from the wine yeast deletion library were provided to researchers at the University of Adelaide for a Wine Australia-funded project.
- A total of 83 previously difficult-to-classify yeast strains were identified, and more than 400 microbial isolates were provided for genome sequencing projects.

Objectives

The objectives of this project were to:

- following OECD guidelines, maintain and further develop a secure state-of-art world-class collection of Australian wine-associated yeast and bacterial strains
- provide quality assurance, to internationally recognised standards (OECD guidelines), of all strains held within the AWMCC
- develop a secure back-up, off-site duplicate microbial collection
- maintain and develop a collection of yeast and bacteria which have been identified to genus and species levels using molecular and/or biochemical techniques
- undertake quality assurance on existing, and new additions of, yeast and bacterial strains in the AWMCC

- provide for additional Australian wine-associated microorganisms, including strains generated and/or isolated in Wine Australia-funded research, being deposited in the AWMCC.

Outcome and conclusion

The AWMCC provides access to the genetic diversity of microorganisms collected over many regions and many decades and this has been crucial for several successful Wine Australia-funded projects. Many strains in the collection pre-date the currently available commercial strains and thus provide a depth and complexity for genetic comparisons that would have been otherwise unavailable.

- More than 200 strains of *Saccharomyces* yeasts from the collection, including 106 commercially available strains gathered over more than 50 years, were genetically sequenced and formed the basis of a study that provided the most comprehensive understanding to date of the genetic diversity of commercially available wine yeast (Borneman et al. 2016).
- Sequencing data enabled the selection of appropriately diverse yeast strains for use in the AWRI's fermentation nutrients project. This project better defined yeast strain-specific performance parameters for a large group of commercially available wine strains, improving the matching of strain to must. The sequence data showed that many commercial strains were genetically very similar, if not identical. This enabled a targeted design incorporating diverse candidates from the newly sequenced strains, rather than choosing randomly from commercial strains which might have provided redundant data and significantly reduced the value of the new knowledge generated.
- Of the collection's more than 360 *Oenococcus oeni* isolates, 200 were sequenced. A subset of these was used for identifying *O. oeni* strains that tolerate malolactic fermentation-limiting wine parameters, grow rapidly and efficiently metabolise malic acid (Costello et al. 2017).
- More than 1,000 of the yeast strains in the collection are non-*Saccharomyces* strains. These were accessed for a project that compared 50 genetically diverse strains to investigate the possibility of using non-conventional yeast to produce wine with reduced ethanol content. An outcome of this project was the identification of a non-*Saccharomyces* strain that could result in lower ethanol when used in sequential inoculations of Shiraz ferments (Contreras et al. 2014).
- The collection contains more than 350 *Brettanomyces* isolates, a genus responsible for wine spoilage and subject to ongoing concern in the wine industry. More than 60 of these isolates were screened as part of a project aimed at developing a monitoring regime to detect the emergence of sulfite-tolerant *Brettanomyces* strains. This project highlighted the importance of having available 'ready-to-go' candidate strains previously deposited over many years, because the number of suitable isolates that become available during any particular vintage can vary widely.
- As part of a study seeking to better understand the importance of timing and strength of yeast flocculation in wine production, a candidate non-flocculating yeast was identified during a screen of 99 *Saccharomyces* strains, with the help of a high-throughput sedimentation assay.

These examples clearly illustrate the importance and value of having instant access to the greatest possible diversity of well-characterised wine-related microorganisms and the AWMCC is the most comprehensive source of such material.

In summary, through this project the AWMCC has been able to grow into a substantially larger, more genetically diverse and operationally secure microorganism collection for the Australian wine industry. Future research projects, particularly those involving bioprospecting and metagenomics

approaches for the study of microbial diversity, are expected to deliver several thousand more isolates to the collection in the coming years. To ensure efficient operation and enable support for complex experimental designs involving hundreds of strains, new high-throughput storage, handling and culturing tools, combined with latest generation sequencing and data mining technologies, will be incorporated. This will improve handling of large numbers of isolates and help capture the full value of this resource for the benefit of the Australian wine industry.

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Project 4.1.1– The staging and conduct of extension programs

Executive summary

The objective of this project was to provide a multifaceted and centralised extension platform to deliver research outcomes, innovations and practical solutions to Australian grape and wine producers. Face-to-face events were delivered through the long-standing Grape and Wine Roadshow program. Roadshow seminars delivered content prepared by researchers from the AWRI, affiliated WIC partners and other organisations. Relevant content was chosen by the local regional association on each occasion, giving an indication of which topics were most relevant in their region at that time. Similar content was also delivered electronically via a webinar platform. Roadshow workshops delivered tailored practical solutions to prevailing wine sector challenges with content prepared by AWRI viticulturists and winemakers. Written extension included preparation of *Technical Notes* and collation of articles for the bi-monthly AWRI *Technical Review,* preparation of articles for AWRI *eNews*, Wine Australia *R&D@Work* and *RD&E news*, *Ask the AWRI* columns and other channels, as well as preparation of content for the AWRI website. *eBulletins* were also prepared when required to provide the wine sector with rapid, early warnings of emerging trends and associated recommendations, based on observations from the AWRI helpdesk.

A total of 117 Roadshow events were delivered over the four years reaching 3,132 attendees, averaging 27 attendees per event. A total of 90 webinars were delivered to 1,463 attendees, averaging 16 attendees per event. A total of 237 articles and webpages were prepared and published.

Evaluation forms were collected after each roadshow event to assess metrics such as reasons for attendance, overall event satisfaction and intention to adopt. Results showed that the Roadshow platform is valued for its delivery of information on the latest research and for the opportunity it gives participants to build on their knowledge base. More than 60% of respondents indicated they would re-evaluate their current practices in the light of information presented.

A total of 97,923 webpage views/year and 20,993 downloads of fact sheets and other packaged material were recorded for the winemaking and viticulture areas of the AWRI website since the new AWRI website structure was updated in 2014, demonstrating the wide reach of this platform. Non-peer-reviewed industry articles, such as those contributed by this project, continue to be the main publications requested from the John Fornachon Memorial Library. Abstracts were collated for each of 24 AWRI *Technical Review* issues published over four years, providing grape and wine producers access to the latest relevant current literature.

Future extension activities will build on the successes of this project and continue to support rapid awareness and adoption of new and improved production and management techniques and technologies. The next extension project will focus on delivering events such as seminars, workshops and webinars to encourage awareness of innovations. New content, including tastings of wines made from research projects, will be introduced so that producers can directly see the benefits of innovations trialled in practice.

The AWRI acknowledges the support of AWRI researchers, researchers from other organisation and individuals that have contributed their time in preparation of material delivered during roadshow seminars and webinars. Acknowledgement of the in-kind support from Australian grape and wine region associations to organise and publicise roadshow events has also been vital in delivering an effective face-to-face extension platform.

Highlights

- 118 Roadshow eventss were delivered over the four years reaching 3,212 attendees, averaging 27 attendees per event
- 90 webinars were delivered to 1,463 attendees, averaging 16 attendees per event
- 237 articles and webpages were prepared
- 97,923 webpage views/year were recorded for the winemaking and viticulture sections of the AWRI website and 20,993 downloads were recorded of fact sheets and other packaged material
- Three new workshops were prepared and delivered:
  - *Adapting to difficult vintages* – providing solutions to growing grapes and making wine in a warmer climate
  - *Addressing regional challenges* – providing solutions to regional issues in each region highlighted by AWRI helpdesk trends
  - *Pinot Noir winemaking trial tastings* – showcasing wines prepared using different winemaking practices.

Objectives

The objective of this project is to raise awareness and facilitate uptake of research outcomes, assist producers to understand the practical value of these outcomes and overcome any potential barriers for adoption. This is achieved by extending research outcomes in a form that encourages adoption by people employed in the Australian wine industry.

Outcome and conclusion

Figure 1 summarises the motivations for attendance at AWRI extension events, as reported in post-event surveys. The primary motives (for 93% of participants) for attendance at Grape and Wine Roadshows were to be regularly informed about current research or new practices and for participants to continually build on their existing knowledge base.



Figure 1. Motivation of participants attending AWRI Roadshows, sourced from attendee surveys.

Table 1 details the target number of extension events versus the number of events delivered for the four years, along with attendance figures and percentage of non-AWRI speakers. All targets were exceeded, both for number of events and for attendance.

Table 1. Number of extension events held, event attendance and percentage of non-AWRI presenters.

Extension event	**Target**	**Delivered**
Face to face presentations		
Roadshow Seminars – number of events	60	69
Roadshow Seminars – number of attendees	1,500	1,967
Roadshow Seminars – percentage of external presenters	10%	21%
Roadshow Workshops – number of events	40	48
Roadshow Workshop – number of attendees	1,000	1,165
Roadshow Workshop – percentage of external presenters	10%	19%
Electronic presentations		
Webinars – number of events	80	90
Webinars – number of attendees	-	1,463
Webinars – percentage of external presenters	40%	60%
Webinars – downloads from the AWRI's YouTube channel	-	10,430

Roadshow feedback forms were handed out at the conclusion of each event. Participants were asked to rate the roadshow overall, as well as the usefulness to their business. Feedback showed that 87% of participants rated the events as *good* or *excellent* and 76% found the information presented useful. This confirms the success of face-to-face communication through the Grape and Wine Roadshow platform.

Adoption and intention to adopt were captured by asking the following question:
As a result of what you have heard today, what actions will you take:

- I will make no changes
- I will reassess current practice/consider alternative choices
- I will seek extra information online
- I will discuss possibilities with my peers/consultants/retailers/AWRI/government organisation
- I will change my current practices

A total of 62% of participants indicated they would re-evaluate their current practices based on what they had heard, demonstrating that Australian grape and wine producers continue to demonstrate a continuous improvement mindset. In terms of intention to adopt, 48% of participants indicated they would seek extra information about the new practices mentioned or would discuss adoption with peers, business decision-makers or key influencers after the roadshow. Only 9% of participants said they would immediately adopt the new practices mentioned in the roadshows with no need to seek out any further information. This data is consistent with findings found in Hill et al. (2014) which demonstrated that Australian grape and wine producers primarily adopt innovations in a multi-tiered process; first they need to be made aware of the new innovations via several channels, they will then

discuss the innovation with trusted peers and local networks, and then they need to see the innovation trialled in practice, before adopting it themselves.

Table 2 details the targets and delivered numbers of written extension material for the four years. All targets were exceeded except for AWRI *eNews* articles, where one fewer article than the target number was produced. Written articles produced through this project regularly feature among the most popular requests to the AWRI library with one example, the 'Ask the AWRI' column on unmanned aerial vehicles (drones), the most requested publication during the 2016/17 financial year. Non-peer-reviewed publications continue to be the preferred platform to initially inform grape and wine producers of new innovations, changes or practical solutions, with material then reinforced during face-to-face extension events. Producing content to be delivered to the 3,600-strong distribution list for AWRI *eNews* and *eBulletins*, as well as material for Wine Australia subscribers and publications in a variety of trade magazines, gives a broad platform to ensure the content has the widest possible reach for grape and wine producers.

Table 2. Target and delivered number of written extension material for the four years

Extension event	**Target**	**Delivered**
Written material		
Technical Review Technical Notes	8	10
AWRI *eNews* articles	48	47
Wine Australia R+D@Work columns	12	17
Wine Australia eNewsletter articles	20	41
Ask the AWRI columns	24	47
AWRI *eBulletins*	8	25
Technical Review Abstract Reviews	24	24
AWRI website webpage additions	48	50

An example of the information reach and information reinforcement strategy is demonstrated by the multi-channeled approach used to inform producers about changes to water addition regulations that occurred in early 2017. An initial e*Bulletin* was produced to inform stakeholders of the changes to regulations about water addition to musts. An *Ask the AWRI* article was then produced highlighting the possible quality implications of adding water to musts. A water addition calculator was prepared and added to the AWRI website. An AWRI webinar was also prepared and presented by researchers from the University of Adelaide working in this area. A *Technical Review* article was then produced which demonstrated some more practical aspects of water additions. A Roadshow workshop presentation was prepared to deliver the information in face-to-face events. In addition, a new research project commenced during the year to evaluate the practice during the 2017 vintage.

Extension of material via the AWRI website had the widest reach of all written communications. An average of 97,923 webpage views per year occurred for the winemaking and viticulture areas of the website since the AWRI website structure was updated in 2014. Additionally, 20,993 fact sheets and other pieces of packaged material were downloaded since 2014, demonstrating that this channel should not be overlooked in extension delivery. Material communicated via the website has an advantage over face-to-face channels in that material is always accessible once uploaded, rather than just being available at a single point in time. An example of this is the 90 webinars that were delivered to 1,463 participants that attended the webinars over the four years of the agreement. Following those events, 10,430 views, or ten times the initial audience of the webinars, have occurred since webinar recordings were added to the AWRI YouTube channel on 6 November 2014. Communication of research outcomes, new innovations or practical solutions via video channels rather than text, or

demonstrations performed online or via YouTube, is thus a powerful and proven tool to communicate with grape and wine producers moving forward.

Looking to the future, the next AWRI extension project will build on the successes of this project and continue to support awareness and adoption of new and improved production and management techniques and technologies. The aspect of the current project that focuses on generation of content for written communication platforms will be incorporated into the communication project under the next investment agreement. The extension project will focus on delivering events such as seminars, workshops and webinars to increase awareness and understanding of available innovations. Tastings of wines made from research projects will be introduced so that producers can see the benefits of innovations trialled in practice, to encourage greater adoption of the innovations or practice changes. The combination of these channels will ensure grape and wine producers are aware of innovations, minimise barriers to adoption and reduce adoption timeframes for Australian producers.

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Project 4.1.2– Specialised technical troubleshooting and responsive helpdesk services for the Australian wine sector

Executive summary

The AWRI helpdesk provides timely and confidential support for technical problems encountered by Australian grapegrowers and winemakers. Services include identifying the root causes of problems, and providing research-based, practical, up-to-date remediation solutions, as well as future prevention strategies. The service also ensures that Australian grapegrowers and winemakers are competitive on the world stage, by having the latest technical information readily to hand. Investigative services, including analysis of problem grapes or wine, are conducted when a problem cannot be solved through discussions with the producer.

Activities in the helpdesk project over the investment period have been critical in identifying and resolving technical issues and have provided knowledge to industry personnel across areas including grapegrowing, winemaking, packaging, regulatory, trade and scientific matters. The adoption of advice and solutions provided by helpdesk also prevented sub-standard fruit or wine from entering the supply chain. In instances where grape or wine value was not recoverable, the technical reports provided by the services enabled producers to pursue insurance or legal claims, including claims arising from the supply of inferior processing aids, additives or packaging materials. The project also contributed to the resolution of issues which, if left unresolved or repeated by other wineries, could incur losses or unnecessary remediation costs, create inefficiencies or potentially damage brands and reputations.

The AWRI helpdesk also provided an early warning system for emerging technical issues, generating information which was applied to prioritisation of research and extension activities. A number of the trends observed in helpdesk enquires during the investment period were related to extreme weather events or climate change and included issues such as earlier harvest dates, higher sugar levels and stuck fermentations, vintage compression, agrochemical issues and smoke taint. This information was used to inform the development of the 'Adapting to difficult vintages' workshop delivered by the extension project.

During the investment period helpdesk staff responded to and confidentially answered 7,647 queries, and performed 860 winemaking investigations. The service was accessed by producers of varying size, from the smallest to the largest Australian grape and wine producers. On average, approximately 11% of enquiries turned into investigations where wines were requested and submitted for further analysis and investigation. Each client who used the investigation service was surveyed, and the results (shown in the Outcome and Conclusion section below) reflect the high value users put on this unique service.

Future directions for the project will see the helpdesk develop more of an online platform for industry, improving access, response times, image capture and reporting, while maintaining the personal contact and advice that is highly valued by industry personnel. It will also be involved in trials of new technologies and the making of wine to demonstrate issues or innovations.

Highlights

- Helpdesk staff responded to 7,647 requests for technical advice, covering grapegrowing, wine production and scientific and regulatory-related matters.
- More than 80% of enquiries were answered within 24 hours.
- Helpdesk staff performed 860 winemaking investigations
- A rapid response was provided to regions affected by smoke from significant fire events in 2014, 2015 and 2016 (South Australia, Victoria, Tasmania, Western Australia). This included face to face Q&A sessions, practical management techniques post-harvesting and detailed discussions and interpretation of analytical results.
- To assist with the interpretation of smoke taint analytical data, a database of background levels of smoke-related phenols and phenolic glycosides was established, initially with five common grape varieties, and later expanded to include a total of ten varieties, namely: Semillon, Chardonnay, Sauvignon Blanc, Riesling, Pinot Gris, Pinot Noir, Merlot, Cabernet Sauvignon, Shiraz, and Grenache.
- Assistance was provided to help wine exporters understand and adapt to regulatory changes regarding metal content (particularly manganese) in wine exported to China
- The helpdesk addressed a number of enquiries regarding sooty mould in vintage 2017. This has been identified as a priority issue for some regions, and has led to the commencement of new research activities

Objectives

To provide rapid support to grapegrowers and winery production staff on technical and scientific issues encountered during the production of wine.

The key objectives are to:

- provide the Australian wine sector with real-time access to experts from a range of disciplines to provide pre-competitive solutions to grape and wine production, composition and processing problems and scientific industry issues
- identify and solve technical problems
- provide Wine Australia, Winemakers' Federation of Australia and Australian Vignerons with an early warning system for industry-wide trends and emergencies, generating information that can be applied to the prioritisation of research activities.

Outcome and conclusion

The key objectives in this project were successfully met.

Over the investment period, helpdesk service staff responded to 7,643 requests for technical advice, covering grapegrowing, wine production and scientific and regulatory-related matters, with more than 80% of the enquiries answered within 24 hours. A breakdown of the queries received by major category and by year is shown in Table 1.

Table 1. Enquiries received by the AWRI helpdesk from 2013/2014 to 2016/2017

	2013/14	2014/15	2015/16	2016/17
Winemaking	1,309	1,265	1,336	1,117
Viticulture	466	487	657	483
Regulatory	178	150	99	96
Total	**1,953**	**1,902**	**2,092**	**1,696**

Queries received were classified further using a range of key words, enabling trends in technical issues to be monitored at a more specific level. Figure 1 shows the most commonly used key words for queries received over the four-year investment period, with smoke taint the most dominant issue, followed by taints and contaminations.

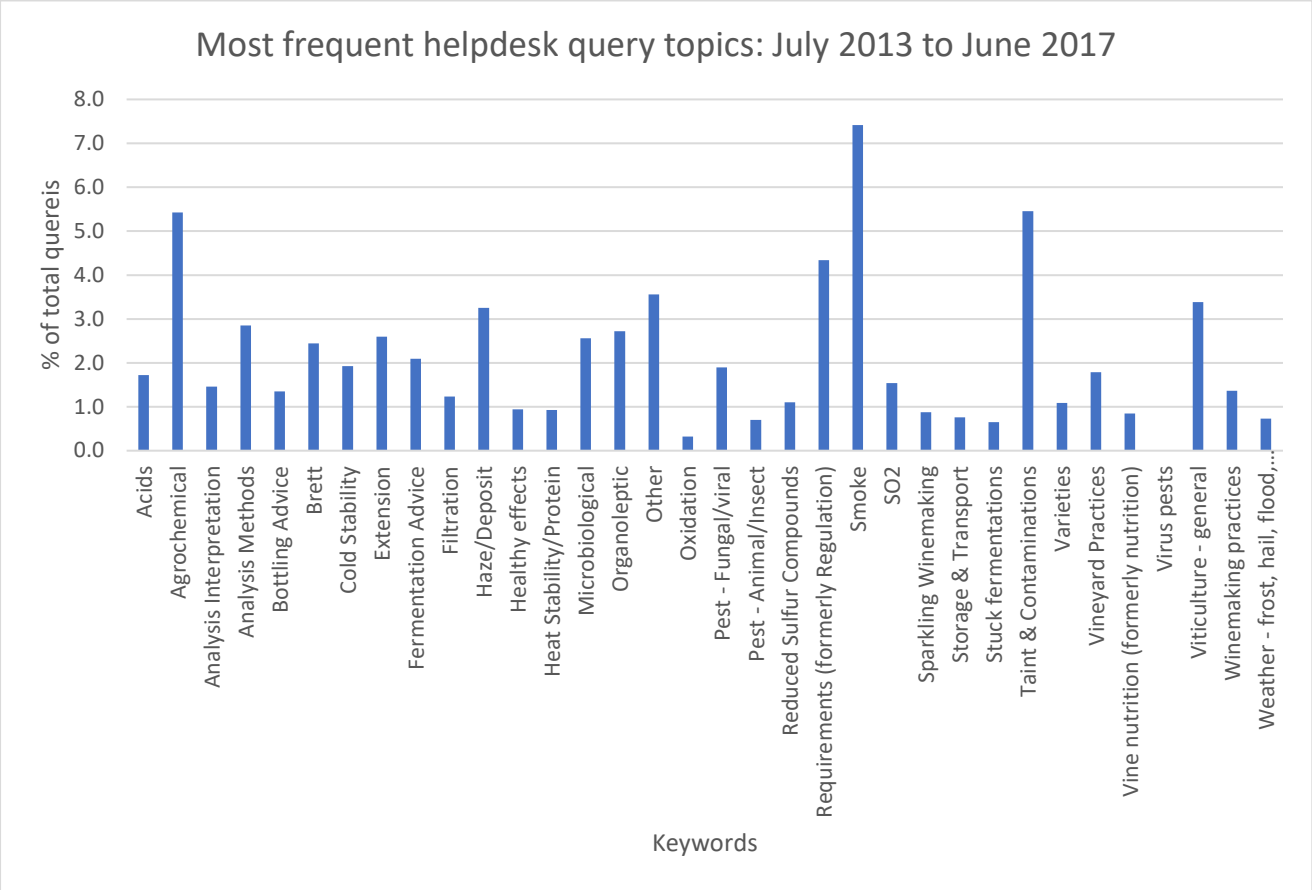


Figure 1. The most frequent helpdesk query topics over the period from July 2013 to June 2017

Helpdesk service staff performed 860 investigations, providing detailed understanding of the issue(s) and steps for remediation where possible. The types of investigations conducted are broken down in Table 2.

Table 2. Types of investigations conducted by the AWRI helpdesk during the investment period

Investigation type	Number of investigations
Haze and deposits	240
Sensory	213
Closure	19
Microbiological	102
Taints and contaminations	175
Other	111
TOTAL	**860**

Identification of hazes and deposits was the most common type of investigation, followed by sensory-related problems and taints and contaminations. Microbiological problems also made up a significant proportion of the issues investigated. Efforts have been made to address the types of problems that are seen most commonly through extension and communication activities.

Impact and measures of success
Each client who used the investigation service and submitted samples for investigation was surveyed. The survey was automatically sent out once the investigation had been completed, and included an email reminder after a period of seven days. The survey response rate was around 9%.

The survey results indicated:

- 86% of respondents rated the access to the helpdesk as easy, or very easy.
- 88% of respondents were satisfied or very satisfied that their problem had been resolved.
- 83% of respondents indicated that it was easy to understand the solution to their problem.
- 70% of respondents were able to avoid product loss through contacting the AWRI helpdesk.
- The potential value of wine involved in the 860 investigations conducted was estimated to be $69m.
- 97% of respondents indicated the suggestions provided by the helpdesk team were helpful.
- 72% of respondents indicated that they would change their practice based on recommendations provided by the helpdesk team to prevent a repeat of the problem.

Economic return on investment
Each client was asked to indicate how much wine was involved in the investigation conducted, and the quality grade of the wine involved. With these two figures, an approximate cost of the wine involved in the investigation could be estimated. The quality gradings were limited to unfinished, premium or ultra-premium. The dollar value attached to each of the quality gradings was based on export approval data (sourced from Wine Australia). Bulk wine was assumed to be $0.98 per litre, premium wine was assumed to be $5.94 per litre and ultra-premium wine $14.81 per litre. The figures used were an average of the price of white and red wine in these quality ranges.

The value of wine involved in the investigations (potential direct savings) ranged from $0 to $594,000 with a mean value of $81,029. Extrapolation of the data to the total number of investigations conducted (860) suggests the potential direct savings over the project was $69,685,083. This equates to a return of 25:1 on a $2,750,418 investment from Wine Australia over the investment period. It should be noted, however, that while this figure of 25:1 is based on the work of the helpdesk as a discreet project, in reality the success of the project is highly reliant on the

rest of the work at the AWRI and elsewhere which informs the investigations conducted and advice given.

Direct feedback
The impact of the helpdesk service can also be assessed based on direct feedback from users. A selection of quotes is reproduced below.

> "Changes in cellar operations were justified with AWRI's assistance"
>
> "Excellent service and recommendations"
>
> "Without doubt the AWRI are the pinnacle in terms of winemaking services worldwide. Over the past 8 years we have won many trophies and gold medals both in national and regional shows and I feel that this is a direct result in the professional advice we receive from the AWRI team. The regional workshops are invaluable and greatly in need of more throughout the industry to improve the quality across the board. Without the AWRI we have no industry, out of 10 I give them 11."
>
> "Always very helpful and efficient"
>
> "Thanks so much. Thanks again, such an amazing resource."

Future directions for the AWRI helpdesk
The next AWRI helpdesk project will continue to deliver the technical support and investigatory services that are so valued by the Australian grape and wine community. At the same time, it will work towards developing a more efficient online platform that will improve access and response times. In addition, the helpdesk will conduct trials of new equipment/additives of potential benefit to the Australian wine industry, and each year will make a series of wines to illustrate technical issues or innovations which will be presented to industry via the AWRI roadshow program.

Project 4.1.3– Library service

Executive summary

The John Fornachon Memorial Library (JFML) holds the largest knowledge base of grape and wine resources in the southern hemisphere and offers specialised information services and resources to the Australian grape and wine sector. Since 2013, most of the items sourced have been in digital format and the search tools that are offered are available online at all times via the AWRI website.

The library collection comprises 87,800 items covering 'vines to wines' and this valuable industry-owned resource is the backbone of a suite of information services available to the Australian grape and wine sector. More than 90% of the 9,569 articles delivered by the project over the investment term were provided from the library's own collection and the remaining requests were fulfilled via inter-library loans. Library services are used by levy payers as well as government, research organisations, students, suppliers and other participants working across the Australian wine sector.

Requests for technical information about oenology and viticulture remain popular. Resources on consumer and marketing studies, climate and the environment, sustainability and grape varieties are expanding due to a growing user demand. The library will continue to monitor this demand and other emerging trends to ensure acquisition activities align with current and future user needs.

The provision of user-friendly online tools is also a focus for the library as more users choose online platforms to find information. The eBooks platforms first introduced in 2013 has been expanded and now includes over 120 titles, providing another way for industry members to access grape and wine publications at any time and from any location.

Looking forward, the next Library project will continue to seek innovative ways to deliver technical and scientific content, and facilitate the use of that information and knowledge, through the use of digital technologies.

Highlights

Project highlights over the investment period include:

- More than 16,000 items were added to the library collection and many of the total 87,800 items are now in digital formats.
- Over 5,900 requests were responded to, with 9,569 articles delivered in that period. Over 80% of requests were completed within one business day.
- A version of the library catalogue optimised for viewing on mobile phones and tablets was launched, enabling users to search and order items using mobile devices.
- An eBook collection was launched and then expanded to two eBook platforms.
- Online information packs were added to the AWRI website in 2013 and usage has steadily increased in the last three years.
- Library resources and services were showcased at the Australian Wine Industry Trade Exhibition in 2013 and 2016.

Objectives

The key objectives of this project were to:

- maintain a comprehensive collection of technical and scientific resources covering 'vine to wine'
- ensure easy access to the library collection for Australian wine sector participants, government and other research institutions.

Outcome and conclusion

Maintain a comprehensive collection of technical and scientific resources covering 'vine to wine'

Over the last five years, the library has added over 16,000 records to its library catalogue. Many of its 87,800 items are now in digital format. A Collection Development Plan is reviewed on a regular basis to ensure there is a strategic approach to sourcing and maintaining this industry-owned collection of grape and wine publications and resources. Items are acquired as a result from user requests and monitoring the latest materials published on grape and wine production. Information request trends suggest an increasing demand for information and resources relating to consumer and marketing studies, climate and the environment, sustainability and varieties. Investing in resources and topic areas experiencing strong demand is a priority.

All items in the library collection are catalogued in a database, which is available for levy payer access via the AWRI website. Where possible, permissions to include abstracts of books and articles are sourced from the copyright owners and abstracts are added to the catalogue to help library users to find relevant information efficiently.

Since a 2014 launch, the library's eBook collection has seen steady growth. To ensure growth and a diversity of titles, a second platform was added in 2016. As it currently sits, the collection holds 120 titles across a broad range of industry relevant topics. All eBooks are catalogued within the library database and access is integrated via the AWRI website.

Ensure easy access to the library collection for Australian wine sector participants, government and other research institutions.

The library catalogue is the primary search tool and is available on the AWRI website. A version optimised for viewing on mobile phones and tablets was launched in 2013/14, making the catalogue more accessible via mobile devices. Specialised online databases, maintained by this project, are also available on the website:

- The staff publications database contains citations of over 1,900 publications authored by AWRI staff. The AWRI publications section of the website received over 27,000 hits from July 2013 to June 2017 and over 3,330 staff publications were requested in that time.
- Online information packs are topic-based and developed to help users easily locate information on common topics such as oenology, viticulture, sustainability, and wine and health. There are now 17 information packs available online and the use of these packs is steadily increasing over the last two years, averaging 1,765 hits per year.

The library also offers literature search services for in-depth research and retrieval of information.

Overall, the library received over an average of 1,480 document delivery requests per year and an average of 2,340 articles were dispatched each year.

Brettanomyces is the most requested topic for AWRI staff publications, followed by articles relating to smoke taint. The top five requested articles between July 2013 to June 2017 are listed in Table 1. Both *Brettanomyces* and Smoke taint were topical issues during the investment agreement period as reported in the AWRI helpdesk project.

Table 1. The top five requested articles from the JFML during the investment period.

Article
Coulter, A. Post-bottling spoilage - who invited Brett? *Aust. N.Z. Grapegrower Winemaker* (559): 78-86; 2010.
Coulter, A., Robinson, E., Cowey, G., Francis, I. L., Lattey, K., Capone, D., Gishen, M., Godden, P. Dekkera/*Brettanomyces* yeast - an overview of recent AWRI investigations and some recommendations for its control. Bell, S. M. (ed.). *Impacts on wine flavour: proceedings of a seminar;* 10-11 July 2003, Barossa Convention Centre, Tanunda, S.A. Australian Society of Viticulture and Oenology: Adelaide, S.A.: 41-50; 2003.
Curtin, C., Bramley, B., Cowey, G., Holdstock, M., Kennedy, E., Lattey, K., Coulter, A., Henschke, P., Francis, L., Godden, P. Sensory perceptions of 'Brett' and relationship to consumer preference. Blair, R.J. (ed.). *Proceedings of the thirteenth Australian wine industry technical conference,* 29 July-2 August 2007, Adelaide, S.A. Australian Wine Industry Technical Conference Inc.: Adelaide, S.A.: 207-211; 2008.
Curtin, C. D., Borneman, A. R., Henschke, P. A., Godden, P. W., Chambers, P. J., Pretorius, I.S. Advancing the frontline against Brett: AWRI breakthrough offers potential to transform the battle against Brett. *Wine Vitic. J.* 26 (6): 18-25; 2011.
Ristic, R., Osidacz, P., Pinchbeck, K. A., Hayasaka, Y., Fudge, A. L., Wilkinson, K. L., The effect of winemaking techniques on the intensity of smoke taint in wine. *Aust. J. Grape Wine Res.* 17(2): 29-40; 2011.

The key communication channels used to promote the library's resources and services include:

- A dedicated 'Information Services' section on the AWRI website
- Newly published AWRI publications listed in every issue of AWRI *eNews* and each year in the AWRI's Annual Report
- *eBulletins* and *eNews*
- The Australian Wine Industry Trade Exhibition, held every three years in conjunction with the Australian Wine Industry Technical Conference.

Library and information services contribute to advancing the knowledge and capabilities of the whole industry. Without these services, grape and wine producers would need to individually invest in setting up their own libraries and spending additional time researching and accessing information. The ability to access an industry-owned suite of library resources and services means producers can focus on their core business of growing grapes and making wine. By having easy access to the latest published research and technical information, they can build their understanding of innovations and learn how new technologies and processes can be implemented in their vineyards and wineries.

Over the last five years, the methods by which grape and wine producers contact the library have changed. More than 80% of library requests are now received via the AWRI website or email, reflecting an increasingly online audience. This change is being taken into account in future plans for the JFML, which will have an increased focus on digital resources and platforms, so as to maintain the library's relevance and continue to provide efficient access to relevant and valuable information for the benefit of grapegrowers and winemakers and other library users.

Project 4.1.4– Communication with stakeholders

Executive summary

This project's primary purpose was to deliver timely and accurate communications to Australia's grape and wine producers in order to enhance awareness and adoption of R&D outcomes. It was designed to work closely with, and complement, the activities in Projects 4.1.1. (Extension), 4.1.2 (Helpdesk) and Project 4.3.1 (Regional nodes).

Activities in this project included production of a large range of electronic and hard-copy industry publications such as the AWRI website, Annual Report, *eNews* and *eBulletins*, *Technical Review*, the AWRI Report, 'Ask the AWRI' column, 'Alternative varieties' column and other trade articles. An active presence in social media, management of the AWRI's interactions with traditional media and promotion of the AWRI webinar program were also included.

Over the investment period the project delivered edited content for publication in a wide range of different outlets (see Table 1 in the 'Outcome and conclusion' section below).

Success of the project in reaching its target audience was demonstrated in a number of ways including: website hits, growth in subscriber numbers for the AWRI's electronic newsletters and bulletins, growth in social media following, requests for articles from readers of *Technical Review,* media interest in AWRI stories*,* and feedback from editors of trade journals and content consumers.

Communication with stakeholders via electronic and hard copy media will continue under the new investment agreement with Wine Australia, including an exploration of possible new formats for delivery of information, informed by research about how people access information.

Highlights

- The major update of the AWRI website in January 2016, which gave the site a fresh new look, made navigation easier and was accompanied by a major review and update of content. This, along with the removal of password protection from some areas of the site, greatly improved usability and resulted in increased web traffic.
- Delivery of more than double the target number of industry articles over the term of the agreement– ensuring AWRI research was regularly being translated into formats tailored to an industry audience
- Coordination of AWRI contributions to a special issue of the *Australian Journal of Grape and Wine Research* commemorating the AWRI's 60th birthday that featured 18 review articles authored by AWRI staff.
- Use of the *eBulletin* format to respond quickly to industry issues such as floods, frosts, heatwaves, bushfires, pest/disease outbreaks and changes to agrochemical recommendations.
- Addition of webinar recordings to the AWRI YouTube channel – greatly increasing the reach of this important communication mechanism.
- Close cooperation with the helpdesk and extension projects that ensured consistent messaging and relevant up-to-date content.

Objective

- Enhance the awareness and adoption of R&D outcomes in the Australian wine sector through timely and accurate communication.

Outcome and conclusion

Table 1 summarises achievement against publication targets during the project term. Cumulative targets for the four years were all met or exceeded, with those for industry articles and *eBulletins* significantly exceeded.

Table 1. Achievement of project targets

Outcome	Number achieved	Target
AWRI Reports in *Wine & Viticulture Journal*	24	24
Alternative varieties columns in *Wine & Viticulture Journal*	24	24
Ask the AWRI column in *Australian and New Zealand Grapegrower and Winemaker*	48	48
Articles in non-peer-reviewed industry journals	53	24
Issues of *AWRI Technical Review*	24	24
Issues of *AWRI eNews*	24	24
AWRI *eBulletins*	72	48
Media releases	19	As required
Articles in GWRDC Innovators' Network eNewsletter/Wine Australia RD&E news	54	48
Articles in GWRDC/Wine Australia R&D@work	29	24
AWRI Annual Reports	4	4
Webinars promoted	92	80

Articles and regular columns in industry journals were a valued platform for communicating with grape and wine producers about latest research results and providing practical advice on specific technical issues. As an example, the 'Ask the AWRI' column about unmanned aerial vehicles (drones) published in *The Australian & New Zealand Grapegrower & Winemaker* was the most requested publication from the AWRI's John Fornachon Memorial Library during the 2016/17 financial year, demonstrating the relevance of this style of communication.

eBulletins were also an essential vehicle for reaching grape and wine producers quickly, particularly in relation to weather events or emerging technical issues. One example where an *eBulletin* assisted practitioners to adapt quickly to a weather-related event was the *eBulletin* issued in January 2014, which warned of an impending heatwave across southern Australia. By drawing on the latest forecasting tools from the Bureau of Meteorology, the AWRI helpdesk was able to issue the warning before the heatwave's arrival and provide advice about irrigation practices to adopt before, during and after the heatwave to minimise damage to fruit and vines. Some of the key advisory *eBulletins* issued during the project term are listed in Table 2.

Topics initially addressed via *eBulletins* were also often followed up by other communication channels. For example, soon after the *eBulletin* on frost issued in November 2013, a webinar was held, and this proved to be one of the most attended webinars during that year. This approach of combining different communication channels has been used across the project to ensure messages reach the widest audience possible.

Table 2. A selection of key *eBulletins* issued during the project term

Title	Date
Support available in response to smoke taint and frost	15 November 2013
Timely reminder about disease risk	13 December 2013
Two current issues: heatwave warning and impact of elemental sulfur residues	9 January 2014
How should I deal with split fruit and disease pressure as harvest approaches?	18 February 2014
Vineyard sprays – clarifying label directions	24 February 2014
Support available on two recent viticultural issues – hail damage and restricted spring growth	8 December 2014
Dealing with fire damage and smoke taint	12 January 2015
Increased risk of bunch rots following heavy rain	16 January 2015
Managing late season wet weather	20 January 2016
Stuck ferments need a rapid response	19 April 2016
Managing vineyards after a wet winter and spring	23 September 2016
Weather update, managing waterlogged vineyards and additional re-entry period information	5 October 2016
Change to Food Standards Code regarding addition of water to high sugar must/juice	16 February 2017

Tables 3 and 4 presents some metrics of audience reach over the four years of the project term. Key points to note are the increases in audience of the AWRI website, *eBulletin* and *eNews* and social media channels. These reflect trends seen in the broader community of improvements in internet access and growth of smart phone use. This increasing importance of electronic media will be taken into account in the planning of future communication activities, without forgetting the importance of more traditional platforms.

Over the project term, social media was used as a way to promote other communication channels and draw attention to key messages and online resources. The AWRI's YouTube channel proved to be a popular platform for viewing of AWRI webinars and other video resources.

The AWRI Annual Report was distributed by mail to all Australian levy payers, ensuring all levy payers were reached at least annually, even if they were not engaged with other AWRI communication channels.

AWRI *Technical Review* is now predominantly an online publication, with just a small number of hard copies printed. Each new issue of Technical Review was promoted via an *eBulletin* and through social media. Library requests for articles included in the 'Current Literature' section averaged at over 800 per year, indicating that this format is still valued by readers as a way to access the most relevant grape and wine related literature.

Wine Australia's monthly electronic newsletter and *R&D@work* column were other important avenues for communicating with the grape and wine community. The 'researcher profiles' included in *R&D@work* were a great way for readers to get to know some of the AWRI's scientists and put a human face to research outcomes.

Table 3. Metrics of audience growth between 2013 and 2017

	2013	**2017**
Growth in annual website visitor numbers	~50,000	~78,000
Growth in annual website page views	~255,000	~336,000
Growth in *eNews* subscribers (distributed every second month)	~2,600	~3,600
Growth in *eBulletin* subscribers	~2,600	~3,250
Growth in Twitter following	~1,800	~3,300
Growth in Facebook 'likes'	~185	~750

Table 4. Additional metrics of audience reach

YouTube views of AWRI webinars since November 2014	10,430
Annual report distribution	~3,700 hard copies distributed to Australian levy payers annually and electronic version available online
Articles requested following their inclusion in the 'Current Literature' section of *Technical Review*	3,304 over four years
GWRDC Innovators' Network eNewsletter/Wine Australia RD&E news (distributed every month)	~1,700 subscribers as at March 2016
GWRDC/Wine Australia R&D@work	Printed in every second issue of *Australian New Zealand Grapegrower and Winemaker*

The next steps for the AWRI's communications with stakeholders over the term of the new investment agreement with Wine Australia will include:

- Creation of new and relevant content for internal and external AWRI communication platforms. This process is led by the AWRI helpdesk team and draws on their regular contact with industry and detailed understanding of emerging industry issues.
- Maintenance and update of digital tools (e.g. apps and calculators).
- Liaison with AWRI researchers to assist with translation and packaging of research outcomes into formats suitable for different communication platforms.
- Coordination, editing and delivery of a wide range of electronic and hard copy publications for an industry audience.
- Management of the AWRI's corporate communications and branding, ensuring that all AWRI communications are of a high standard. This includes editing of reports, grant applications and other corporate documents, and management of the AWRI's media presence including promotion of outcomes from Wine Australia-funded research, development and extension activities.
- Exploration of new formats for delivery of information, drawing on social science research related to how people access information.

Project staff will also continue to work closely with Wine Australia to ensure harmonised RD&E communications for the Australian grape and wine community.

Project 5.1.3– Efficient management and administration

Executive summary

The AWRI's research, development and extension activities are underpinned and enabled by leadership and essential services provided by the Corporate Services group. The group works closely with the AWRI Board to provide an appropriate mix of strategic, commercial and scientific leadership, guidance and support to all AWRI staff, and increases the efficiency of all Wine Australia investments at the AWRI by allowing operational staff to focus on their core activities with minimal administrative and commercial demands.

While predominantly supported by Wine Australia, the costs of delivering the Corporate Services function over the four-year agreement term were significantly defrayed by contributions made by the AWRI's Commercial Services group, projects not funded by Wine Australia, or otherwise underwritten by the AWRI, which together contributed more than $3.3 million.

These services will continue to be delivered in a broadly equivalent manner from July 2017 under renewed funding arrangements between the AWRI and Wine Australia.

Highlights

Most activities of the Corporate Services group are routine in nature, supporting the broader achievements of the research, development, extension and commercial teams across the AWRI. The following achievements of the group are however worthy of specific recognition:

Progress towards RDE reform

Towards the later stages of the agreement the AWRI worked closely with Wine Australia on reforming the Australian grape and wine research, development and extension (RDE) system to improve the productivity of the system for its investors and better integrate RDE outcomes with marketing activities. Some outcomes of this work (for example, the AWRI playing a more active role in Wine Australia's market development activities) were implemented during the term of the agreement, others (such as the AWRI playing a direct role in the administration of the Regional Program) are expected to become effective from July 2017 as part of the replacement investment agreement, while further elements remain prospects for reform over the longer term.

Charitable registration and concessional tax status

The AWRI was granted charitable exemptions under payroll taxation legislation in South Australia, Victoria and Queensland (all states in which it has employees). These exemptions, together with registration as a charity with the Australian Charities and Not-for-profit Commission, and preferential status with suppliers such as Microsoft, have allowed the AWRI to further lower its cost base and deliver even greater value for its industry stakeholders.

Supporting other wine industry organisations

The AWRI assisted numerous smaller wine industry organisations through the provision of secretariat and other support services, including to the Australian Wine Industry Technical Conference Incorporated, Wine Innovation Cluster (WIC), WIC Winemaking Services, the Interwinery Analysis Group, and Bioplatforms Australia, as well as discrete events including Crush symposia, the VALO program, International Wine and Health Conference and the Yeast: Products and Discovery meeting of the Australasian Yeast Group.

Diversified investment strategy
A new investment policy was developed in order to address risks associated with concentration of investments within a single class of assts. This resulted in the appointment of an external investment manager, and the approval and implementation of a conservative investment strategy which saw a significant component of the AWRI's reserves invested across a range of new investments (all of which are quoted and actively traded on the Australian Securities Exchange), in addition to a component retained in fixed interest instruments. The enhanced returns expected to be generated by this portfolio over the longer term will enable the AWRI to further invest in critical capabilities and activities to support the Australian grape and wine industry.

Development and implementation of an IT Strategic Plan
In 2015 an IT Strategic Plan was developed, setting out a roadmap for step-changes in IT infrastructure, service delivery and knowledge management within the AWRI over the subsequent three years in the first instance. The implementation of that plan is substantially progressed but remains ongoing, financially supported by the Strategic IT reserve previously created by the AWRI Board. As a knowledge organisation, the enhancements to the AWRI's IT environment achieved through this plan add considerable value to almost every aspect of the organisation's operations.

New Director election process
Following extensive negotiations with the Department of Agriculture and Water Resources and amendments to the AWRI's constitution, an electronic ballot process was developed and used for the first time in October 2014 to elect Directors to the AWRI Board. This development simplifies the voting process for levy payers, encourages greater participation in voting, and greatly improves the efficiency of administering elections.

Strengthening of workplace health and safety (WHS) systems
Partly in response to shifts in legislative requirements, the AWRI reviewed and strengthened various aspects of its WHS management processes, resulting in the renewal of the AWRI's WHS policy, education sessions conducted for the AWRI's employees and Directors, and enhanced regular reporting to the AWRI Board and senior management. An external WHS review was completed by an industry expert, leading to a range specific WHS initiatives including a contractor management framework, regular defensive driver training sessions, improved training record management and a greater focus on chemical management. More recent efforts have focused on the promotion of mental well-being.

Renewed focus on the AWRI's 'Employer of Choice' program
The AWRI's 'Employer of Choice' program was substantially refreshed and now features an increased focus on health and well-being, with specific initiatives including 'healthy heart' assessments, skin cancer checks, influenza vaccinations, subsidised Pilates/yoga classes, and access to fresh fruit and freshly ground coffee, with other new benefits including a workplace banking program, Microsoft products for home use, and access to preferential wine programs in conjunction with industry partners. It became evident that sufficient access to professional development opportunities represents an important element in ensuring the AWRI's status as an employer of choice, and such access was greatly enhanced through availability of a broader range of financial support, most significantly from the AWRI's Directors who throughout the agreement elected for the organisation to retain many of their directorship fees to support such activities. These changes were significantly informed by annual Human Resources surveys, introduced to monitor employee satisfaction, cultural metrics and various aspects of the AWRI's employer of choice status, as well as capturing employee input in developing and refining workplace conditions and benefits.

Strengthened risk management framework
The AWRI revised and strengthened its risk management framework, encompassing a substantial overhaul of its Risk Oversight and Management Policy as well as the establishment and maintenance of an operational risk register and strategic risk register. Both registers are subject to periodic rounds of review by the AWRI's management team and Board, and risk is now included as a standing agenda item in all senior management meetings.

Objectives
This project will support the activities of the AWRI operational staff through the efficient and effective provision of services including:

- Leadership and administration
- Business development
- Contract management
- Finance and accounting
- Human resources
- Information technology
- Operations management
- Risk management, including workplace health and safety
- Corporate governance.

Outcome and conclusion
The Corporate Services group now operates with a staffing complement around a third less compared to a decade prior, despite a modest increase to the number of operational staff and substantial growth in total revenue over this time. Both internal benchmarking and external feedback indicate that the cost base of the AWRI's Corporate Services group is reflective of Australian and international best practice. Despite constrained resourcing, the level of service provided by Corporate Services across the AWRI and to other wine industry organisations is highly regarded – the positive working environment (naturally, owing to a range of factors) is well reflected in the results of annual staff surveys, which routinely show well over 90% of respondents confirming that 'all things considered, the AWRI is a great place to work'.