# Resources for water reuse and recycling in the wine sector

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# Who cares about winery waste water?

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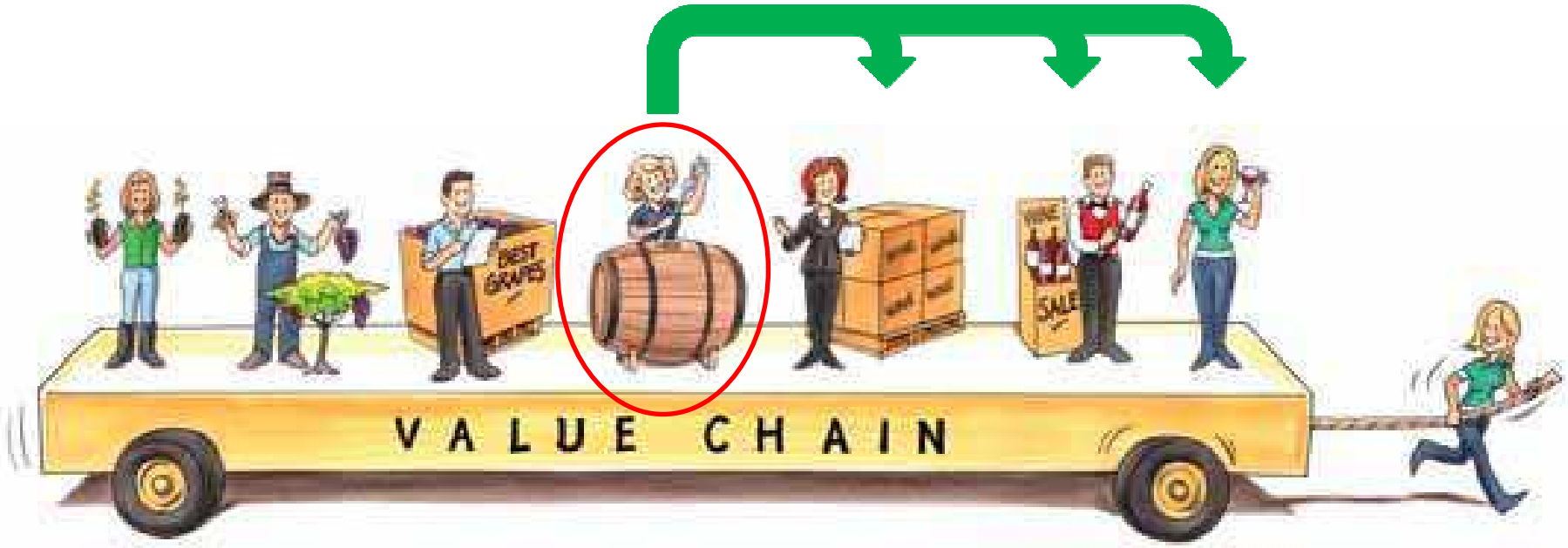

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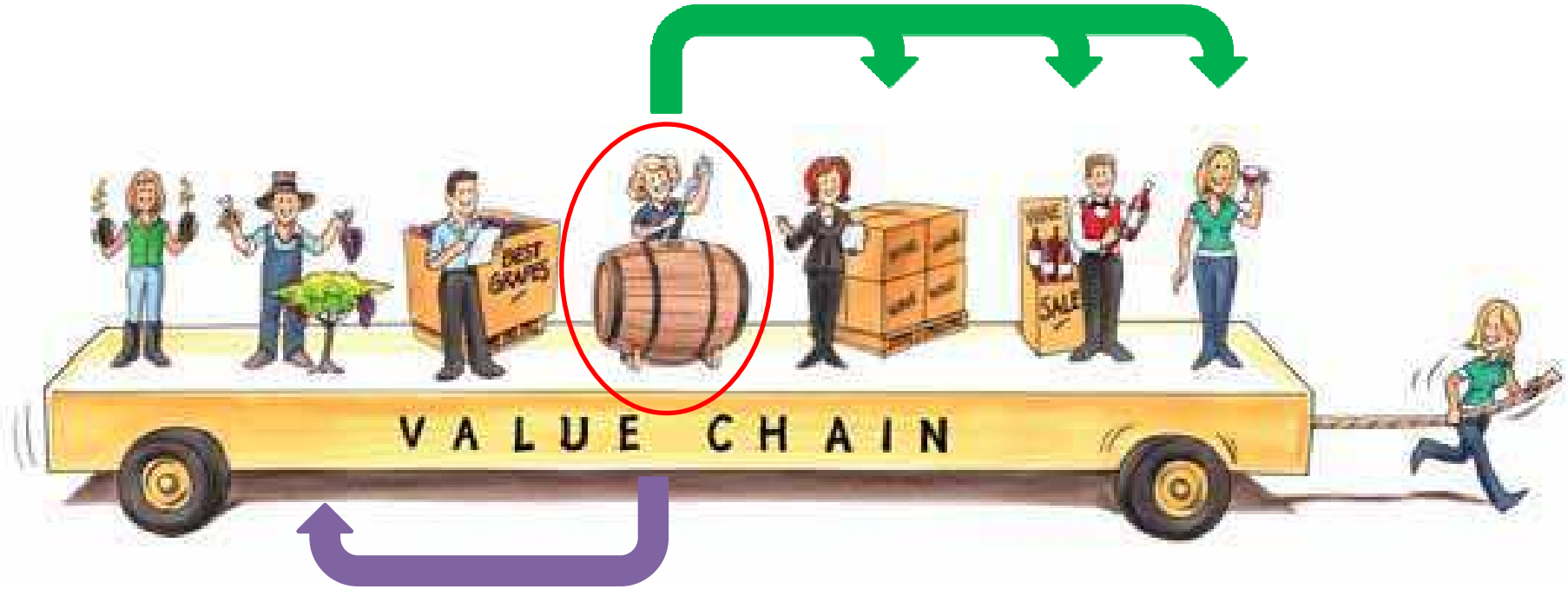


# A large range in performance

- Water use:
  - 0.4-11.6 KL/t crush
  - Bottling has a large impact
- Salt
  - <1,000-5,000 EC units
- As much variation within different wineries of similar size as across wineries of different size

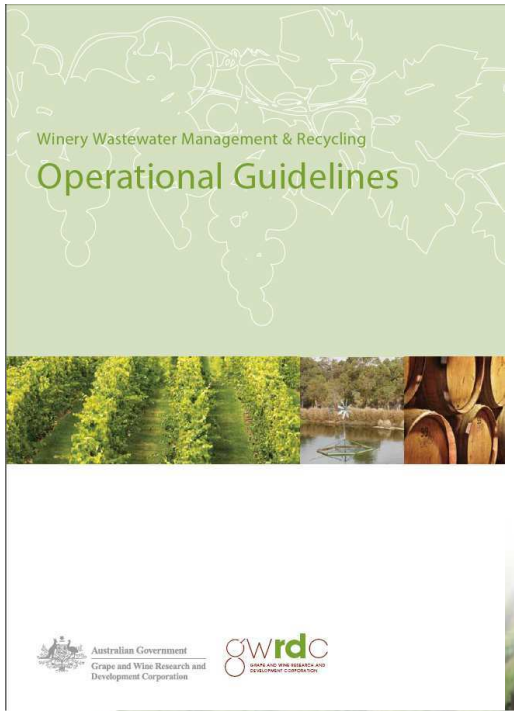
= room for improvement

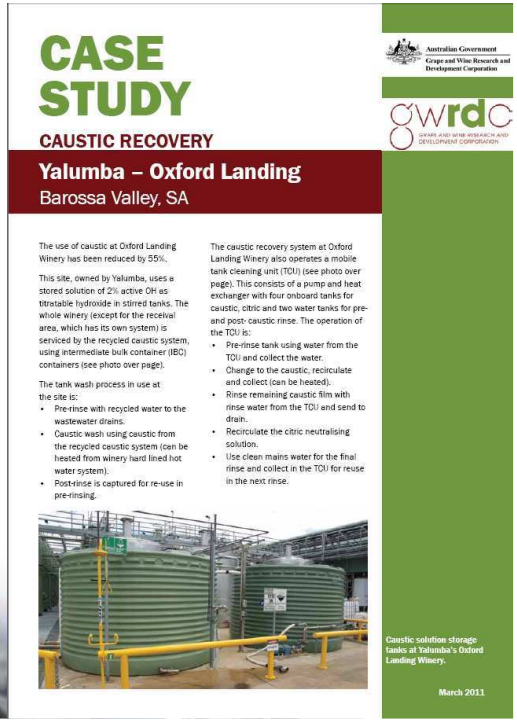
# Problem or Opportunity?

- Wastes include unused grapes, juice and wine = lost profit and increased cost to treat
- Waste = a potential profit centre
- Avoid environmental harm and regulation
- Generate and access ‘fit for purpose’ water
- Retain industry and brand image

# Product Launch

- A new set of resources for water reuse and recycling in the wine sector





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# Winery Wastewater Products

- Fact Sheets
  - What information is available
  - Key principles for wineries
  - Key principles for vineyards

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# Winery Wastewater Products

Winery Wastewater Management & Recycling

## Information products

Australian Government
Grape and Wine Research and Development Corporation

Winery Wastewater Management & Recycling

## Key principles for wineries

Australian Government
Grape and Wine Research and Development Corporation

Winery Wastewater Management & Recycling

## Key principles for vineyards

Australian Government
Grape and Wine Research and Development Corporation

# Winery Wastewater Products

- Business fundamentals
  - an overview, outlining the fit between winery wastewater management and operations in the winery and vineyard

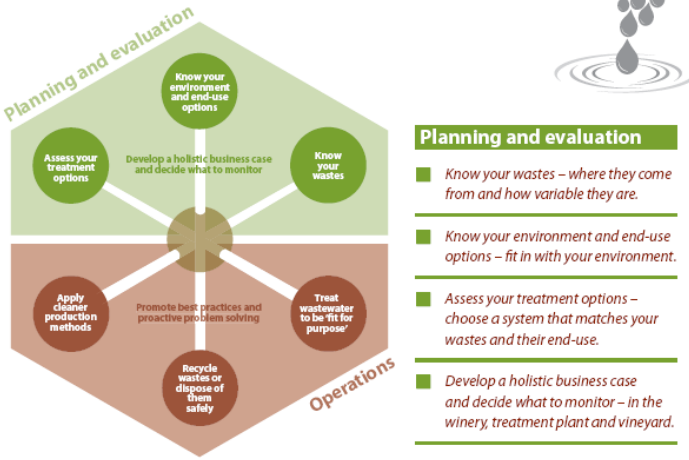
# Winery Water Products

Winery Wastewater Management & Recycling

## Business Fundamentals

Australian Government
Grape and Wine Research and Development Corporation

## Key messages




### Planning and evaluation

- *Know your wastes – where they come from and how variable they are.*
- *Know your environment and end-use options – fit in with your environment.*
- *Assess your treatment options – choose a system that matches your wastes and their end-use.*
- *Develop a holistic business case and decide what to monitor – in the winery, treatment plant and vineyard.*

### Operations

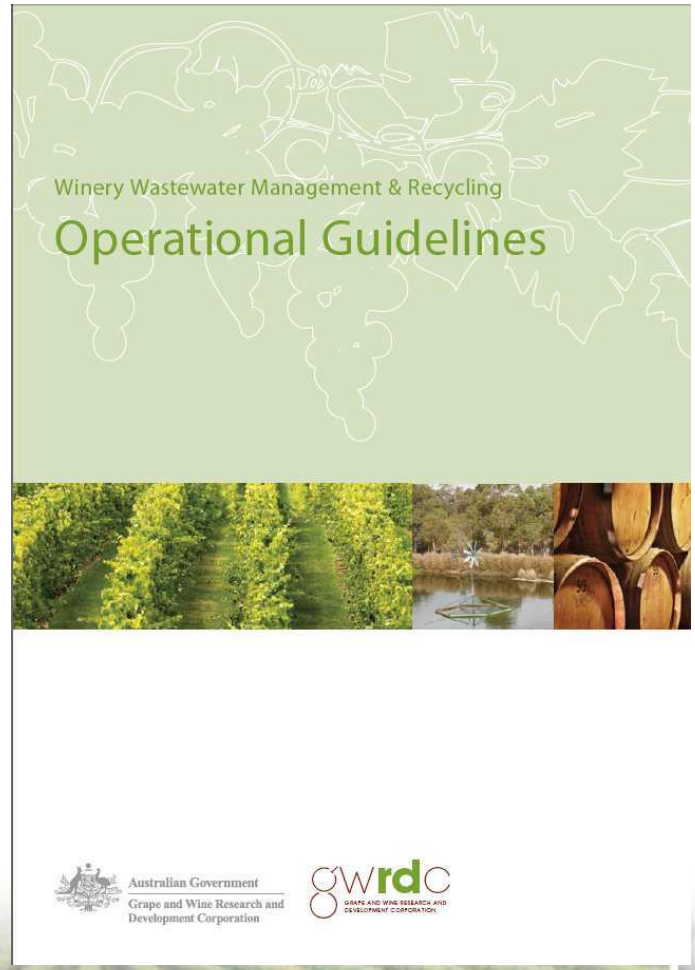
- *Apply cleaner production methods – reduce, recycle and segregate wastewater at its source for easier treatment, more efficient wine making and greater profit.*
- *Treat wastewater to be 'fit for purpose' – get it to the standard required for its next-use.*
- *Recycle wastes or dispose of them safely – get value from wastes and reduce the risk of environmental harm by recycling, e.g. recycled water can be a valuable asset for irrigation or industrial use.*
- *Promote best practices and proactive problem solving - train and empower staff for low-cost improvements and solve problems early. Diagnose the specific causes of individual problems but seek integrated solutions and, if in doubt, consult an expert.*

These key messages are discussed in detail in the Operational Guidelines, available at **www.gwrdc.gov.au/www**

# Winery Wastewater Products

- Operational guidelines
  - A detailed guide, presenting information to assist the planning and management of winery wastewater treatment and its disposal or recycling

# Winery Wastewater Products



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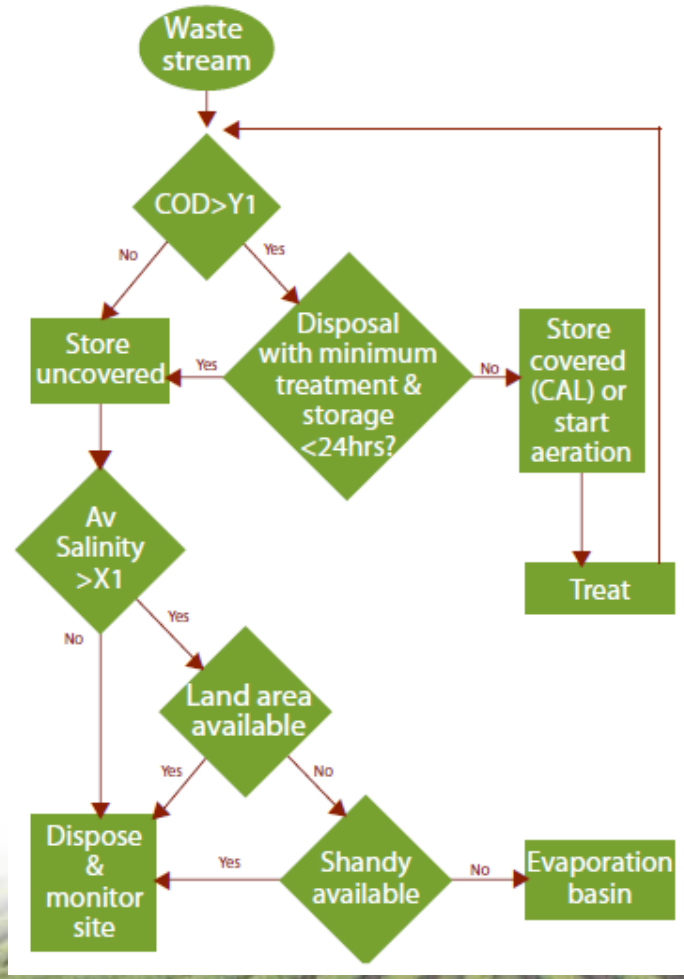
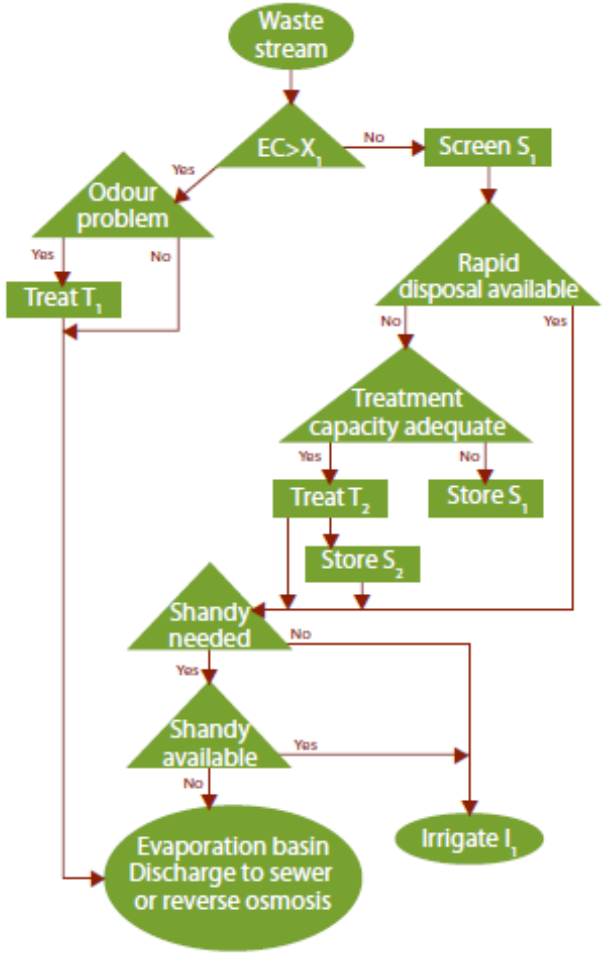
# Decision Support Tools



# Risk Assessment Frameworks

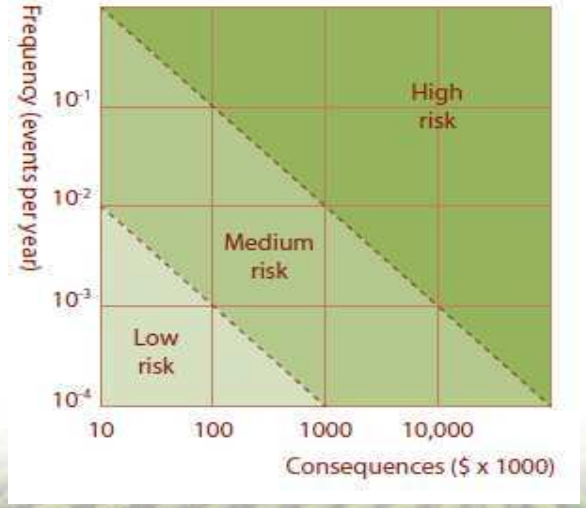



Table 7: Qualitative measures of likelihood [126]

| *Level* | *Descriptor* | *Example description* |
|---|---|---|
| A | Rare | May occur only in exceptional circumstances. May occur once in 100 years |
| B | Unlikely | Could occur within 20 years or in unusual circumstances |
| C | Possible | Might occur or should be expected to occur within a 5- to 10-year period |
| D | Likely | Will probably occur within a 1- to 5-year period |
| E | Almost certain | Is expected to occur with a probability of multiple occurrences within a year. |

Table 8: Qualitative measures of consequence or impact [126]

| *Level* | *Descriptor* | *Example description* |
|---|---|---|
| 1 | Insignificant | Insignificant impact or not detectable |
| 2 | Minor | Health—Minor impact for small population<br>Environment—Potentially harmful to local ecosystem with local impacts contained to on-site |
| 3 | Moderate | Health—Minor impact for large population<br>Environment—Potentially harmful to regional ecosystem with local impacts primarily contained onsite |
| 4 | Major | Health—Major impact for small population<br>Environment—Potentially lethal to local ecosystem; predominantly local, but potential for offsite impacts |
| 5 | Catastrophic | Health—Major impacts for large population<br>Environment—Potentially lethal to regional ecosystem or threatened species; widespread on-site and offsite impacts |

Table 9: Qualitative risk estimation [126]

| *Likelihood* \ *Consequences* | *1-Insignificant* | *2-Minor* | *3-Moderate* | *4-Major* | *5-Catastrophic* |
|---|---|---|---|---|---|
| *A Rare* | Low | Low | Low | High | High |
| *B Unlikely* | Low | Low | Moderate | High | Very high |
| *C Possible* | Low | Moderate | High | Very high | Very high |
| *D Likely* | Low | Moderate | High | Very high | Very high |
| *E Almost Certain* | Low | Moderate | High | Very high | Very high |

# Winery Wastewater Products

- Resources kit on the web
  - Calculators
  - Case studies
  - Fact Sheets
  - Numerous references about wastewater and recycling

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[www.gwrdc.com.au/www](http://www.gwrdc.com.au/www)

# Winery Wastewater Management & Recycling



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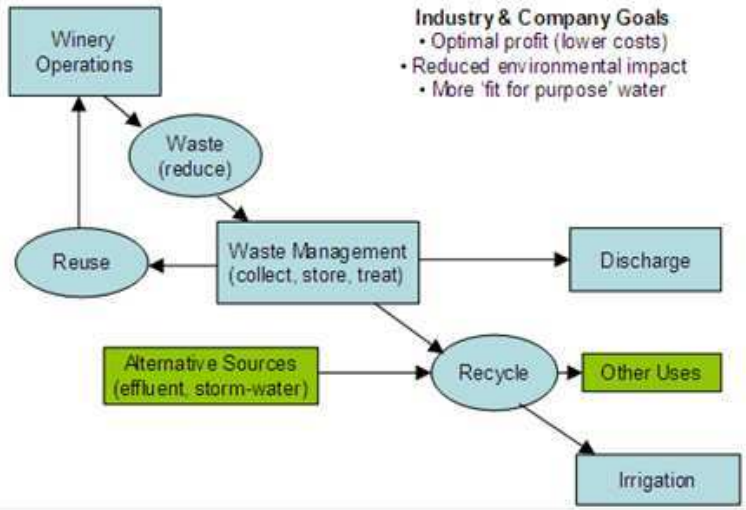
## Winery Wastewater Management & Recycling

### Background

Recognising that winery wastewater management and recycling are important issues in the grape and wine industry, GWRDC has commissioned research and communications projects to develop, synthesise and share knowledge about better wastewater management, water reuse and recycling.

There is information available on winery wastewater treatment, recycling the treated water in vineyards, using other sources of recycled water and other forms of discharge.

Access the Resource Kit...



## Brochures

- Information products - a summary of the project and the information products available,
  B1_Product list (373 kb)
- Key principles for wineries - additional overview information for in the winery,
  B2_Winery (413 kb)
- Key principles for vineyards - additional overview information for in the vineyard.
  B3_Irrigation (462 kb)

## Reports

- Business Fundamentals - a booklet highlighting the business issues associated with winery wastewater management and the key principles to govern its management in the winery, treatment plant and vineyard.
  Business Fundamentals (911 kb)
- Operational Guidelines - a technical reference explaining key principles and providing directions to other sources of information and expertise.
  Operational Guidelines (3051 kb)

## Resources

- Resources Kit - an easy to navigate electronic library of reports, fact sheets, case studies and spreadsheet calculators. The Kit may be accessed live from this page or downloaded as a ZIP file to be saved onto a computer for immediate use when internet access is not available.
  Access the Online Resouce Kit
- Overview PowerPoint Presentation - a summary of the key principles to winery wastewater management and recycling (as presented in Business Fundamentals), available here as a PDF
  WWW Overview (358 kb)
- Technical PowerPoint Presentation - a summary of the important themes presented in the Operational Guidelines, including some graphics and tables, available here as a PDF.
  WWW Technical (915 kb)

Current versions of the two presentations are available from GWRDC as PowerPoint files by emailing:
gwrdc@gwrdc.com.au

# Winery Wastewater Management & Recycling



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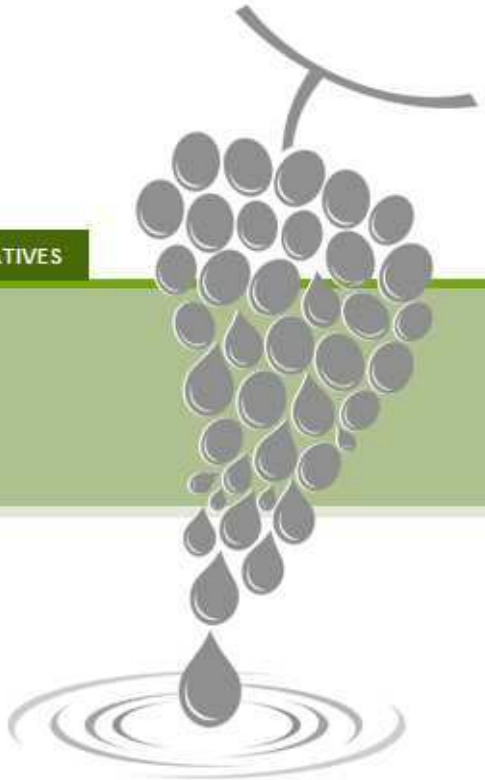

The following resource material contains links to files in "PDF" and "XSL" format. You can download the free free pdf reader from here

## Contents


- Introduction
- Planning & evaluation
- Waste streams
- Risk management.
- Monitoring & evaluation
- Business Considerations
- Management options
- Summary
- Cleaner Production
- Fit for Purpose Treatment
- Discharge and Recycling - irrigation
- Problem Solving..
- About this product


**Download the Resource Kit...**

## DOWNLOAD INSTRUCTIONS

DOWNLOAD: Left click 'Download the Resources Kit'
SAVE: Left click Save, select a location on your computer (e.g. Desktop) and Save
OPEN: Left click the saved folder and access

## Case Studies

### Reduce

Water use and wine losses can be reduced.

- Whole of winery
- Transfers

### Segregate

Segregation simplifies treatment and enhances re-use options.

- Segregation

### Recycle

Water and cleaning agents may be recycled.

- Crusher water
- Vacuum pump water
- Caustic re-use - transportable container
- Caustic reuse - mobile tank  cleaning unit

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# Fit for Purpose Treatment

## References

### Ponds

A WA Winewatch Fact Sheet with information on planning and managing treatment ponds.

- Ponds and lagoons

# Environmental Rating Index - Winery

| | |
|---|---|
| **Your Environmental score out of 10** | **7.1** |
| **Best Practice score out of 10** | **7.2** |

| | | Your Sub-category | |
|---|---|---|---|
| **Variable** | **Enter your value** | **Environment** | **Practice** |
| **General** | | **n/a** | **n/a** |
| Winery size (tonnes/year) | 40000 | | |
| Do you bottle on site | No | | |
| EC inflow water (microS/M) | 700 | | |
| What percentage of the wine is red wine? | 75% | | |
| **Processing** | | **5.1** | **5.8** |
| Typical batch size (tonnes) | 199 | | |
| Number of barrels washed | 20 | | |
| Number of tranfers in red wine process | 7 | | |
| Number of tranfers in white wine process | 8 | | |
| Recycling of cleaning agents | Yes | | |
| Diatomaceous earth (kg/year) | 50 | | |
| DE Fate | Recovery | | |
| Do you use perlite for filtration | Yes | | |
| COD before treament (mg/L) | 6000 | | |
| **Chemical usage** | | **9.9** | **9.9** |
| NaOH/Caustic (kg dry product equivalent) | 4000 | | |
| KOH/Cleanskin (kg dry product equivalent) | 200 | | |
| Other cleaning agents | Yes | | |
| **Water management** | | **6.0** | **6.0** |
| Water use (kL) | 38000 | | |
| Dry sweeping of winery floor | 90% | | |
| High pressure washing of barrels and equipment | 100% | | |
| Nozzles on hoses | 100% | | |
| Pigging | 100% | | |

# CASE STUDY

## CAUSTIC RECOVERY

## Yalumba – Oxford Landing

Barossa Valley, SA

The use of caustic at Oxford Landing Winery has been reduced by 55%.

This site, owned by Yalumba, uses a stored solution of 2% active OH as titratable hydroxide in stirred tanks. The whole winery (except for the receival area, which has its own system) is serviced by the recycled caustic system, using intermediate bulk container (IBC) containers (see photo over page).

The tank wash process in use at the site is:

- Pre-rinse with recycled water to the wastewater drains.
- Caustic wash using caustic from the recycled caustic system (can be heated from winery hard lined hot water system).
- Post-rinse is captured for re-use in pre-rinsing.

The caustic recovery system at Oxford Landing Winery also operates a mobile tank cleaning unit (TCU) (see photo over page). This consists of a pump and heat exchanger with four onboard tanks for caustic, citric and two water tanks for pre- and post- caustic rinse. The operation of the TCU is:

- Pre-rinse tank using water from the TCU and collect the water.
- Change to the caustic, recirculate and collect (can be heated).
- Rinse remaining caustic film with rinse water from the TCU and send to drain.
- Recirculate the citric neutralising solution.
- Use clean mains water for the final rinse and collect in the TCU for reuse in the next rinse.

Caustic solution storage tanks at Yalumba's Oxford Landing Winery.

March 2011

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Caustic wash using recycled caustic in progress at Oxford Landing Winery.

Mobile tank cleaning unit in use at Oxford Landing.

### Reference

Ide, J. (2007) *Target 1:1 Wine to Water Ratio. Towards Best Practice Through Innovation in Winery Processing.* Australian Society of Viticulture and Oenology Seminar Proceedings.

### Acknowledgement

John Ide, Luke Wilson, Ken Johnson Yalumba Wines

Prepared by DO Consulting for Peter R Day Resource Strategies
Winery Wastewater Management & Recycling – Communications Project

# What next?

- Media campaign to raise awareness
- By August AWRI will have developed:
  - Research to Practise module
  - Road show materials

# Take home message

- Raising awareness of Winery Wastewater and the latest suite of tools available to manage it

www.gwrdc.com.au/www

# Acknowledgements


- Funders
  - Grapegrowers and winemakers of Australia, Commonwealth Government
- Project Team
  - Peter Day, Julian Cribb, Anne Maree-Boland, Matt Shanahan, Darren Oemcke, Anu Kumar, Geoff Cowey, Karl Forsythe, Anne Burgi
- Industry Reference Group
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