CV-SALTS Subcommittee Meeting

Central Valley Management Practice Subcommittee

When:       Wednesday February 22, 2012 from 8:30 AM to 10:00 AM
Location:   Conference Call only

Conference #: (218) 339-4600 Participant Code: 927571#

Agenda

1. Welcome and Introductions Co-Chairs Rob Neenan/Parry Klassen and Linda Dorn
2. Regional Board Comments on the MP process
3. Overview of Practice Nominations received for reviews
   a. Dairy – Paul Martin - Attached
   b. What is the schedule for the others in Pilot Pg 11 Attachment 2?
   c. Review process and industry segments
   d. Identify and prioritize other needs
   e. Revised Wine and Food Processing Revised Forms – Attached March 8 at TAC for Toolbox
4. Next Meeting/Call March _____ at ________
We would like to offer some suggestions regarding how to structure the process for reviewing CV-SALTS management practice nominations. Although a thorough review of proposed BMP’s is warranted, it will be important to recognize that the BMP Subcommittee, Technical Committee, Executive Committee, and stakeholders have limited time and resources to devote to reviewing and commenting on nomination forms. It seems to be the consensus that the toolbox will expand and improve over time, but we need to get something in the toolbox to get the process rolling. The committee chairs will have to strike a fine balance between understanding the details of a proposal and clarifying every possible detail. Regarding the approval process, we have the following suggestions:

- Approval by the BMP subcommittee requires a simple majority of the members present and voting.
- Approval by the Technical Committee will require a majority of the members present. In most cases, the committee should render its decision within 30 days of receiving the nomination form.
- Approval by the Executive Committee requires a simple majority of the members present and should be taken as a consent item unless there are well defined objections which must be communicated to the Executive Committee Chair in advance of the meeting. The objective here is not to revisit the same issues in three separate venues. The Executive Committee should trust the Technical Committee to have done its job. In most cases, the committee should render its decision within 30 days of receiving the nomination form. The toolbox will be presented to the Regional Board for approval.
- When reviewing nominations regarding BMP manuals (e.g. Wine Institute, CLFP, other) we suggest that the key issue is whether the approach should be viewed as a validated BMP. While the manuals include a large number of individual practices that may evolve over time, a holistic approach to managing wastewater essentially will not. Some of the practices may be viewed as validated or developing, however, the approach should be viewed as validated if it has been vetted.

Rob Neenan
California League of Food Processors
CV-SALTS Management Practice Nomination Form

This Nomination Form includes limited instructions for the completion of the form. Initial reviewer instructions are included the Subcommittee Screening Document and will be further developed in future work. The nominator of the practice will provide all available information for the practice and may include estimated information to be verified if noted in the text. Should additional information be required to complete the review it will be requested.

In the pilot phase additional standardization of requested information on the management practices will likely be developed. Additionally review of the practice implementation and effect on overall salinity and nitrate management in the Central Valley may be further assessed at a future date. Submittal of management practices for inclusion into the toolbox should answer the following questions with the best information available to the submitter. Please annotate responses with references and source documents, list these under Question 7.

A. Is this nomination for a plan or programmatic activity as opposed to a field implementation practice or technology? □ YES XXX□ NO
   if yes, complete the following sections as appropriate, if no proceed to question 1.

1. Title – Please provide a short descriptive tile for the practice

   Reducing salts in dairy rations

2. Description – Please provide a short (1-2 paragraphs) description of the practice/technologies to summarize the practice, industries and important information

   Dairy animals of all ages and stages of production and reproduction have a certain need for salt in their diet. The requirement will vary depending on the status of the animal and is published by the National Research Council (NRC) Committee on Animal Nutrition, Nutrient Requirements of Dairy Cattle: Seventh Revised Edition, 2001. However, some dairy producers feed more than is truly needed by the animal, especially Sodium Bicarbonate and Sodium Chloride as those two salts may often be offered to the animals in a free-choice fashion. Therefore, if a producer were to limit salt feeding to that recommended by the NRC and avoid free-choice feeding, he would be able to quantify exactly how much supplemental salt was being added to the salts delivered to the animals naturally in the feed ingredients. He should be able to quantify the actual reduction by comparing purchases before and after.

   The same will hold true for nitrate reductions, albeit not as directly. Protein requirements of dairy cattle are also published by the NRC. Nitrogen is a key ingredient in the protein molecules, so controlling the feeding of protein to the NRC guidelines can reduce the nitrogen excreted in the manure and therefore less N will be available for conversion to nitrate. Protein is one of the more
expensive feed ingredients; therefore, while ensuring the animals get the proper amount of protein, feeding close to the NRC recommendations can be a win-win control measure.

3. **Constituent Salts or Nutrients Managed** – Identify the primary and secondary constituents (EC TDS, Nitrates other nutrients etc) that are treated, reduced or managed by this practice and how they are reduced or managed.

   Nitrate, Sodium Chloride, Sodium Bicarbonate (Bicarb)

4. **Applicability** – Describe the documented application of this practice, where how and how extensively the practice has been implemented what conditions or circumstances limit the application of this practice. Industry specific application and limitations may be developed and show as Attachment A. Such limitations may include industry, region, soil type, media or other limits.

   The practice of feeding close to NRC recommendations, especially for protein, is practiced by most dairy producers, but is not currently applied from a salt management standpoint. Since the dairy water regulation limits the amount of N that can be applied to soils to 1.4 times the plant uptake and implementation of the new rules is underway, opportunity for reductions exists. On the other hand, the free choice feeding of Bicarb is very strongly advocated by those who believe in it. It is widely used as a rumen buffer to avoid acidosis in today’s high producing cows. Bovine antacid if you will. It will be difficult to change the practice and professional animal nutritionists will be needed to avoid adverse animal impacts – as well as to convince producers to use this strategy.

5. **Practice Benefits and Impacts** – Describe the documented benefits of implementing the practice (what does it do) including any negative impacts of implementation (including cross media/air/energy/supply etc)

   THIS SEEMS VERY SIMILAR TO #4 and #5

   The practice eliminates the excretion of excessive salts and nitrogen

6. **Effectiveness Documentation** – 6 a. Describe the documented effectiveness of implementing the practice on the target constituents. Whenever possible quantify the effeteness of the practice as completely as possible. 6 b. Summarize and critical factors or limitations to effectiveness. If documentation of a cost benefits study please reference it below in 7.

   a. Less deposition is documented by less purchases of salt and Bicarb.

   b. Additionally, the balancing of salt and N using feeding software will show the effectiveness of the mitigation measure.
c. Producer acceptance is the critical control point

7. **Supporting studies, Research and Source Documents** – List all documents referenced in responses above or other documents that provide information evidence or background on the technology or practice and electronic availability.


   http://www.nap.edu/openbook.php?isbn=0309069971

8. **Implementation**

8.1 **Costs** - Summarize and document costs for implementation of this practice both Capital and Annual operations and maintenance costs. If possible, express in industry relevant units of $/acre foot or $/million gallons, $/ton or etc. to allow comparison with other practices.

   Costs can be calculated by pricing out the feed ingredients. This is a normal feature of the ration building software. The elimination of free-choice feeding will be a direct reduction in cost – depending on how much is no longer being used. Current price for Sodium Bicarbonate is $12.38/50 lbs.

8.1.1 **Status and Potential** – Describe the Historic and current level of implementation, at the level know. List any information known on the potential full implementation of this practice

   Most dairy producer do or have done for them by a consultant, a formal ration building specific for the various animals they own. Most could reduce the Bicarb being used and could manage protein more closely. See # 4 for the same answer here.

8.1.2 **Monitoring Documentation** – Describe the level of monitoring and documentation available to support the practice. If known, what additional monitoring is needed? If known what level of monitoring will be needed at implementation.

   The monitoring of salt, bicarb and protein in the dairy ration can be monitored by presentation of the “feed sheets,” which are the documents used by the producer to measure out the various feed ingredients. The elimination of free-choice feeding will be visible from an inspection of the facility.
9. **Other Regulatory Approvals or Requirements** – Has this practice been approved or required by any other government agency or independent standard setting body, if so summarize this and any information you may have on the process and status of approvals. Indicate what level of review if required for that regulatory requirement or guidance?

Dairies are required to prepare and implement a Nutrient Management Plan to hold the Nitrogen application to a limit of 1.4 times plant uptake. They must test their manure, soil and plant tissue. A universal salt management plan has been prepared and producers are offered a menu of practices to choose from. This practice (Reducing salts in dairy rations) is selected from that menu).

I THINK WE COULD GET THIS DONE BY ANSWERING THE 4 QUESTIONS IN THE STANDARDS – THIS FORM SEEMS QUITE REPITIOUS TO ME.
Standards and information repeated for the Nominator from the Subcommittee screening document.

4 Standards
Screening of practices to include in the toolbox requires the review of practices for effectiveness in reducing salt and nitrate in the system. The Screening tool uses the following standards as documented by the proposer of the practice for screening.

4.1 Technical Effectiveness – does it work?
Demonstrating technical effectiveness is critical for a management practice to be implemented and accepted by industry or communities. Evidence of technical effectiveness is demonstrated by lab, pilot and demonstration studies and evaluation of the studies. Does the documentation indicate strongly that the practice removes, destroys, manages or otherwise reduce any negative impacts to beneficial uses associated with its presence and assist with compliance or improvement of the waters of the valley.

4.2 Implementability – can it be used broadly?
Implementability includes both feasibility as well as well as broad applicability. In most cases, satisfactory implementability is demonstrated by documentation of the use of the management practice by a significant portion of the sector and considers other issues related to cost and efficiency covered in other sections. Implementability of management practices may consider cross-media impacts, and look for management practices that reduce any detrimental effect to other media while achieving the goals of the management practice. These should be identified and any impact quantified if possible.

4.3 Cost effectiveness – is it economic to implement today?
Cost effectiveness is critical to being an effective best practice. Low efficiency costly practices are not likely to be broadly implemented. High value practices will likely be implemented with minimal regulatory requirements. The assessment of effectiveness related to cost is not always a simple as dollars per ton of salt or pound of nitrate, often costs include a technically trained workforce to implement, operate and maintain the practices. Additionally, this may vary across industry and across regions. The cost effectiveness should strive to take into account all benefits to the entity implementing the practice as well as direct and indirect cost of implementation. In other words not just the technology but the impacts on quality of the product or preparation or disposal of wastes and other potential cross media impacts. These costs should evaluate life cycle benefits and costs of implementations and societal and environmental benefits and costs, when possible.

4.4 Monitoring – proving it works?
Both the ability to monitor as well as the length and breadth of the monitoring history will be reviewed as a part of screening. Monitoring during the implementation stage may be greater in developing practices than fully validated practices that have already completed it.
Nomination Form Attachment 1

Applicability checklist by Industry, Processes or Region

The following industries, processes and regions may have specific screening requirements that the Subcommittee will develop in the future.

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<td>5. WWTP</td>
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<td>14. OTHERS</td>
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CV-SALTS Management Practice Subcommittee

Effective Management Practices Evaluation for Salt and Nitrate

(Version 10 - Approved November 17, 2011, with minor changes and January 24, 2012 committee changes)

The Management Practice Subcommittee’s (Subcommittee) charter is to assist CV-SALTS to improve salt and nitrate management through industry and community management practices, identifying and screening the management practices to improve implementation and monitoring of results. This document is part of the Management Practice Document Review developed in 2010 and 2011. This approach and process draw from others used to review stormwater\(^1\) and water conservation practice and criteria.\(^2\)

1 Management Practice Review Approach

At the recommendation of the CV-SALTS Committees or in accordance with the sector schedule below the Subcommittee will evaluate management practices in accordance with the following process and standards. These standards will be used to screen management practices for inclusion in a “toolbox” of Effective or Beneficial Management Practices, generally referred to as Management Practices (MPs) in this document. These MPs have been vetted in the CV-SALTS process to assist others in reducing salinity and nitrate. This “toolbox” of MPs provides a range of new and existing MP options, their documented effectiveness, expected reductions, current status of implementation and cost when available. The listed practices provide early implementation opportunities and the basis to recommend reasonable implementation requirements for the Salt and Nitrate Management Plan for the Central Valley including the related Basin Plan Amendment. In addition, the “toolbox” identifies new technology and innovative practices that may provide further improvement and flexibility.

1.1 Products

A brief description of the products of the Subcommittee’s efforts is described in the following sections.

1.1.1 Screening Tool

The Subcommittee uses the enclosed procedure and standards along with a related Nomination Form to evaluate the presence of adequate evidence and information to characterize the utility and efficacy of MP’s to reduce or manage salt components and nitrates. The purpose of the screening tool and standards is to assist in the review of the scientific and monitoring documentation, not to perform that assessment or certify a practice for purposes other than those evaluated. The use of the screening tool requires that the Subcommittee (or help available to it) be able to understand the information provided

\(^1\) International Stormwater BMP Database Performance evaluation
http://www.bmpdatabase.org/MonitoringEval.htm#PerformanceEval

not necessarily be experts in the scientific area or the region it is being applied. The screening tool Nomination Form will result in practices added to the “toolbox”. The screening process will rely on groups, industries, and practice proponents to nominate and complete the nomination form and supporting information for evaluation. This process will be described in the sections below.

1.1.2 Toolbox of Practices
The Management Practice Subcommittee will utilize volunteers and technical support available to it to review and evaluate MPs that reduce salt constituents and nitrates of relevance to the Central Valley. Initially the “toolbox” may be a reviewed set of electronic documents for each practice with supporting materials. Later, as the number and diversity of practices increase, the “toolbox” format will likely need to become more sophisticated to facilitate its use. The “toolbox” and the practices were extensively discussed among the Subcommittee members.

The Subcommittee identified the best use of the “toolbox” as a source of documented and validated practices that regulated entities could use to develop their management plans for salinity and nitrate for both voluntary action and Regional Board consideration as part of the permitees plan or other regulatory programs.

A factsheet or summary technical document should be prepared for practices accepted into the “toolbox” so that potential users can easily evaluate the practices for their own use. Other examples of “toolbox” development include the Stormwater BMP Manual\(^3\) and the Salinity Guideline\(^4\). The Subcommittee however wants to ensure that users of the “toolbox” understand the need to evaluate any practice for their own application. Additionally, regulatory programs and permits should not inappropriately default to the “toolbox” as a requirement for any specific facility or location. Dischargers will be able to take advantage of the information developed on the treatment and control options provided in the “toolbox”, but the “toolbox” will not limit their options. Any discharger that wants to use an alternative approach to manage salt or nitrate will be able to submit information that will be evaluated by the same process the committee followed when creating the “toolbox”. This consistency will provide the discharger and Regional Board a clear understanding of how nominated practices perform relative to practices documented in the “toolbox”.

2 Process
The process for documenting new or developing practices and validated practices differ. The new and developing and validated practices are described in section 3 of this document. The process for each is summarized below (additional details or modifications may be made by the Subcommittee). After a call for nominations of practices by an industry, the practices will be evaluated for acceptance in the “toolbox” with the screening tool, or further information and study may be requested and developed, as needed. The Subcommittee may then recommend to the Executive Committee that the practice be included (or not) in the toolbox.


The Subcommittee may request support from consulting entities where support is needed to develop documentation or to assist with review. The Subcommittee will also propose projects for grant support or coordination with other efforts where this is consistent with MP development goals.

### 2.1 Sector Review Schedule

The Pilot Salt and Nitrate Source Implementation Study\(^5\) identified sources of salt. Each significant source by industry sector of salt shown in the report will be scheduled for review. Review priority will be based on salt and nitrate loading that was reported in the pilot implementation study. This initial list and prioritization is intended as a guideline, and should not result in exclusion of unlisted sources. The list will be reviewed and revised as needed by the Subcommittee. Industries or communities which have prepared MP documents may request to be reviewed ahead of schedule, subject to Subcommittee approval. The Subcommittee will establish the final schedule for review of practices and technologies in

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each industry sector, at a pace that is manageable but that reviews MPs from significant sources before developing the implementation portion of the Salt and Nitrate Management Plan. The Call Dates shown below are set to allow 2-3 months for preparation and review of the MPs before the next is called. As processes are reviewed, the common MPs will be reviewed for consistent assumptions and completeness. When a practice’s effectiveness is based on readily-available information, it may be recommended for approval by the Executive Committee with less rigorous review or scientific study. The Water Boards will assist with the calls for practices via their Lyris List for CV-SALTS and other related groups.

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<th>Source</th>
<th>Call Date</th>
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<tr>
<td>1. Pilot Implementation candidates-Significant sources</td>
<td>November 2011</td>
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<td>2. Surface Drinking and Irrigation Water</td>
<td>January 2012</td>
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<td>4. Irrigated agriculture/Fertilizer</td>
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<td>5. Non-point source/stormwater</td>
<td>May 2012</td>
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<td>6. Wetlands</td>
<td>May 2012</td>
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<td>7. Wastewater/Industrial dischargers</td>
<td>May 2012</td>
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<td>8. Food processing industries</td>
<td>October 2012</td>
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<td>10. Dairy and CAFO</td>
<td>October 2012</td>
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<td>11. Water treatment and softening</td>
<td>January 2013</td>
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<td>12. Septic tank discharges</td>
<td>January 2013</td>
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<tr>
<td>13. Other point sources and discharges to land</td>
<td>January 2013</td>
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<tr>
<td>14. Atmospheric deposition and other sources</td>
<td>May 2013</td>
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</table>

Nominations provided will undergo a preliminary review to be sure the documentation is adequately complete for review, for more information see Attachment 1. This initial review will include data on use of the practice in field implementations, or recommendation by an industry association, farm advisor, public agency, a user of the practice in the Central Valley or recommendation from a Subcommittee member. Review of practices is limited to the capacity of the Subcommittee and its resources.

2.2 Conflicts
Because the Subcommittee has an active role in the review and recommendation for approval of MPs, the credibility of the process relies on member’s objectivity. Members will disclose any potential conflicts of interest to the Co-Chairs of the Subcommittee who may ask them to recuse themselves from practices where the member has a direct or indirect personal financial interest.

2.3 Committee Test Run
Subcommittee members performed a “test run” of the screening tool and Nomination Form to identify gaps in the tool and to better understand the level of effort that will be required to complete the review. This review took place in summer 2011 and screened practices from Ag and wastewater treatment industries.

2.4 Committee Pilot Testing
As the Subcommittee continues developing the screening tool and toolbox the Subcommittee may prepare a technical scope of work for pilot implementation of the screening tool on several practices. This testing will expand on the reviews completed by the committee in the “test run” and help improve the screening tool and “toolbox” as well as help to determine the cost of the review process. The Pilot
Test was encouraged to include a broader variety of practices, including physical change projects and outreach or management projects, in order to better explore diverse practices.

2.5 Consultant Scope of Work
After pilot testing, the committee may recommend broader application through a scope of work for larger scale review of practices for the “toolbox”.

3 Practice Types
To simplify review and inclusion in the “toolbox” the MPs have been separated into three types: validated practices, new or developing practices, and indirect or policy practices. All three types of practices may be included in the “toolbox” if they meet the standards provided in section 4.0 as screened in the tool. Each type of practice represents a different stage or expectation for the documentation and analysis. Additionally, practice types may characterize single practices or sets of practices that address salt, nitrate, or both. Additional types of practices, or practice variations, may be developed in the future. Validated practices are intended to be a “high bar” for practices where complete information is available. Most other practices will fall into the developing category. Developing practices require additional evaluation and monitoring before they can be validated.

3.1 Validated Practices
MPs for which information shown in Attachment 1 (to be developed by the Subcommittee) is available should be submitted under the validated practices category. The standards (described in Section 4) for effectiveness and field implementation should be met by documentation including scientific studies (university research, trade research publications, other technical literature), by monitoring results, or by some other verifiable evidence. These practices will allow the greatest implementation flexibility and lowest monitoring requirements. Attachment 1 provides the information and evaluation process and Attachment 2 the nomination form to be submitted. The result will be a compendium of information concerning the practice or action that makes it amenable to implementation (inclusion in the “toolbox”). Where a practice has complete information but is lacking in one or two areas deemed non-critical to the approval, it may be classified as validated with conditions or flags. The condition flags would identify the area where added information is needed or recommended if used for a regulatory purpose. An example could be additional monitoring of implementation or cost effectiveness information or format preferences.

MPs that have been evaluated by other Best Management Practice programs acceptable to the Subcommittee may be submitted in their existing formats provided they contain equivalent information.

3.2 New or Developing Practices
Many MPs to address salt and nitrate are new or documentation is still being developed, demonstrated or validated. The identification of a practice as new or developing should not detract from its perceived effectiveness or value, but only indicates it status of implementation and review. New or developing practices will not have all documentation under the standards section and will not generally have monitoring necessary for full validation. When practices characterized as new or developing it may be anticipated that additional monitoring or information may need to be provided by implementing industries or communities for it to be considered a fully validated practice.
3.3 Indirect or Policy Practices

Another grouping of practices includes practices that are deemed appropriate or necessary, that may not directly impact salt or nitrates in the environment, and for which the only possible quantification of impact may be a general estimate. For these practices, inclusion in the “toolbox” will be based on industry recommendations or regulatory requirements or where they are a clear adjunct to other practices. Examples of such practices may include public outreach to improve awareness of urban and rural water users, or economic incentives (e.g., rate structures and fees) to reduce salt and nitrate releases. When salt and nitrate load reductions cannot be reliably estimated, cost effectiveness of the practice may be impossible to determine.

4 Standards

Screening of practices requires review of their effectiveness in reducing salt and nitrate in the system. If a practice is demonstrated as superior to general current practices for salt and nitrate management, and meets other (e.g., cost, feasibility) criteria, then it warrants consideration for the “toolbox”. General practice is defined as the unregulated or unimproved baseline. Industries that previously or voluntarily reduced salt or nitrate discharges will not be penalized for such leadership. MPs in this document are defined as beneficial or effective at management of salt and nutrients. The demonstration of Best Practices may be highly situational or impossible to determine before practices are implemented and monitored in several locations. The Subcommittee will further develop screening standards to provide additional detail on standards, as needed. The Screening of nominations uses the following standards. The nominator of the practice shall provide readily available documentation of the practice relative to each question on the Nomination Form (Attachment 3). The standards discussion in this section includes the directions to reviewers in evaluating a nomination. The Nomination Form has corresponding instructions for those completing the form.

4.1 Technical Effectiveness – does it work?

Demonstrating technical effectiveness is critical for a MP to be implemented and accepted by industry or communities. Reviewers will look for evidence of technical effectiveness as demonstrated by lab, pilot and evaluated demonstration studies. The documentation should indicate the practice removes, destroys, manages or otherwise reduces negative impacts to beneficial uses from salt and nutrient constituents or otherwise assists with compliance or improvement of the waters of the valley for these constituents.

4.2 Implementability – can it be used broadly?

Implementability includes both feasibility as well as broad applicability. In most cases, satisfactory implantmentability is demonstrated by documentation of the use of the MP by a significant portion of the sector and considers other issues related to cost and efficiency covered in other sections.

4.3 Benefits and Impacts

In evaluating the implemtability of MPs the Subcommittee will consider the benefits and impacts of the MP. Have the benefits and impacts been acceptably quantified? Do the benefits appear to outweigh identified negative impacts of its implementation?
Additionally, the Subcommittee should consider cross-media impacts, such as impacts to air quality, water supply, energy consumption, and other water quality constituents. The ideal practices are effective on salt and nutrient constituents and have few or minimal impacts to other areas.

Reviewers should look for MPs that reduce any detrimental effect to other media while achieving the goals of the MP. These should be identified and any impact quantified if possible.

4.4 Cost effectiveness – is it economic to implement today?
Cost effectiveness is critical to being an effective best practice. Low efficiency costly practices are not likely to be broadly implemented. High value practices will likely be implemented with minimal regulatory encouragement. Reviewers assessment of effectiveness related to cost is not always a simple as dollars per ton of salt or pound of nitrate, often costs include a technically trained workforce to implement, operate and maintain the practices. Additionally, this may vary across industry and across regions. The cost effectiveness should strive to take into account all benefits to the entity implementing the practice as well as direct and indirect cost of implementation. In other words not just the technology but the impacts on quality of the product or preparation or disposal of wastes and other potential cross media impacts. These costs should evaluate life cycle benefits and costs of implementations and societal and environmental benefits and costs, when possible.

The ideal practice nomination will provide information on the practices costs on an industry appropriate unit basis such as, per acre, per acre foot, per million gallons, per ton or etc. so it may be compared.

4.5 Monitoring – proving it works?
Reviewers should evaluate both the ability to monitor as well as the length and breadth of the monitoring history as a part of screening. Monitoring during the implementation stage may be greater in developing practices than fully validated practices that have already identified critical monitoring parameters for implementation and operations.

4.6 Other Regulatory or Non-Regulatory Approvals
CV-SALTS, as an option, may be able to utilize prior validation work performed by Regional Water Quality Control Boards (Regional Water Board) and State Water Resources Control Board (State Water Board) collectively Water Boards, Department of Public Health, building codes, or other accreditation groups for validation. Where appropriate this should be done to reduce the cost and delays associated with duplication of validation. Cost effectiveness of the MP should still be evaluated.

Additionally, in cases where a practice is obvious, broadly implemented and effective it may be recommended with less rigorous review or scientific study for approval by the Executive Committee.

5 Management Practice Toolbox
The Subcommittee will establish and update a list of MPs for each sector in the form of a “toolbox”. The “toolbox” will change as more information is reviewed and may also be used to track MPs, alternatives and technologies. The list will be maintained by the Subcommittee and Central Valley Salinity Coalition (CVSC). The “toolbox” will be available on the cvsalinity.org website and facilitate tracking the status of evaluation, verification, and monitoring. The Preliminary list of practices is shown as Attachment 2; this list will be updated or replaced as the “toolbox” is developed by the Subcommittee.
6 CV-SALTS Management Practice or Technology Presentations

MPs and Technologies that warrant recommendation for inclusion in the tool box by the CV-SALTS Technical Committee and Executive Committee will have been reviewed according to the processes described previously. Recommended MPs will have been found to merit wider application to CV-SALTS stakeholders. Technologies warranting recommendation should have been monitored during several pilot deployments to demonstrate effectiveness. Exceptions may be granted by the Subcommittee for practices that show special promise or at the request of the Executive Committee. Executive or Technical Committee members may recommend practices for Subcommittee consideration at the next regularly scheduled meeting. The Subcommittee should assist in promotion of the practices.

Vendors or technology proponents who wish to have specific practices evaluated for inclusion in the “toolbox” should contact the Central Valley Salinity Coalition or the Subcommittee Chair. Nominations provided will undergo a preliminary review to be sure the documentation is adequately complete for review. This initial review will include data on use of the practice in field implementation, or recommendation by an industry association, farm advisor, public agency, a user of the practice in the Central Valley or recommendation from a Subcommittee member. Review of practices is limited to the capacity of the Subcommittee and its resources.
Attachment 1

This attachment provides information on the review of MPs for inclusion in the CV-SALTS “toolbox” for reductions in salt and nitrate that are significant to the Central Valley.

Screening Process

The Subcommittee will use the evaluation framework process in Section 2 and standards in Section 4 to review MP documentation submitted on the Nomination Form in Attachment 3 or alternatively provided as industry collections of MPs. Such collections of MPs may summarize information on the practices in a matrix or summary to improve review and may need to interpret the Nomination Form to fit their documents.

Steps in the process

1. Industry nomination or source or industry sector call for nominations request sent by Subcommittee

2. Formatting of information by nominator using the Nomination Form or alternate format acceptable to the Subcommittee.

3. Initial review for completeness and appropriateness for review by Subcommittee

4. Assessment of submitted data by Subcommittee and recommendation for additional information and/or expert review, if needed

5. MP Committee Review process

5.1 Committee reviews nominations depending on volume and complexity

5.2 Assistance provided by experts or others, if needed

5.3 Consensus review call or meeting for discussion

6. Recommendation of acceptance of the Nomination into the Toolbox by Subcommittee

7. MP Subcommittee and Technical Committee recommend practices for Toolbox

8. Executive Committee approves acceptance recommendation and Toolbox is updated or disapproves returning to the Subcommittee

9. Practice Implementation, Operations and Maintenance, Monitoring, Reporting conducted by anyone implementing for regulatory purposes

10. Revision, if needed and review

This is also shown in Figure 1 in Section 2.

Committee Process

Although a thorough review of proposed BMP’s is warranted, it will be important to recognize that that the BMP Subcommittee, Technical Committee, Executive Committee, and stakeholders have limited time and resources to devote to reviewing and commenting on nomination forms.

The toolbox will expand and improve over time but practices should be added to the toolbox. The committee chairs should strive to strike a fine balance between understanding the details of a proposal and clarifying every possible detail.
Regarding the approval process, the committee utilizes the processes:

1. Approval by the BMP subcommittee requires a simple majority of the members present and voting.

2. Approval by the Technical Committee will require a majority of the members present. In most cases, the committee should render its decision within 30 days of receiving the nomination form and recommendation or the Subcommittee may request approval of its recommendation by the Executive Committee directly.

3. Approval by the Executive Committee requires a simple majority of the members present and should be agendized as a consent item on the Executive Committee Administrative meeting unless there are well defined objections which must be communicated to the Executive Committee Chair in advance of the meeting. The Subcommittee does not see value in revisiting the same issues in separate venues. In most cases, the committee should render its decision within 30 days of receiving the nomination form and recommendation of the subcommittee.

4. The review and approval process with the initial Toolbox practices will be presented to the Regional Board for at the Water Board CV-SALTS workshop in June 2012 and when updated at subsequent Water Board presentations. Ultimately this process will become part of the implementation component of the Basin Plan Amendment and updated as indicated.

5. Industries providing leadership to prepare collection of practices in holistic BMP manuals the approach should be viewed as a validated BMP. These manuals many individual practices that may evolve over time, a holistic approach to managing will only improve. Individual practices may be viewed as validated or developing, however, the approach should be viewed as validated if it has been vetted.

The Nomination Form with brief instructions for users shown in Attachment 3 to ensure nominated practices meet the standards presented in section 4.0.

Comparison of practices is and their relative effectiveness and costs on a common basis are a goal of any practice in the toolbox. The Subcommittee will assess the completeness of this goal in the pilot.

Depending on number, complexity and other factors the Subcommittee will prepare a recommended scope for any Technical Support that may be needed to assist the review of nomination or formatting into final products. Support may also be available from the NRCS, UC Davis Extension, CDFA-FREP, Fertilizer Institute and others.
The Subcommittee has compiled a preliminary list of potential MPs for salt and nitrate to be developed and screened in the Pilot Testing of the screening process. The following practices have nominators from the Subcommittee willing to submit and participate in the screening of the nominations:

1. **Nitrogen/Nutrient Management by well testing for leaching of nutrients to groundwater one of the Sustainable Growing Practices in a collection from the Almond Board nominator Parry Klassen**

2. **A Selected Dairy Practice from the Dairy Practice Report Nominated by Paul Martin**

3. **KOCI substitution for NaOCl use in cleaning and processes (Tom - Enviro Tech)**

4. **Collection of Practices Document Submission from Wine Institute – Chris Savage**

5. **Collection of Practices Document Submission from California League of Food Processors – Rob Neenan**

Pilot practice Nominations to be submitted to Daniel Cozad on behalf of the committee by January 9, 2012. The practice documents will be aggregated and distributed to the committee for review at its January 17, 2012 call.

Potential Practices (listed to promote discussion only, not as nominations to prioritize)

1. **Irrigation efficiency/reduce irrigation – Reduce salts imported with water or from groundwater**
2. **Tailwater reuse/drainage recirculation – reduced discharges of salt**
3. **Growing salt tolerant crops – reduced imported water while maintaining production**
4. **Evaporation ponds, solar evaporators – isolates the salt to allow management**
5. **Salt separation and utilization – fractionate and create products for reuse or sale**
6. **Drain water and brackish water desalination- Isolates salt for management**
7. **Detergent reformulation – source control**
8. **Industrial biomass and brine management – isolates salts and potentially reuses salts**
9. **Reduce imported feed for CAFO’s – reduces salt import from feed sources**
10. **Reduce seepage from brine conveyance - reduces dissolution of salt from soils**
11. **Industrial salt source reduction/reuse – reduces salts for production**
12. **Increase export of salt containing products - exports salt unless salt is imported for products**
13. **Increase salt export in surface waters leaving the region**
14. **Increase outdoor landscape irrigation efficiency – reduces imported water/groundwater use**
15. **Increase indoor water use efficiency – reduces imported water and groundwater use**
16. **Reduce water softening need or shift to ocean disposal of brine – reduces residential salt source**
17. **Local salt collection and disposal – Disposal and removal from basins**
18. **Increase salt discharge at EBMUD – ocean discharge and removal from basins**
19. **Salt collection and treatment (ocean qualified brine) for ocean discharge and removal**
20. **Deep well injection storage/recovery of salts – Removal from basins, recovery when economic**
21. **Soil testing for accurate nutrient fertilization**
22. **Nitrate removal from drinking water by fluidized bed reactor technology**
23. **Selective pumping of well water without TDS via insitu membrane filtration/RO**
Attachment 3

MP Screening Nomination Form is located at:
and appears on the following pages in PDF format.
1. TITLE


A complete copy of the document is available at no cost on the California League of Food Processors web site, [www.clfp.com](http://www.clfp.com)

2. DESCRIPTION

The purpose of the Manual is to provide a state-of-the-knowledge resource for designing and operating a land application system for food processing/rinse water. Specifically, the Manual was developed to establish and explain the scientific, agricultural, and engineering basis and methods for good practice as necessary to achieve regulatory compliance and foster environmentally and economically sustainable operations.

The Manual was prepared to serve as a reference for use by members of the California League of Food Processors (CLFP), regulators, and consulting engineers involved in planning, designing, evaluating, and operating land application systems. The focus of the Manual is on slow rate land application systems where hydraulic loading rates are generally similar to agricultural irrigation rates. Although many of the topics and discussions of chemical and physical properties are technical in nature, the guidance elements of the Manual were intended to be accessible and useful to a broad industry audience. The Manual includes design examples, decision trees, and sample worksheets to aid in the practical application of the principles.

The Manual is not just a collection of best practices. It provides a holistic science-based approach to the long-term management of a land application site. The topics covered in the text include (but are not limited to) an overview of pertinent regulations, water quality analysis, chemical constituents of concern, land application site characteristics, soil analysis, hydrogeology, crop selection, hydraulic and nutrient loading rates, wastewater pretreatment and source control, irrigation systems, and site monitoring and data analysis. The information is based on the best and most current data and studies available, but no original research was conducted to develop new data for the Manual.

The Manual was prepared by the environmental consulting firms Brown and Caldwell and Kennedy/Jenks, in collaboration with Central Valley Regional Water Board and State Water Board staff, CLFP staff, a number of technical experts and practitioners from the food processing industry, and other engineering consultants and stakeholders. The interdisciplinary team included soil scientists, engineers, environmental scientists, economists, and food processors.
3. CONSTITUENT SALTS OR NUTRIENTS MANAGED

The focus of the Manual is on the proper management of salinity, nitrates, and BOD at food processing wastewater/rinse water land application sites. The volume and concentration of these constituents and the total volume of wastewater discharge may vary significantly between locations.

4. APPLICABILITY

The Manual can be used by any food processor that discharges wastewater to a land application site. The document is designed to address differences in soil type, climate, irrigation method, crop, or other site specific characteristics. Regulatory agency staff and environmental consultants can use the document to obtain technically sound information that can be applied to a wide range of discharge permits.

5. PRACTICE BENEFITS AND IMPACTS

The Manual includes a number of specific practices designed to effectively manage wastewater, but does not take a prescriptive approach. In most cases, the best approach will vary based on local conditions and the makeup of the wastewater. The text provides an approach for assessing how to apply principles and techniques to specific situations, and how to assess the potential risks. For example, the section regarding organic loading rates provides technical background and calculations to demonstrate how much BOD can be applied to a site, and also general levels of risk to groundwater for different loading rates and groundwater depths.

However, the strength of the Manual is that it focused on developing a site-specific long-term comprehensive program to manage waste constituents. To effectively manage wastewater each of the major components (loading rates, irrigation method, crop selection) must be integrated into a holistic plan with the ultimate goal of protecting groundwater. This approach will likely be more effective than a piecemeal assembly of practices.

In regards to salts, the Manual provides technical details on the measures of total salinity, the major contributing ions, and considerations with respect to each major ion. Salinity loading, soil effects, management, regulatory considerations, and monitoring are addressed in detail. The salinity related information is provided in a logical and coherent manner for use in proper planning, design and operation of land application systems.

CLFP sponsored the development of the Manual so food processors, consulting environmental engineers, and regulatory officials would have a common starting point for managing, monitoring, and regulating land application sites. It is critical that all of the parties involved work from a common set of facts, scientific principles, and economically sound best practices to ensure that the protection of groundwater can be accomplished in a fair and consistent manner across the region and the state. CLFP believes that the Manual provides that common and defensible basis for developing waste discharge permits. Adding the Manual to the CV-SALTS toolbox will provide interested parties with the necessary tools to manage land application sites.
6. EFFECTIVENESS DOCUMENTATION

The approach described in the Manual is based on the best available research and analysis selected from dozens of professional publications. The effectiveness of this approach is clearly demonstrated by the widespread use of the Manual by food processors and Regional Board staff. CLFP believes that, even though the Manual is not currently a regulatory guidance document, in most cases the Regional Board would not issue a permit to a land application site, at a minimum, if the general principles articulated in the Manual were not integrated into the management plan.

The final version of the Manual was released in March, 2007, and a workshop was conducted to present the results and encourage industry to use the document. The ability to monitor and demonstrate the effectiveness of the overall approach depends upon site-specific factors such as loading rates and depth to groundwater. In the case of one site in Kingsburg, the groundwater is shallow and it was possible to document the effectiveness of the approach. Two major changes were implemented – switching to potassium hydroxide as the peeling agent instead of sodium hydroxide, and converting to sprinkler application instead of flood irrigation. Within 18 months a 30 to 50 percent reduction was documented in the salinity as well as iron and manganese concentrations in groundwater.

Experience with approximately a dozen new permits subsequent to the Manual’s release has been that both consultants and regulatory staff are making use of the Manual. BMPs in the Manual are cited by Regional Water Board staff in the findings for new Waste Discharge Permits.

7.1 COSTS

The practices recommended in the Manual are cost-effective in terms of minimizing salinity impacts and nitrate impacts to groundwater. The Manual encourages practices that reuse nutrients and some of the salts directly for crop production. The practices also provide cost and energy efficient means for allowing natural treatment and dispersion mechanisms to reduce concentrations of remaining salts and nutrients to below adverse levels. For example, capital and energy costs for conventional treatment facilities can often be an order of magnitude greater than the process/rinse water handling and distribution facilities related costs for land application in accordance with Manual guidelines. These lower construction and energy costs translate into less generation of indirect pollution, contributing to greater overall sustainability.

Some practices in the Manual, such as the substitution of potassium hydroxide for sodium hydroxide as a peeling agent, increase the cost of production, but may still provide overall net benefits. While the potassium product is roughly three times more expensive per ton of fruit processed, it has the benefit of substituting a fertilizer for a salt, which reduces the impact of salinity on the groundwater. Potassium also helps the crop’s yield, which increases the nitrogen uptake and reduces nitrate leaching to groundwater.
7.2 STATUS AND POTENTIAL

The practices in the Manual have been used successfully in Washington, Oregon, Idaho and Minnesota as well as throughout California. Staffs of the Regional Water Boards and numerous food processors have been using the Manual regularly since its publication in 2007.

7.3 MONITORING DOCUMENTATION

The Manual has an entire section dedicated to the proper monitoring and documentation of the practices recommended. No additional monitoring is required.

8. OTHER REGULATORY APPROVALS OR REQUIREMENTS

The Idaho Department of Environmental Quality used elements of the CLFP Manual in developing a similar document for food processors in Idaho.

9. SUPPORTING STUDIES

The data, analysis, and recommendations in the Manual are based on over 80 published studies and industry reports from U.S. and international sources. Key references included:


22. Crites, R.W. 1982. *Land Treatment and Reuse of Food Processing Waste*. Presented at the 55th Annual Conference of the Water Pollution Control Federation, St. Louis, MO.


32. Farnham, D.S. et al. *Water Quality; its Effects on Ornamental Plants*. Cooperative Extension University of California, Division of Agricultural and Natural Resources. Leaflet 2995.


44. King, L.D. 1986. *Design and Management Considerations in Applying Minimally Treated Wastewater to Land*. Soil Science Society of America, Madison, WI.
80. USDA, 1992. *Agricultural Waste Management Field Book*. Washington, DC
84. Water Pollution Control Federation, 1981. *Design of Wastewater and Storm Water Pumping Stations*.
CV-SALTS Management Practice Nomination Form

This Nomination Form includes limited instructions for the completion of the form. Initial reviewer instructions are included the Subcommittee Screening Document and will be further developed in future work. The nominator of the practice will provide information requested below, including supporting documentation. Should additional information be required to complete the review, it will be requested.

Additional standardization of requested information on the management practices will likely be developed in the future. Additionally, review of the practice implementation and effect on overall salinity and nitrate management in the Central Valley may be further assessed at a future date. Submittal of management practices for inclusion into the toolbox should answer the following questions with the best information available to the nominator. Please annotate responses with references and source documents (list these under Question 9).

A. Is this nomination for a plan or programmatic activity as opposed to a field implementation practice or technology? □ YES □ NO
   If yes, complete the following sections as appropriate; if not, proceed to question 1.

1. Title – Please provide a short descriptive title for the practice


   Companion/support documents include:


2. Description – Please provide a short (1-2 paragraphs) description of the practice/technologies to summarize the practice, industries and important information

   The Comprehensive Guide to Sustainable Management of Winery Water and Associated Energy was developed by Kennedy/Jenks Consultants on behalf of the Wine Institute and American Vineyard Foundation, in association with the National Grape and Wine Initiative (NGWI), to provide wineries with tools to evaluate and modify their water use practices in all aspects, including land application practice that improve salt and nitrate management. Due to the embedded energy in water management, these changes can also result in lower energy demand and a reduction in greenhouse gas emissions. The
Comprehensive Guide was designed with a goal of enabling wineries of all sizes, geographic locations, and levels of staff experience to enhance the sustainability of their operations. The do-it-yourself orientation is particularly suitable for small- or medium-sized producers, who are often very interested in sustainability but may not have an engineer on staff or resources to hire a consultant. The original scientific work behind the land application guidelines provides technical strength as well.

The Comprehensive Guide is organized around a five-step process that begins with planning and goal setting. Next, the winery gathers existing data and collects additional data as needed to characterize individual wastewater streams in the winery. Using these data, in the third step the winery can identify activities that use the most water and discharge the most wastewater and/or wastewater with the highest constituent concentrations. This step also includes matching possible improvement options to the targeted activities. Improvement strategies can range from simple procedural changes to capital intensive projects. In the fourth step, the winery evaluates the most promising options in detail for technical and economic feasibility. This is the basis for defining a prioritized plan to best meet the goals established by the winery. The final step is to implement the plan, including an ongoing monitoring program to track results.

The Comprehensive Guide and companion/support documents provide a state-of-the-knowledge resource for planning and designing a process water characterization, water conservation, and waste minimization (organics, salts and nutrients) program for a winery. The documents also provide a resource for planning, designing and operating a land application system for winery process water. Specifically, the Comprehensive Guide and companion/support documents were developed to establish and explain the scientific, agricultural, and engineering basis and methods for good practice as necessary to achieve regulatory compliance and foster environmentally and economically sustainable operations.

The Comprehensive Guide and companion/support documents serve as a reference for use by the wine industry, regulators, and consulting engineers involved in planning, designing, evaluating, and operating process water management and land application systems for wineries. The Comprehensive Guide includes several guidelines and many water conservation and waste minimization and design examples and sample worksheets to aid in the practical application of the principles.

The topics covered in the Comprehensive Guide and companion/support documents include (but are not limited to) an overview of pertinent regulations, water quality analysis, chemical constituents of concern, land application site characteristics, soil analysis, hydrogeology, crop selection, hydraulic and nutrient loading rates, wastewater pretreatment and source control, irrigation systems, and site monitoring and data analysis. The information is based on the best and most current data and studies available, and it includes some original research conducted to develop new data on land application of winery process water and characterization of various process water streams within a winery. When taken together all three documents provide a practical working basis to reduce water and salt use in the wineries, as well as greatly reduce the opportunity for nitrate formation in the land application area.
The Comprehensive Guide and companion/support documents were prepared by the environmental consulting firm of Kennedy/Jenks, in collaboration with Central Valley Regional Water Board and State Water Board staff, Wine Institute staff, and a number of technical experts and practitioners from the wine industry. The interdisciplinary team included soil scientists, engineers, environmental scientists, and winery operational staff.

3. **Constituent Salts or Nutrients Managed** – Identify the primary and secondary constituents (EC, TDS, Nitrates, other nutrients, etc.) that are treated, reduced, or managed by this practice and how they are reduced or managed.

The focus of the Comprehensive Guide and companion/support documents is on the proper management of salinity, nitrates, and BOD at winery process water land application sites. The volume and concentration of these constituents and the total volume of wastewater discharge may vary significantly between facilities and locations, but the fundamental approach described applied to all.

4. **Applicability** – Describe the documented application of this practice: where it has been implemented; how it has been implemented; what conditions or circumstances limit the applications of this practice; and how extensively has the practice been implemented. Industry specific application and limitations may be developed.

The Comprehensive Guide and companion/support documents can be used by any winery that discharges wastewater to a land application site. The document is designed to address differences in soil type, climate, irrigation method, crop, or other site specific characteristics. Regulatory agency staff and environmental consultants can use the document to obtain technically sound information that can be applied to a wide range of discharge permits.

5. **Practice Benefits and Impacts** – Describe the documented benefits of implementing the practice (what does it do) including any negative impacts of implementation (including cross media, e.g. air quality, energy demand, water supply, etc.).

The Comprehensive Guide and companion/support documents include a number of specific practices designed to effectively manage wastewater, but does not take a prescriptive approach. Instead, it uses a five-step approach as outlined below.

**Step 1: Planning and Organization**

This first step sets the stage for successful outcomes. The winery is encouraged to establish and communicate internally that the owners or top management are committed to implementing a winery water and energy program and are prepared to provide necessary resources and leadership to make it effective. Support from management is critical not only in financial terms, but also for promoting and incentivizing cultural changes in their operations. For example, staff may resist procedural improvements that require them to do things differently than they have been done in the past.
When the winery is ready to move forward, they are advised to identify a project team with representation from all parts of their organization. The team will begin to formulate specific goals to reduce water use, decrease wastewater generation and strength, and reduce associated energy use. These goals may be refined as additional information is collected and baselines for current use are determined. Some wineries may defer goal-setting until more information on potential opportunities is obtained in Steps 2 and 3. While each winery’s goals will be unique, the industry is moving toward developing key metrics that are normalized to production, such as water used per gallon of wine produced.

**Step 2: Winery Self Assessment**

In the assessment step, the winery will collect data to determine how much water is currently being used in each discrete production operation, as well as how much is used to run building systems. For example, their operations may include crushing, storage, blending and bottling, and most buildings having heating and cooling systems. Guidance is provided on how to monitor the influent (or effluent, if feasible) flows associated with each operation in order to develop a water balance. The chemistry of each of the wastewater streams is also assessed in this task by collecting samples for laboratory analysis.

The Comprehensive Guide provides extensive information to support this task, including recommendations for appropriate sample types and monitoring methods for each process stream. If winery staff have never installed a flow meter or collected a water sample before, they can turn to a more detailed reference section of the guide. In addition, a case study illustrating winery wastewater characterization activities and results is provided for reference. Data from the case study, which was previously conducted at several large wineries on behalf of the Wine Institute (companion documents), show which winery operations use the most water and which are significant sources of high-strength wastewater. If a winery is unable to collect their own characterization data, they may able to identify useful improvements by correlating the case study findings with their operations.

The Comprehensive Guide includes worksheets that can be used to develop an inventory of existing data, plan for flow monitoring and sampling activities, and compile collected data. Regardless of each winery’s size and configuration, the basic self-assessment process described in the guidebook will still be applicable, and the associated worksheets can be readily adapted and used. Alternatively, if a winery has their own preferred data collection formats or an existing database format, these can be substituted for the worksheets in the guidebook without detracting from the assessment program.

**Step 3: Data Evaluation and Option Identification**

With a compiled set of data on their operations (either direct measurements or estimates), wineries will begin to see patterns and should be able to identify certain processes and waste streams that are the largest contributors to the total facility effluent, in terms of discharge volume and/or constituent loading. BOD, total nitrogen and salinity are three primary areas of focus. These activities and sources can be targeted for improvement. In some cases, wastewater streams can be sorted into reuse categories, ranging from good quality water that can be used in place of source water, to water that is essentially not reusable without significant, costly treatment and will most likely require offsite disposal.
These categories will make it easier to identify the “low-hanging fruit” for immediate action. The guide includes lists of improvement options that will be applicable at many wineries. Generalized screening criteria are included with the options so that wineries can identify those projects that may be the most promising to meet their needs.

The compiled data will also provide a baseline of current operations and use rates, so that—after changes are made—the improvement can be measured and communicated. Measurable results are critical for justifying the winery’s investment in any new equipment, as well as for helping them decide whether they have done enough to reach their goals or need to undertake more aggressive changes.

**Step 4: Feasibility Analysis**

After a set of potential improvement options has been identified, this step entails more detailed screening and feasibility evaluation to determine preferred solutions. The feasibility evaluation includes both technical and economic components, with worksheets provided for this task. The winery can then prioritize the best options, considering available funding, and prepare an action plan for implementation. The action plan may include both near-term and long-term steps and should consider the impact of any known/planned changes in facility configuration or production volume.

**Step 5: Implementation**

The scope of implementation will be different for each winery; therefore, the instructions for the final step are limited. However, any change—whether equipment or procedural in nature—should be accompanied by a monitoring program that is launched at the time the option is put in place. As noted above, this is critical to determining whether the changes are leading to the desired results. If not, the approach calls for the winery to cycle through the sequence of steps for data evaluation and option identification, again to define additional feasible improvements until acceptable levels of progress are evident. Implementation should also include communicating changes and results to staff to build interest and ownership in the outcomes.

In most cases, the best approach will vary based on local conditions and the makeup of the wastewater. The text provides an approach for assessing how to apply principles and techniques to specific situations and how to assess the potential risks.

However, the strength of the Comprehensive Guide and companion/support documents are that they focus on developing a long term and site specific comprehensive program to manage waste constituents, with the ultimate goal of protecting groundwater.

In regard to salts, the Comprehensive Guide and companion/support documents provide technical details on the measures of total salinity, the major contributing ions, and considerations with respect to each major ion. Salinity loading, soil effects, management, regulatory considerations, and monitoring are addressed in detail. The salinity related information is provided in a logical and coherent manner for use in proper planning, design, and operation of winery process water management and land application systems.
The Wine Institute sponsored the development of the Comprehensive Guide and companion/support documents so wineries, consulting environmental engineers, and regulatory officials would have wine industry specific data and a common starting point for managing, monitoring, and regulating winery process water management systems and land application sites. It is critical that all of the parties involved work from a common set of facts, scientific principles, and economically sound best practices to ensure that the protection of groundwater can be accomplished in a fair and consistent manner across the region and the state. Wine Institute believes that the Comprehensive Guide and companion/support documents provide a common and defensible basis for developing waste discharge permits. Adding the Comprehensive Guide and companion/support documents to the CV-SALTS toolbox will provide interested parties with the necessary tools to manage land application sites.

6. **Effectiveness Documentation** – Describe the documented effectiveness of implementing the practice on the target constituents. Whenever possible, quantify the effectiveness of the practice as completely as possible. If available, provide documentation of a cost benefit study. Summarize any critical factors or limitations to effectiveness.

The approach described in the Comprehensive Guide and companion/support documents are based on the best available new research and analysis and research and analysis selected from dozens of professional publications. The effectiveness of this approach is clearly demonstrated by the widespread use of the Comprehensive Guide and companion/support documents by wineries and Regional Board staff. Wine Institute believes that—even though the Comprehensive Guide and companion/support documents are not currently regulatory guidance documents—in most cases, the Regional Board would not issue a permit to a land application site if, at a minimum, the general principles articulated in the Comprehensive Guide and companion/support documents were not integrated into the management plan.

The final version of the Comprehensive Guide was released in 2008; and since then, ten workshops have been co-sponsored by the Wine Institute/California Sustainable winegrowing Alliance and PG&E in the various winegrowing regions of California, and one workshop each in New York and Washington has occurred. The workshops have been conducted to present the five-step approach, share results and encourage industry use of the Comprehensive Guide. Wine Institute does not have site-by-site monitoring data to demonstrate the effectiveness of the overall approach of the Comprehensive Guide because at many sites (particularly those with legacy issues), it may take many years to detect significant changes in groundwater quality. However, during the many workshops, participants share results and develop action plans for improving winery process water management and many have demonstrated significant improvements in how process water is or will be managed. As a result, it seems intuitive that if the application site managers continue to diligently apply all of the principles and practices described in the Comprehensive Guide, it should be entirely consistent with protecting and improving groundwater quality. Some specific examples of improvements are provided below.

As mentioned, a series of workshops on how to use the guide is now being co-hosted by the California Sustainable Winegrowing Alliance (CSWA) and the Pacific Gas & Electric Company in winegrowing
regions throughout the state. The first workshop, conducted in June 2008 in Paso Robles, was well attended and received. Evaluation forms completed immediately following the workshop indicated people understood the approach and garnered ideas about how they would get started in their facility. In response to one question, “based on today’s workshop, what specific immediate actions are you likely to take for water management and energy efficiency?”, participant answers included: fixing leaks, adding low-flow nozzles, making changes to a pond system, mapping out total process, posting data for staff information, forming a water committee, reducing use of high-volume hoses, and reconsidering standard operating procedures.

Approximately five months after the workshop, a follow-up survey was offered to participants online. Based on a limited number of responses (just over ten percent of attendees), results suggest the guidebook is having an impact. For example, the respondents indicated that since the workshop, they had installed flow meters to monitor individual processes, collected wastewater samples, and implemented changes. They reported improving cleaning and sanitation procedures, reducing or eliminating water softening, switching to high-pressure barrel washer, upgrading pumps, motors, and controls, and reusing process water for landscape or crop irrigation.

For the coming year, respondents planned to establish, update, or follow standard operating procedures more consistently, modify cleaning and sanitation procedures, migrate to a CIP system in the cellar, and identify and repair leaks.

Wine Institute distributed a news release and link to a pdf guide to nearly 1,000 winery members, and the publication has also been mentioned in numerous trade publications. To date, CSWA has received more than 75 requests for the guide from many international wine regions, including Argentina, Australia, Chile, France, and Spain, and from many states throughout the US.

7. Implementation

7.1 Costs - Summarize and document costs for implementation of this practice both Capital and Annual operations and maintenance costs. If possible, express in industry relevant units of $/acre foot or $/million gallons, $/ton or etc. to allow comparison with other practices.

The five-step process and practices recommended in the Comprehensive Guide and companion/support documents are cost-effective in terms of minimizing salinity impacts and nitrate impacts to groundwater because they first focus on prevention, then minimization and optimization. For example, switching from chlorine to chlorine dioxide or peracetic acid for sanitation reduces the salinity of the process water. The Guide takes the winery through the steps necessary to evaluate the effectiveness of such a switch to their operations.

Another example is the product substitution of potassium hydroxide for sodium hydroxide. While the potassium product is more expensive, it has the benefit of substituting sodium for a salt that can double as a fertilizer. This change reduces the impact of salinity on the groundwater. Potassium also
helps the crop yield, which increases the nitrogen uptake and reduces the potential for nitrate leaching to groundwater.

In addition to the detailed recommendations for minimizing salinity and nitrate impacts in the Comprehensive Guide, the overall practice of land application for winery process water is very cost and energy efficient. The use of natural aeration, soil filtration, and crop uptake over a large area requires far less energy use and less resultant generation of indirect pollution than conventional wastewater treatment systems, contributing to more sustainable overall processes.

7.2 Status and Potential – Describe the historic and current level of implementation, at the level known. List any information known on the potential full implementation of this practice

The practices in the Comprehensive Guide have been used successfully in Washington and New York, as well as throughout California. Kennedy/Jenks and staffs of the Regional Water Boards have been using the Comprehensive Guide and companion/support documents to develop new and modify existing permits regularly since the publication of Land application guidelines in 2004 and the publication of the Comprehensive Guide in 2008.

7.3 Monitoring Documentation – Describe the level of monitoring and documentation available to support the practice. If known, what additional monitoring is needed to document management practice effectiveness? If known, what level of monitoring will be needed at full scale implementation?

The Comprehensive Guide has an approach and an entire section dedicated to the proper monitoring and documentation of the practices recommended. No additional monitoring is required.

8. Other Regulatory Approvals or Requirements – Has this practice been approved or required by any other government agency or independent standard setting body? If so, summarize this and any information you may have on the process and status of approvals. Indicate what level of review—if required for that regulatory requirement or guidance.

The New York and Mid-West wine industries have accepted the approach and plan on using it as the basis for future regulatory discussion.

9. Supporting studies, Research, and Source Documents – List all documents referenced in responses above or other documents that provide information on the technology or practice and electronic availability.

The data, analysis, and recommendations in the Comprehensive Guide and companion/support documents are based on over 70 published studies and industry reports from U.S. and international sources. Key references included:


61. Ryder, R. A. and Chrobak, R. S., 2006. Aerator Types Features and Efficiencies in Aerobic Winery Wastewater Treatment. Poster for IV International Specialized Conference on Sustainable Viticulture, Vina del Mar, Chile.


Standards and information repeated for the Nominator from the Subcommittee screening document.

4 Standards

Screening of practices to include in the toolbox requires the review of practices for effectiveness in reducing salt and nitrate in the system. The Screening tool uses the following standards as documented by the proposer of the practice for screening.

4.1 Technical Effectiveness – does it work?

Demonstrating technical effectiveness is critical for a management practice to be implemented and accepted by industry or communities. Evidence of technical effectiveness is demonstrated by lab, pilot and demonstration studies, and evaluation of the studies. Does the documentation indicate strongly that the practice removes, destroys, manages or otherwise reduces any negative impacts to beneficial uses associated with its presence and assist with compliance or improvement of the waters of the Valley?

4.2 Implementability – can it be used broadly?

Implementability includes both feasibility, as well as broad applicability. In most cases, satisfactory implementability is demonstrated by documentation of the use of the management practice by a significant portion of the sector and considers other issues related to cost and efficiency covered in other sections. Implementability of management practices may consider cross-media impacts and look for management practices that reduce any detrimental effect to other media, while achieving the goals of the management practice. These should be identified and any impact quantified if possible.

4.3 Cost effectiveness – is it economic to implement today?

Cost effectiveness is critical to being an effective best practice. Low efficiency costly practices are not likely to be broadly implemented. High value practices will likely be implemented, with minimal regulatory requirements. The assessment of effectiveness related to cost is not always a simple as dollars per ton of salt or pound of nitrate. Often costs include a technically trained workforce to implement, operate, and maintain the practices. Additionally, this may vary across industry and across regions. The cost effectiveness should strive to take into account all benefits to the entity implementing the practice, as well as direct and indirect cost of implementation. In other words, not just the technology, but the impacts on quality of the product or preparation or disposal of wastes and other potential cross media impacts. When possible, these costs should evaluate life-cycle benefits, as well as implementation and societal and environmental benefits.

4.4 Monitoring – proving it works?

Both the ability to monitor and the length and breadth of the monitoring history will be reviewed as a part of screening. Monitoring during the implementation stage may be greater in developing practices than fully validated practices that have already completed it.