

CV-SALTS BMP Subcommittee

Management Practices Evaluation

Approach for Salt and Nutrients (Nitrate)

Version - 2

The BMP Subcommittee's charter is to assist CV-SALTS to improve salt and nitrate management through industry and community management practices, identifying, characterizing and evaluating the management alternatives to improve implementation and monitoring of results. This document is part of the Best Management Practice Document Review developed in the Spring 2010.

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 a management practices in accordance with the following process and standards. These will be used to develop a "toolbox" of Management Practices or actions (BMPs) which have been vetted in the CV-SALTS process to assist others in reducing salinity and nitrate. This "toolbox" would provide a range of options and their document effectiveness or expected reductions.

2 Process

The process for new or developing and validated practices are different in their requirements and efforts. Each process is described in summary below (additional details to be described by the subcommittee). Practices are evaluated for acceptance in the "toolbox" as a salt or nitrate management practice. They may be included in the "toolbox" as a management practice or action if they are found to be an improved or advanced practice for a given process and circumstances.

2.1 Sector Review Schedule

The Pilot Salt and Nitrate Source Implementation Study identified sources of salt and each primary or significant source of salt shown in the report will be scheduled for review. Sources (industries or communities) which have prepared Best Management Practice documents will be reviewed in priority to other sources. The Subcommittee will establish the final schedule for review of practices and technologies in each sector, at a pace that is manageable but which reviews all significant sources alternatives prior to the implementation plan development.

| Source | Preliminary Date |
|--|------------------|
| 1. Surface Irrigation and Drinking Water | January 2011 |
| 2. Groundwater Drinking and Irrigation Water | January 2011 |
| 3. Irrigated agriculture/Fertilizer | May 2011 |
| 4. Non-point source/stormwater | May 2011 |
| 5. Wetlands | May 2011 |
| 6. Wastewater/Industrial dischargers | October 2011 |
| 7. Food processing industries | October 2011 |
| 8. Wastewater/Residential dischargers | January 2012 |
| 9. Dairy and CAFO | January 2012 |
| 10. Water treatment and softening | May 2012 |
| 11. Septic tank discharges | May 2012 |
| 12. Other point sources and discharges to land | October 2012 |
| 13. Atmospheric deposition and other sources | January 2013 |

3 Practice Types

To simplify review and inclusion in the “toolbox” the various practices have been separated into several types. Each type represents a different stage or expectation for the documentation and analysis. There may be additional or subtypes developed in the future.

3.1 Validated Practices

Management practices which are established and can provide information shown in Attachment 1 (to be developed by the Subcommittee) should submit under validated practices. The standards (described below) for effectiveness and broadly demonstrated field implementation should be thoroughly met through any variety of sources of documentation including scientific studies, university research, trade research publications and monitoring or other verifiable sources. These practices will allow the greatest implementation flexibility and lowest monitoring requirements. Attachment 1 (to be developed) will provide an evaluation framework and formats for information to be submitted. The result will be a compendium of information concerning the practice or action that makes it amenable to implementation.

Management Practices which have been evaluated by other Best Management Practice programs may submit documentation for concurrence in the formats provided in Attachment 1.

3.2 New or Developing Practices

Many management practices to address salt and nitrate are new or are 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 its 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 information. The practices will be listed as new or developing and included in that section of the “toolbox” meaning additional monitoring or information may need to be provided by implementing industries or communities.

3.3 Indirect or Policy Practices

Another grouping of practices includes practices which are deemed appropriate and necessary but may not directly impact salt or nitrates in the environment and for which quantification other than broad societal estimates are not reliable. For these practices inclusion in the “toolbox” will be based on industry recommendation or regulatory requirement or where they are a clear adjunct to other actions. Such actions and practices may include public outreach and awareness for urban and rural water users and wastewater dischargers. Rate structures and other economic incentives to reduce salt and nitrate that could become released to the environment. Because of their status cost effectiveness may be impossible to determine.

4 Standards

Effectiveness and superiority to general practice must be shown for management practices for salt and nitrate. The Demonstration of Best Practices may be situational or not be able to be determined until implemented in several locations. (The Subcommittee will develop these further in the coming meetings.)

4.1 Technical Effectiveness

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.

4.2 Implementability

Implementability includes both feasibility as well as well as broad applicability. Satisfactory implementability is shown by evidence of implementation by industries and communities as wells as other issues related to cost and efficiency covered in other sections.

4.3 Cost effectiveness

Cost effectiveness is critical to being a best practice, low efficiency costly practices are not likely to be able to be broadly implemented due to the value of implementation. 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 it is the cost to implement, operate and maintain and the availability of technically trained workforce to implement the practice.

4.4 Monitoring

Both ability to monitor as well as the length and breadth of the monitoring history will be identified in this standard, primarily related to validated or developing.

4.5 Other Regulatory or Non-Regulatory Approvals

CV-SALTS may be able to defer to prior decisions made by Waterboards, industrial societies and accreditation groups for validation. Where appropriate this should be done to reduce the cost and delays associated with duplication of validation.

5 Management Practice List

The Subcommittee will establish and update a list of management practices and alternatives that are known to the Subcommittee. This list will be used to track management practices, alternatives and technologies. The list will be maintained by the Subcommittee and CVSC. The list will be available on the cvsalinity.org website and track the status of evaluation and verification or monitoring. The Preliminary list of practices is shown as Attachment 2, this list will be replaced by committee efforts.

6 CV-SALTS Management Practice or Technology Presentations

Technologies appropriate for presentation to CV-SALTS Technical Committee or Executive Committee are technologies and approaches that have been reviewed in accordance with the process set forth above and found to merit wider application. Presentation opportunities are limited to available meeting time and may take several months to schedule. Technologies warranting presentation should normally be validated or have had several pilot deployments with monitoring data to demonstrate effectiveness. Exceptions may be granted by the committee for alternatives and technologies that show special promise or that are strongly recommended by an Executive Committee Member.

Vendors or technology proponents who wish to have their salt and nitrate alternatives or technologies evaluated for presentation should contact the Central Valley Salinity Coalition or the Committee Chair.

7 Additional Recommendations and Questions for Consideration

The CV-SALTS committees should consider the following recommendations and questions:

1. We recommend the Technical Committee discuss the level of expertise needed to review the practices and make recommend where that expertise is available to CV-SALTS.
2. We recommend CV-SALTS consider who should best implement this effort, from a technical and management or policy approach. Should it be contracted or done by volunteers and if so what funding and support is available from the State/Regional Board or industry.
3. We recommend the Executive Committee and Regional Board determine what information is needed from this process for the Basin Plan amendment and how will the results be integrated into the Basin Plan or supplemental documents.
4. What accounting methods are needed for the implementation of the BMPs and what credit or allowances will be provided to those who have implemented the BMP's or commit to do so?
5. We recommend the Regional Board both CV-SALTS and other regulatory areas provide guidance on how they review such practices related to permits issued by their agencies
6. We recommend that CV-SALTS and the Regional Board determine what the "toolbox" practices with the Regional Board and its programs?
7. We recommend the committees discuss the importance of the Indirect BMPs in the Basin Plan context and their proposed inclusion in the "toolbox".
8. If an entity commits to implement a specific management practice with a documented efficiency will they be held to achieve that reduction? What if the basin plan counts of that reduction for salt management or balance?

Attachment 1

This attachment provides information on the review of Management Practices for inclusion in the CV-SALTS “toolbox” for reductions in salt and nitrate that are significant to the basin plan.

Outline

Evaluation Framework

The committee should develop an evaluation framework for review and documentation.

1. Screening
2. Preliminary Assessment
3. Detailed/Expert Review
4. Science Review if needed
5. Committee actions
6. Toolbox update
7. Implementation
 - 7.1 Operations and Maintenance
 - 7.2 Monitoring
 - 7.3 Reporting
 - 7.4 Continuous improvement

Data Formats

Standardization of information on Management Practices is of value for both review of the practices as well as for management of the implementation and effects to overall salinity management in the basin plan. The following areas should be more completely developed by the committee:

1. Title
2. Description
3. Constituent salt or nutrient
4. Applicability
5. Effects and Results
6. Effectiveness calculation or narrative discussion
7. Studies and research (compendium format)
8. Implementation monitoring (completed and required)
9. Critical factors to efficiency
10. Implementation Costs (range per _____)
11. Cost effectiveness (range per ton?)

Attachment 2

A very preliminary list of potential management practices, actions, efforts and alternatives to manage salt and nitrate. This list is sourced from brainstorming, web research and other sources no attempt at screening or evaluation was conducted. This list should be replaced with a list developed by the Subcommittee.

1. Irrigation efficiency/reduce irrigation – Would reduce salt from imported or evapotranspiration of groundwater
2. Tailwater reuse/Drainage recirculation – reduced discharged salt may increase
3. Growing Salt tolerant Crops – reduces imported water and maintains some production
4. Evaporation Ponds, solar evaporators – isolates the salt
5. Land disposal and retirement uses land to store salt and retired
6. Biologic and filtration drainage treatment systems to remove salt and selenium
7. Enhanced evaporation systems – Isolate salts for management
8. Salt separation and utilization – fractionate and create products
9. Drain water and brackish water desalination Isolates salt for Management
10. Detergent reformulation - source control
11. Industrial biomass and brine management – isolates salts and potentially reuses salts
12. Plasma converter – creates fuel and products
13. Reduce Imported Feed for CAFO's – reduces salt import from feedsources
14. Reduce Seepage from Conveyance - reduces dissolution of salt from soils
15. Industrial Salt Source reduction/reuse – reduces salts for production
16. Increase export of salt containing products - exports salt unless salt is brought in to produce products
17. Increase salt export in surface water leaving the region, San Joaquin River and State Water Project- export of salts could be hampered by toxic constituents and flow required
18. Increase Outdoor Landscape Irrigation efficiency – reduces imported water and groundwater use with salts
19. Increase indoor water use efficiency – reduces imported water and groundwater use with salts
20. Reduce water softening need or shift to ocean disposal of brine – reduces salt from residential indoor plumbing
21. Water preconditioning, Lime softening and management at water plant – reduces softening need and salt related to softeners
22. Salt collection and Landfill disposal – Disposal and removal from basins
23. Increase salt discharge at EBMUD – ocean discharge and removal from basins
24. Salt collection and treatment (ocean qualified brine) for ocean discharge – ocean discharge and removal from basins
25. Deep well injection for storage and recovery of salts – Removal of salt from basins, with recovery when economic
26. Various source controls - Reduce salt imported and discharged

27. Legislation to require any new industrial use of salt to use salt produced in “salt surplus” areas of the state, as public policy to reduce transportation and minimize import
28. Tax imported salt and credit salt that is produced from salt surplus areas and exported.
29. Sell the salt to the melting polar ice cap areas to help offset the dilution of ocean water with melting ice
30. Concentrate and market to Canada, Toronto alone uses 150,000 tones of salt annually, or trade them for low TDS water.
31. Digestion and Co-digestion of wastes containing salt – Concentrates salt for removal
32. Credit or offset program, cap and trade programs to geographically or temporally shift salts

This list likely should be converted to a matrix by type of management effort, application and result

Salt Reuse Opportunities

Nutrient or Flavor

baking, breakfast cereals, butter and cheese, canning, cattle blocks, flour mixes, heat tablets, isotonic solutions, livestock feeds, oleomargarine, pickles, potash substitute, salted nuts, table salt, spices and flavoring

Preservative

cheese making, cucumber salting, fish bait curing, fish curing, hay preserving, hide curing, meat curing, sausage

Food Processing Material

blanching seafood & vegetables, chicken de-boning, crabmeat pickling, egg preservative, fish striking agent, gravity separation, oyster shucking, wine stabilization, yeast processing

Chemical Manufacturing

Calcium hypochlorite, Chlorine dioxide, Sodium chlorate, Sodium fluosilicate, Sodium hypochlorite, Sodium Perchlorate

Freezing Point Depressant

coal antifreeze, highway de-icing, ice cream making, ice manufacture, iron ore antifreeze, refrigerating brines, refrigerating cars

Metallurgical Processing

chloride roasting, drawing lubricant, foam killer, heat treating baths, iron ore cementation, metallurgical flux, mill scale remover, molten metal cover, rare metal refining, sink and float baths

Miscellaneous Processing

artificial seawater, coal briquettes, dehydrating agent, dye processing, dyestuff carrier, electrolytic milling, emulsion breaker, etching aluminum foil, herbicides, ion exchange regeneration, leather tanning, rubber coagulant, soap salting-out agent, soil stabilizer, starch manufacture, synthetic leather manufacture, textile dyeing, tile glazing, water softening, weed killing, well drilling fluids.

Soda Ash - Na₂CO₃

abrasives, adhesives, batteries, ceramics, cleansers, cosmetics, degreasers, dyes, explosives, fats and oils, fertilizers, fire extinguishers, inhibitors, insecticides, leather, metal fluxes, ore refining, paint removers, paper, petroleum, pigments, soap, textiles, water softeners

Sodium - Na

bactericides, case hardening, cosmetics, detergents, dye fixation, dyes, flour conditioning, fumigation, heat

transfer, ore refining, organic synthesis, paints, pharmaceuticals, photography, pigments, plating salts, pulp bleaching, starch conversion, tetraethyl lead, textile bleaching, titanium metal, zirconium metal

Sodium Sulphate - Na₂SO₄

ceramics, detergents, dyes, explosives, fertilizers, metal fluxes, paper, pharmaceuticals, photography, pigments, plating salts, rubber, soap, textiles

Business or Enterprise Model to Combine Alternative Technologies or Processes

