California Regional Water Quality Control Board
Colorado River Basin Region

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov/~rwqcb7
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Gray Davis
Governor

June 20, 2001

TO: TAC Members and Interested Parties

RE: Salton Sea Nutrient Total Maximum Daily Load Technical Advisory Committee Meeting

Enclosed is a copy of the information that was distributed at the Salton Sea Nutrient Total Maximum Daily Load (TMDL) Technical Advisory Committee (TAC) meeting. The meeting was held on Wednesday, June 19, 2002.

If you have any questions, please contact me at (760) 776-8931 or Dr. Francisco Costa at (760) 776-8937.

Teresa Newkirk-Gonzales, Senior Environmental Scientist
Chief of TMDL Development

FC/hs

Enc: As noted above

cc: Regional Board Members

File: TMDL SS N
TMDL SS N TAC

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DEVELOPMENT AND IMPLEMENTATION OF NUTRIENT TOTAL MAXIMUM DAILY LOAD FOR THE SALTON SEA

TECHNICAL ADVISORY COMMITTEE
Meeting Agenda

Wednesday, June 19, 2002, 10:00 AM -12:00 PM.
Imperial Irrigation District
Water Control Center Building
333 East Barioni Boulevard
Imperial, CA 92251

- Introductions

- Salton Sea Background Information
  Best Management Techniques for Phosphorus Fertilization by Jason Smith

- TAC Workgroup Break-Out Sessions
  - Organization
  - Strategy of how to meet the required TMDL milestones

- Action Items
  - Set date and agenda for next meeting
  - Questions and comments
  - Adjournment

From: Khaled M Bali <kmbali@ucdavis.edu>
To: "Francisco Costa" <costf@rb7.swrcb.ca.gov>
Date: 6/14/02 11:26AM
Subject: Nutrient TAC

Francisco,
I talked to Herman Meister <hmeister@ucdavis.edu>, Agronomy Farm Advisor in our office. He is willing to give a presentation on agricultural practices and fertigation/fertilization practices in the Valley. He has extensive experience in field crops. You may contact him at the email address above or call him at 760-352-9474.

Regarding other UC researchers who are doing work on P, you may contact one of the following contacts from Davis (or if you want me I can contact them directly
Both Steve and Randy have experience in TMDL, I know Steve has done some work on soil erosion and P in Northern California. He has also conducted several research studies in the Valley. Below you will also find the web sites of two departments in Davis.
If you need to get a professor from UCR, Please check with Chris A. and ask for his advice.
Thanks,
Khaled

1- Steve Kaffka
Assistant CE Agronomist VI & Lecturer, WOS
Specialties: Works on sugar beets and safflower, particularly ways to improve the efficiency and reduce the environmental impact of producing these crops. Also works on water quality and agricultural drainage and salinity management.

Unit: Agronomy & Range Science
Location: College of Agricultural & Environmental Sciences [Davis Campus]
Agronomy & Range Science, One Shields Avenue, 159 Hunt Hall
Davis CA, 95616-8515
srkaffka@ucdavis.edu
(530) 752-8108
Fax: (530) 752-4361
http://agronomy.ucdavis.edu/agronomy/

2- Randy A Dahlgren
Professor, Pedologist & Soil Mineralogist-AES
Specialties: Biogeochemical aspects of pedology-interactions of biological, hydrological and geochemical processes in natural and managed environments; processes and products of mineral weathering in the soil environment

Unit: Soils & Biogeochemistry Program
Location: College of Agricultural & Environmental Sciences [Davis Campus]
LAWR/Hoagland, One Shields Avenue, 235 Hoagland Hall
Davis CA, 95616
radahlgren@ucdavis.edu
(530) 752-2814
Fax: (530) 752-1552

http://lawr.ucdavis.edu/

Best Management Techniques for Phosphorus Fertilization

Prepared for Nutrient TMDL-TAC
June 19th, 2002

Jason Smith
Agricultural Engineer
USDA-NRCS

Definition of BMT

- BMTs are methods, measures, or practices selected by an agency to meet its point and nonpoint source control needs. BMTs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters.

Background

- Phosphorus was identified as limiting agent in eutrophication of the Salton Sea
- Phosphorus reaches waterways: adsorbed or soluble
- Silt TMDL identified BMTs for reducing adsorbed phosphorus
- Nutrient TMDL will focus on both adsorbed and soluble phosphorus

Flood Irrigation of Phosphorus

- Water run phosphoric acid used to fertilize alfalfa fields after bound phosphate is taken up by the plant, (~2 years after planting)
- 3 methods for preventing phosphorus rich soil and irrigation water from reaching ag drain

3 Methods

- Minimize Tailwater
- Filter Tailwater
- Recycle Tailwater

BMTs for Minimizing Tailwater

- Irrigation Water Management
- Landleveling
- Nutrient Management
- Infiltration Additive (PAM)

Irrigation Water Management (449)

- Determining and controlling the rate, amount, and timing of irrigation water applied to crops to minimize phosphorus movement

Irrigation Landleveling (464)

- Reshaping the surface of land to planned grades to give effective and efficient water movement

Nutrient Management (590)

- Selecting the proper time, placement and method of fertilizer (phosphorus) application to reduce losses through soil erosion, and ensure adequate crop nutrition

Infiltration Additive (PAM) (716 interim)

- A chemical additive that enhances infiltration and reduces potential for soil erosion

BMT's for Filtering Tailwater

- Grassed Waterway
- Filter Strips
- Field Border
- Natural or Constructed Wetlands

Grassed Waterway (412)

- Establishing and maintaining adequate plant cover on channel banks to stabilize channel banks

Filter Strips (393)

- A strip or area of vegetation in permanent vegetation, established downslope of agricultural runoff or waste water source to control erosion, reduce organic matter, and other pollutants from entering an adjacent watercourse

Field Border (386)

- A border or strip of permanent vegetation, established at field edges to control soil erosion and slow, reduce, or eliminate pollutants from entering an adjacent waterway

Natural or Constructed Wetlands (657)

- Providing adequate land absorption or wetland areas downstream from agricultural areas so that soil and plants receive and treat agricultural nonpoint source pollutants

BMT's for Recycling Tailwater

- Irrigation System, Tailwater Recovery

Tailwater Recovery (447)

- Regulating the type and quantity of water return flows as a means of maintaining and improving irrigation water quality

Effectiveness of BMTs on Surface Water Quality

Technique	Efficacy
Irrigation Water Management	L-M
Landleveling	Negligible
Infiltration Additive (PAM)	M-H *
Nutrient Management	L-H
Grassed Waterway	L
Filter Strips	M
Field Border	Negligible
Natural or Constructed Wetlands	H
Irrigation System, Tailwater Recovery	L-H

L = Low efficacy
M = Low to moderate efficacy
H = Moderate to high efficacy

* Not obtained from FOTG

Cost of BMTs

Technique	Cost
Irrigation Water Management	$15 per acre per year
Landleveling	N/A
Infiltration Additive (PAM)	$1.50 per acre per irrigation *
Nutrient Management	Varying
Grassed Waterway	Installation - $0.05-0.05 per foot O & M - $0.03-0.15 per acre per year
Filter Strips	Installation - $0.04 per foot for 30-foot-wide strip O & M - $0.04-0.25 per foot
Field Border	N/A
Natural or Constructed Wetlands	Constructed Treatment Wetlands - $35,000-150,000 per acre **
Irrigation System, Tailwater Recovery	Installation - $300-500 per acre O&M - $28-60 per acre per year

* Lentz et al. 1992
** www.bnl.gov/erd/peconic/Wetlands.pdf

Farmer John

Bound

initial application	100lbs/acre P 43.7lbs P/acre *
Plant uptake	41.6 lbs P/acre *
P lost in sediment	2.1 lbs P/acre

Farmer John

water run irrigation

Mass Applied	125 lbs H3PO3	47.25 lbs P/ acre
%bound in soil	90%	
%in surface water	9%	
%in subsurface drainage	1%	
mass bound in soil (lb P/acre)	42.52	
mass in surface water (lb P/acre)	4.25	
mass in subsurface drainage (lb P/acre)	0.47	

Farmer John with BMTs

Nutrient TMDL Compliant

Practice	%reduction	-mass reduced in surface water	-mass reduced by Silt TMDL	Total Phosphorus reduction
Nutrient Management	20-80	0.85-3.4 lb P/acre	1.05 lb P/ acre	1.90-4.45 lb P/acre
Irrigation Water Management	20-80	0.85-2.5 lb P/acre	1.05 lb P/ acre	1.90-3.55 lb P/acre
Infiltration Additive (PAM)	40-80	1.7-3.4 lb P/acre	1.05 lb P/ acre	2.75-4.45 lb P/acre
Grassed Waterway	20-40	0.85-1.7 lb P/acre	1.05 lb P/ acre	1.90-2.75 lb P/acre
Filter Strip	40-60	1.7-2.5 lb P/acre	1.05 lb P/ acre	2.75-3.55 lb P/acre
Natural or Constructed Wetland	80	3.4 lb P/acre	1.05 lb P/ acre	4.45 lb P/acre
Irrigation System, Tailwater Recovery	20-80	0.85-3.4 lb P/acre	1.05 lb P/ acre	1.90-4.45 lb P/acre

Questions?