



California Regional Water Quality Control Board

Colorado River Basin Region



Gray Davis
Governor

Winston H. Hickox
Secretary for
Environmental
Protection

Internet Address: <http://www.swrcb.ca.gov/~rwqcb7>
73-720 Fred Waring Drive, Suite 100, Palm Desert, California 92260
Phone (760) 346-7491 · FAX (760) 341-6820

May 24, 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, May 22, 2002.

If you have any questions, please contact me at (760) 776-8931 or Dr. Francisco Costa at (760) 776-8937. I look forward to your continued participation in our efforts to protect water quality.

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, May 22, 2002, 10:00 AM -12:00 PM.
California Regional Water Quality Control Board
73-720 Fred Waring Drive, Suite 100
Palm Desert, CA

- Introductions

- Salton Sea Background Information
The Last 50 years living next to the Salton Sea by Al Kalin

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

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

Salton Sea Nutrient TMDL TAC Workgroups

Numeric Target Development	Existing Projects Evaluation	BMT Development
George Ray (Farmer)	Jim Setmire (BR)	Jason Smith (USDA/NRCS)
Khaled Bali (UCCE)	Tom Kirk (SSA)	Eric McGee (Western Farm Service)
Debi Livesay (Torres Martinez)	Doug Barnum (USGS)	Khaled Bali (UCCE)
G. S. Sidhu (RCACO)	Carol Roberts (USFWS)	David Ritter (ICACO)
Jim Setmire (BR)	Susanne Lockhart (Dudek and Associates) (1st priority)	Nicole Rothfleisch (ICFB)
Carol Roberts (USFWS)	Elston Grubaugh (IID)	Susanne Lockhart (Dudek and Associates) (2 nd priority)
Charlie Pelizza (USFWS)	Eldon Lee (CC)	Al Kalin (Farmer)
Elston Grubaugh (IID)	Sabine Huynen (U Redlands)	Elston Grubaugh (IID)
Eldon Lee (CC)	J. Menvielle (Farmer)	Robert Robinson (CVWD)
Charlie Phillips (SAIC)		Linden Anderson (RCFB)
Doug Barnum (USGS)		
Robert Robinson (CVWD)		

Suggested Salton Sea Nutrient TMDL TAC Workgroup Assignments

- Nominate a Leader, Alternate Leader and a Secretary.
- Outline tasks to fulfill objective(s)
- Individuals take on responsibility for tasks
- Establish aggressive, reasonable deadlines for completion of tasks and meeting the Nutrient TMDL TAC milestones
- Interim meetings as necessitated
- Report progress at regular TAC meetings
- Consult Regional Board and other technical assistance agencies as necessary
- Present formal recommendations to the Salton Sea Nutrient TMDL TAC

**Milestone Schedule for California Regional Water Quality Control Board to achieve
the Development and Implementation of Nutrient Total Maximum Daily Loads for
the Salton Sea**

Task Name	Start	Finish
Problem Statement	Wed 11/28/01	Fri 2/1/02
Numeric Target Report	Wed 11/28/01	Tue 10/25/02
Source Analysis	Wed 11/28/01	Mon 7/21/03
Allocations	Wed 11/28/01	Mon 12/8/03
<i>Linkage Analysis</i>	Wed 11/28/01	Mon 7/21/03
<i>Critical Conditions Analysis</i>	Wed 11/28/01	Mon 7/21/03
<i>Margin of Safety</i>	Wed 11/28/01	Mon 12/8/03
<i>Load Allocations</i>	Wed 11/28/01	Mon 7/21/03
Implementation Plan	Wed 11/28/01	Fri 10/6/03
Monitoring Plan	Wed 11/28/01	Mon 12/1/03
Peer Review Draft	Wed 11/28/01	Tue 2/2/04

THE LAST 50 YEARS LIVING NEXT TO THE SALTON SEA

A report to the Salton Sea Nutrient TMDL TAC

By Al Kalin

Westmorland Area Farmer

EARLIEST MEMORIES

- Folks purchased 80 acre field east of the New River Delta
- FWS fields on the west
- Snow and Canadian geese fed on rye grass in winter
- FWS fresh water ponds on the north - ducks and geese

BEACHCOMBING ALONG THE SHORE

- From the Salton Sea
 - ◆ Wooden crates from the navy base
 - ◆ Trees, power poles and driftwood
 - ◆ Dead sheep and Mullet
- From the New River
 - ◆ Wine bottles, medicine bottles
 - ◆ Platform shoes, toy soldiers
 - ◆ Coconuts

The Salton Sea Before Tilapia

- Fish Species
- Bird Species
- Algae
- Botulism

FISH SPECIES LIVING IN THE SALTON SEA



- Mullet
- Corvina
- Croaker
- Sargo
- Mudsuckers
- Mollies

BIRD SPECIES LIVING AROUND THE SALTON SEA



- Gulls, egrets
- Shore birds - sandpipers, avocets, stilts
- Ducks and Geese
- Eared Grebes, Ruddy Ducks

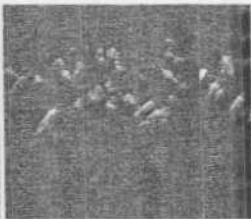
TYPES OF ALGAE IN THE SALTON SEA

- Brown Algae
 - ◆ Year around Red Tide on a 30 day cycle – major fish kills
- Green Algae
 - ◆ Algae blooms in the summer triggered by southeast winds
 - ◆ Major fish kills – croaker, mullet, corvina

BOTULISM

- Common occurrence in the late summer
 - ◆ Keyed to arrival of pintail migrating through to Mexico
- Brown Pelicans infected near delta of Alamo in 1959

CATTLE EGRETS



- Arrived in the 60's
- Built up large populations
- Fed on crickets in the fields
- Roosted around the Salton Sea in flooded trees and brush
- Droppings added to nutrient load

TILAPIA ARRIVE

- Canals threatened by infestation of hydrilla
- IID plants Tilapia with State and Federal Agency's OK
- Canal current too fast – Tilapia wash on through to Sea
- Fish and Game says "Not to worry" Tilapia don't live in salt water

WRONG!

- Within a few years millions are living in the Salton Sea
- Saw same species being netted in Indian Ocean in 1972

THE SALTON SEA AFTER TILAPIA



- Fish Species
- Bird Species
- Algae
- Botulism

ARE TILAPIA FEEDING ON FISH EGGS?

- Mollies disappear
- Mudsuckers disappear
- Sargo hard to find

TILAPIA CAN'T TAKE THE COLD

- Largest die off in history due to cold winter in the 80's
 - ◆ Piles two feet high around the shore
- Seek warmer water in bay east of New River Delta
 - ◆ Fresh water floating on salt water creates magnifying lens
 - ◆ Water heated 5 degrees warmer – draws Tilapia
- Corvina change feeding habits
 - ◆ Move from deep water to shallow in winter to feed on Tilapia

BIRD POPULATIONS EXPLODE AROUND THE SEA



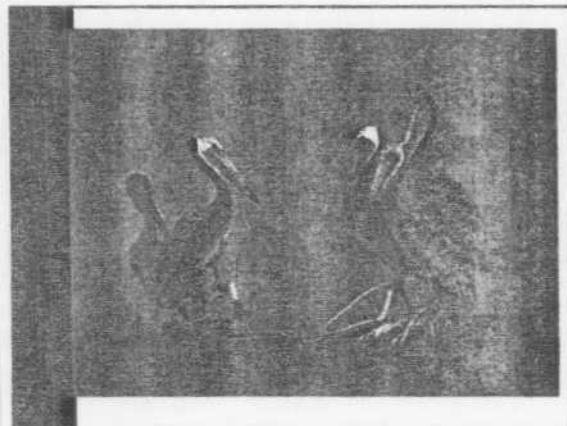
- Brown and White Pelican populations increase
- Rare before, Great Blue Herons number in the thousands
- Cormorants arrive and paint Mullet Island white
- Snowy and Great White Egret populations increase
- Numerous Osprey move in to fish

ALGAE BLOOM CYCLES CHANGE

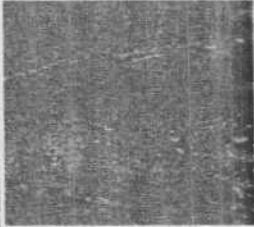
- Sickly sweet smell of red tides gone except during the winter
 - ◆ Tilapia lethargic – quit feeding on algae
- Green algae blooms continue, triggered by summer winds
 - ◆ Higher populations of fish so more die after the southeast winds

BOTULISM RUNS RAMPANT WITH LARGER BIRD POPULATIONS

- Majority of infected Brown Pelicans are immature birds
- Become stressed flying from Mexico in the late afternoon
 - ◆ Desert surface temperatures 175 degrees
 - ◆ Some crash in the desert, hit powerlines, crash in fields
 - ◆ Too weak to fish
 - ◆ Become Dehydrated
 - ◆ Sick Tilapia easy food source



CO2 IN THE SALTON SEA FEEDS ALGAE



- Large field of CO2 vents at southeast side of the Salton Sea
- Captured and compressed to dry ice during World War II
- Numerous mudpots
- Most are covered by the sea and are very active

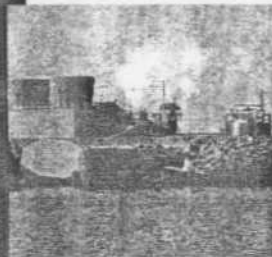
ALAMO AND NEW RIVER DELTAS CREATE LARGE BIRD HABITATS

- Deltas continue to grow larger as more silt is deposited
- Do birds add to the nutrient loads?

PINK FLAMINGOS AT ALAMO DELTA



DIKES ARE BUILT TO HOLD BACK THE SALTON SEA



- Dikes protect geothermal plants and farmland
- Dikes create shelter for young Tilapia and Croaker

CURRENTS IN THE SALTON SEA

- Wind currents
- Water mixing currents

WIND CURRENTS

- Run counter-clockwise and clockwise
- Keep water mixed
- Spreads dead fish around the sea
- Moves dead water and oxygen rich water around
- 2 currents running opposite directions may meet
 - ◆ Form "scum line"
 - ◆ Traps debris
 - ◆ Stirs bottom sediment

WATER MIXING CURRENTS

- Fresh water from deltas floats on top of salt water with no wind
- It finally “falls off” much like water going over a cliff
 - ◆ Creates boiling scum line from surface to bottom
 - ◆ Stirs up bottom sediment

ARE WE LOOKING AT ALL THE REASONS FOR ALGAE BLOOMS?

- Bird and fish droppings
- CO2 vents
- Two different types of currents
- Wind triggered algae blooms

QUESTIONS?