CALIFORNIA
Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

Public Workshop

Organochlorine Compounds TMDLs

Upper and Lower Newport Bay:

DDT, Chlordane, PCBs

San Diego Creek:

DDT, Toxaphene

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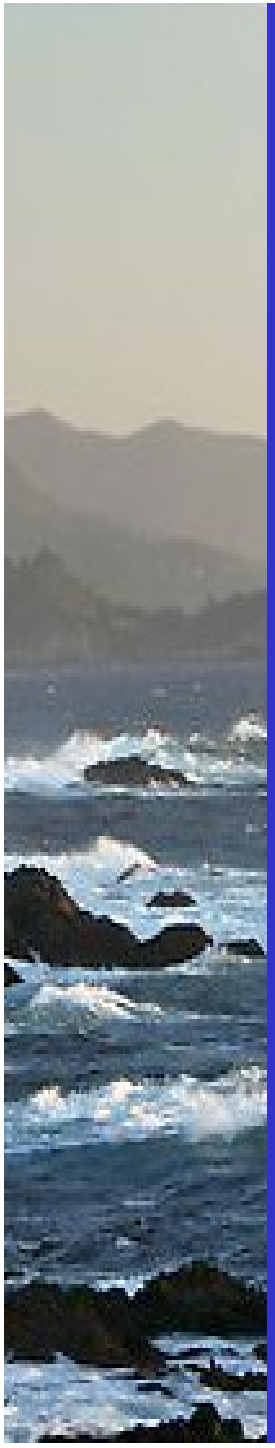
SARWQCB

December 1, 2006



Outline

- Overview of the Watershed
- Overview of TMDLs
- About the Organochlorine (OC) Pollutants
- History of OCs TMDLs
- Impairment Assessment
- TMDL Elements
- Implementation Plan
- Economic Considerations
- CEQA
- Anticipated Schedule

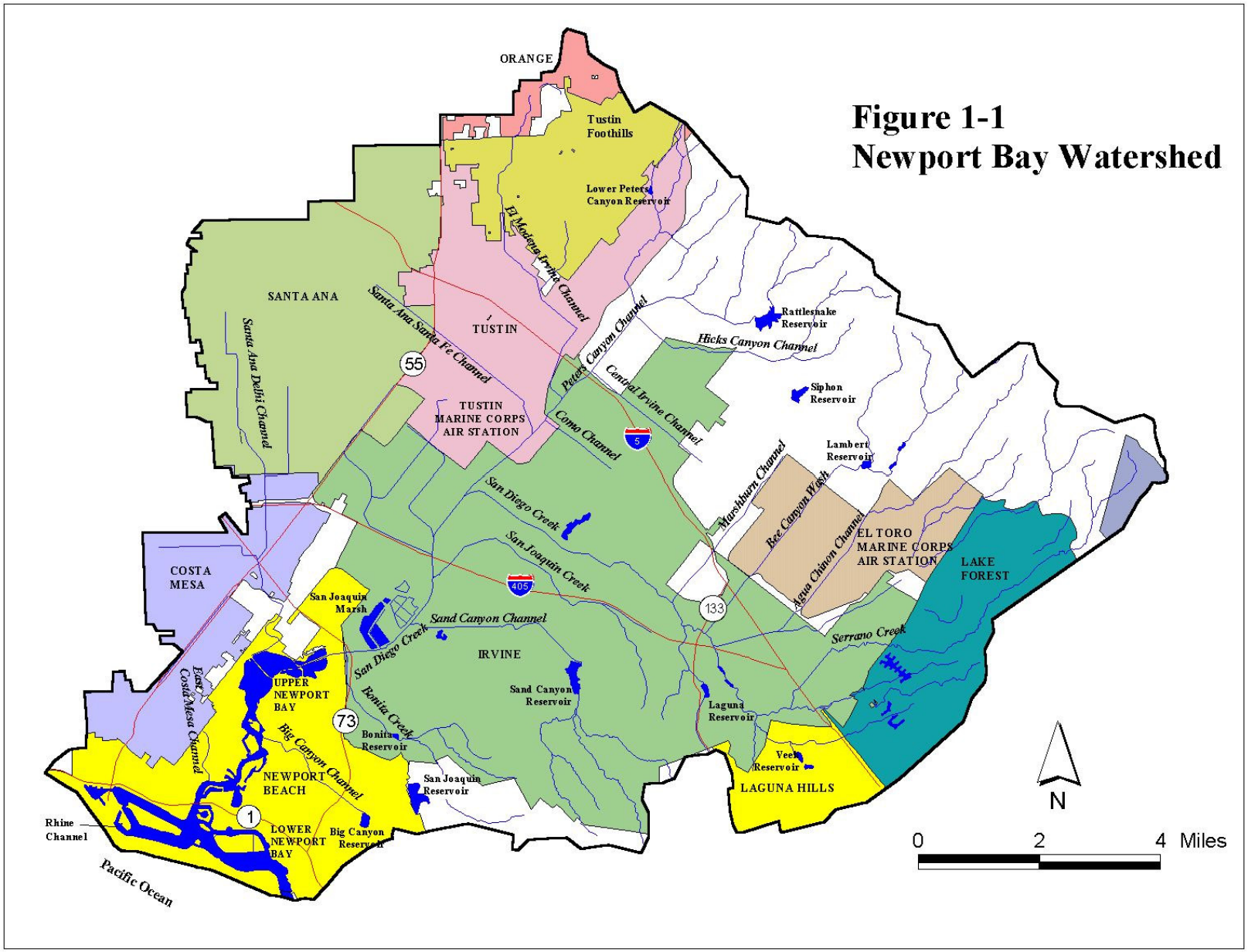
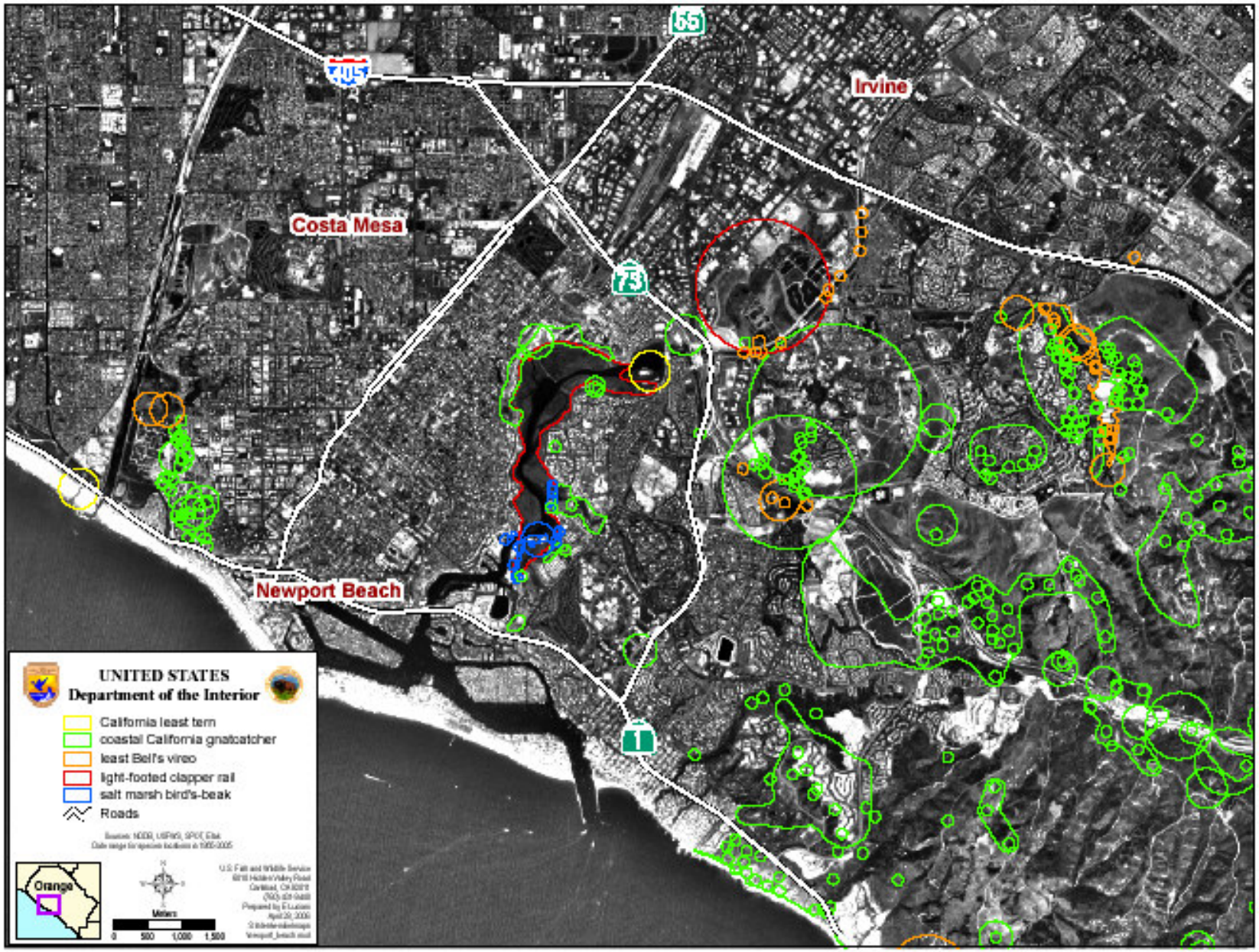


Figure 1-1
Newport Bay Watershed
ORANGE
Tustin Foothills
Lower Peters Canyon Reservoir
El Modena Irvine Channel
SANTA ANA
Santa Ana Delhi Channel
Santa Ana Santa Fe Channel
TUSTIN
55
TUSTIN MARINE CORPS AIR STATION
Peters Canyon Channel
Central Irvine Channel
Como Channel
Rattlesnake Reservoir
Hicks Canyon Channel
Siphon Reservoir
Lambert Reservoir
Marshburn Channel
Bee Canyon Wash
Agua Chinon Channel
EL TORO MARINE CORPS AIR STATION
LAKE FOREST
San Diego Creek
San Joaquin Creek
405
133
COSTA MESA
San Joaquin Marsh
Sand Canyon Channel
San Diego Creek
IRVINE
Serrano Creek
East Costa Mesa Channel
UPPER NEWPORT BAY
Bonita Creek
73
Sand Canyon Reservoir
Laguna Reservoir
Big Canyon Channel
Bonita Reservoir
Veeh Reservoir
NEWPORT BEACH
San Joaquin Reservoir
LAGUNA HILLS
Rhine Channel
1
LOWER NEWPORT BAY
Big Canyon Reservoir
Pacific Ocean
N
0
2
4 Miles

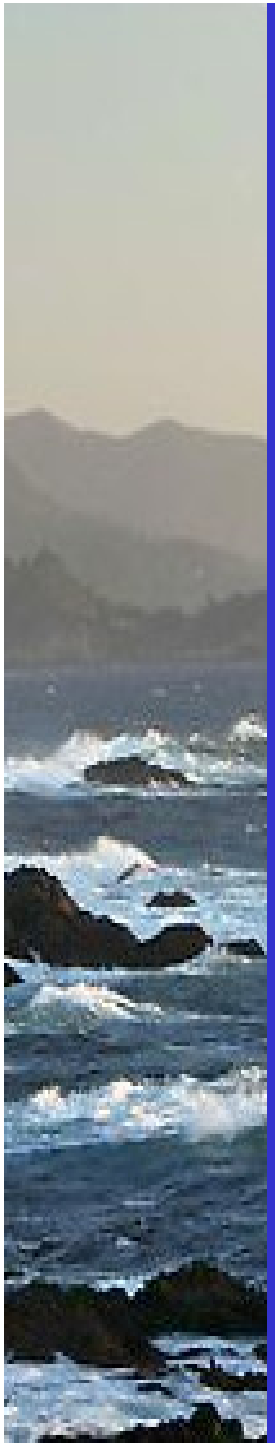
Slide #3


55
405
Irvine
Costa Mesa
73
Newport Beach
1
UNITED STATES
Department of the Interior
California least tern
coastal California gnatcatcher
least Bell's vireo
light-footed clapper rail
salt marsh bird's-beak
Roads
Orange
Meters
0
500
1,000
1,500

Slide #4

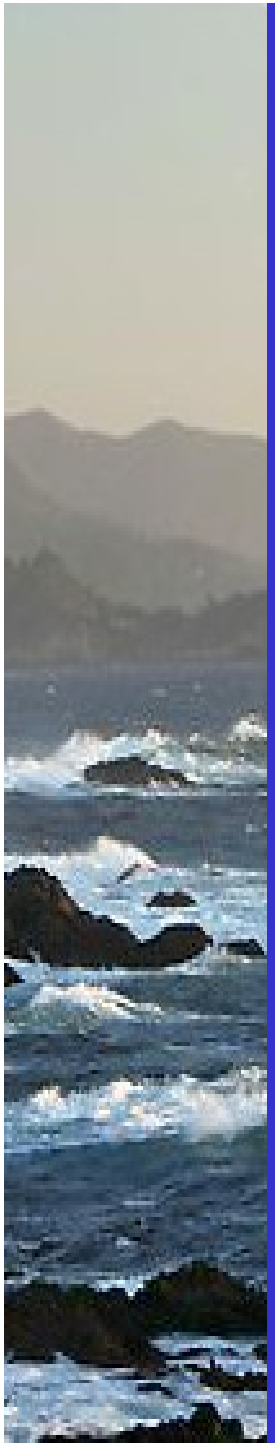
Land Use Data Provided by Orange County, March 2002

Land Use	San Diego Creek Watershed		Newport Bay Watershed	
	Acres	Percent	Acres	Percent
Vacant	21,910	28.5	23,462	23.9
Residential	11,668	15.2	19,420	19.7
Education/Religion/Recreation	15,811	20.6	17,393	17.7
Roads	10,295	13.4	15,774	16.0
Commercial	6,381	8.3	9,641	9.8
Industrial	3,965	5.2	5,263	5.4
Agriculture	5,092	6.6	5,147	5.2
Transportation	1,177	1.5	1,326	1.3
No code	440	0.6	936	0.9
Total	76,739	100	98,362	99.9



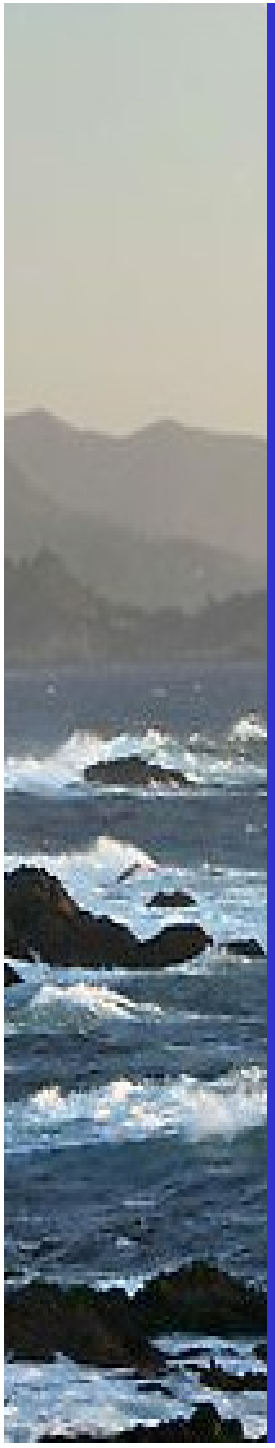
What is a TMDL?

- **Total Maximum Daily Load**: The maximum amount of a pollutant that can a waterbody can receive and still attain water quality standards (i.e., meet applicable water quality objectives and support all beneficial uses)
- Triggered by placement on CWA 303(d) List
- Development of OCs TMDLs considered a high priority



TMDL Elements

- Problem Statement
- Numeric Targets
- Source Analysis
- Existing Loads
- Loading Capacity/Linkage Analysis
- TMDL and Allocations
- Seasonal Variation/Critical Conditions
- Margin of Safety
- Implementation Plan



About the OCs:
DDT, Chlordane, Toxaphene, PCBs

- Legacy pesticides historically used on agricultural crops and in urban areas
- PCBs used in transformers and as lubricants
- Uses banned in the U.S. for one or more decades
- Strongly persistent in the environment; associated with the organic fraction of fine sediments
- Low solubility in water

Biomagnification

Birds

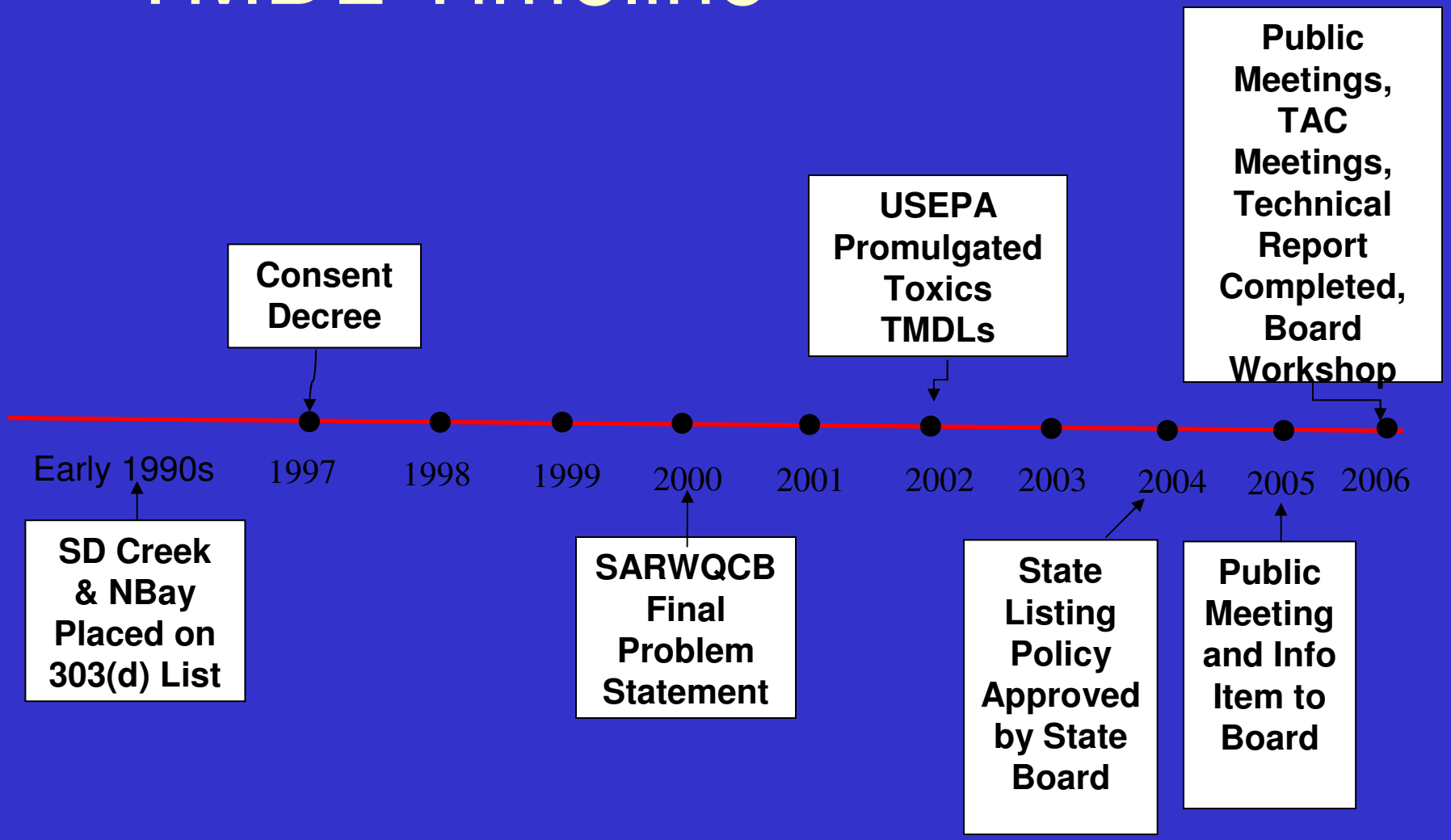
Fish

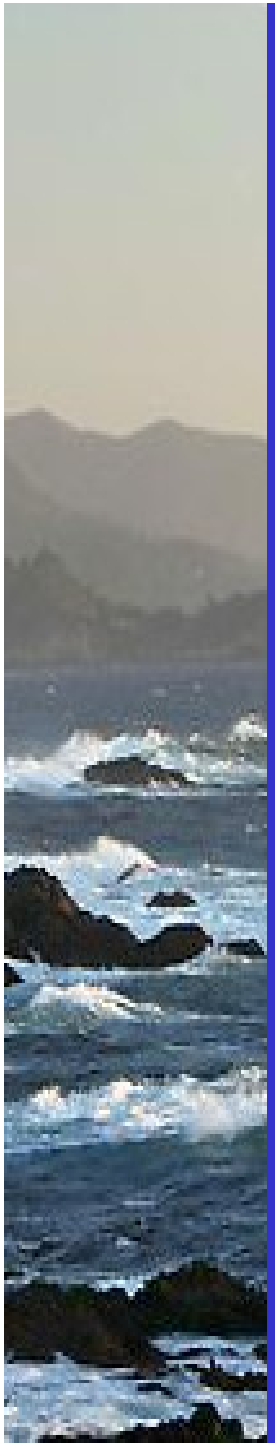
Benthic Organisms

All OCs pollutants bioaccumulate in plants and fatty tissues of fish, birds, and mammals, and biomagnifiy in food chain.

DDT linked to eggshell thinning in bald eagle, peregrine falcon, brown pelican and osprey

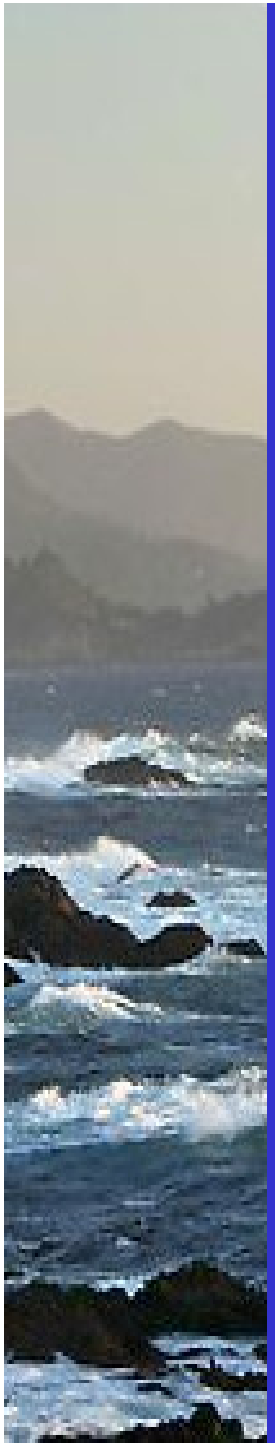
TMDL Timeline





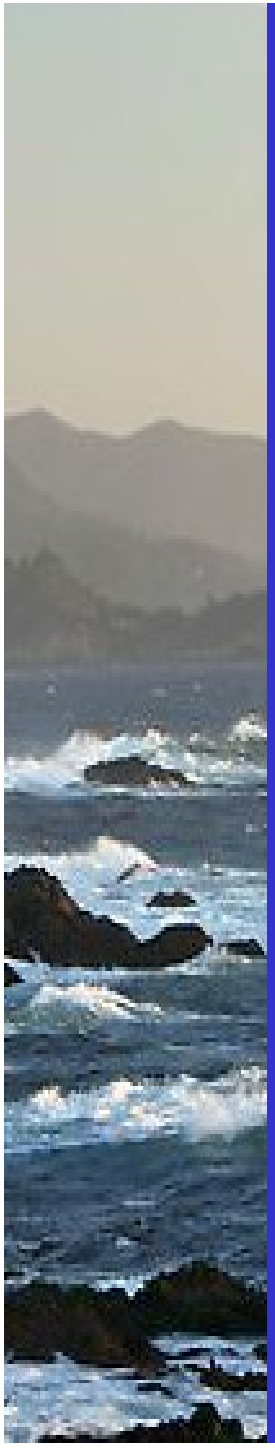
USEPA Technical OCs TMDLs

Waterbody	USEPA (2002)
San Diego Creek	Chlordane, Dieldrin, DDT, PCBs, Toxaphene
Upper Newport Bay	Chlordane, DDT, PCBs
Lower Newport Bay	Chlordane, Dieldrin, DDT, PCBs



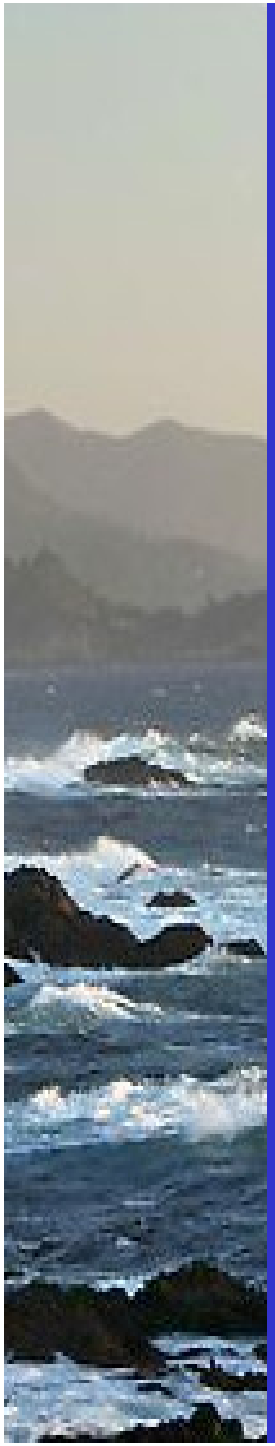
Impairment Re-Evaluated

- Based on controversy surrounding TMDLs
- Consistent with State Listing Policy approved in 2004
- Used a weight of evidence approach



Water Quality Standards

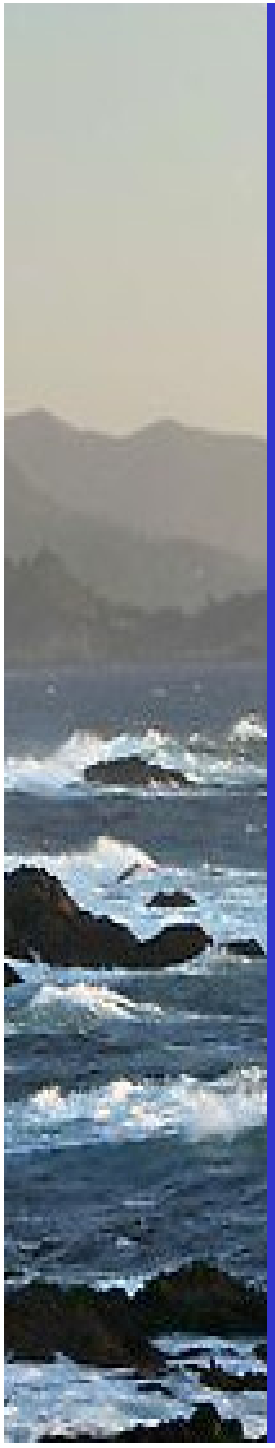
- Numeric Water Quality Objectives: California Toxics Rule
  - Numeric water aquatic life criteria for 23 priority toxic pollutants
  - Numeric water human health criteria for 57 priority toxic pollutants



Narrative Water Quality Objectives for Toxic Substances

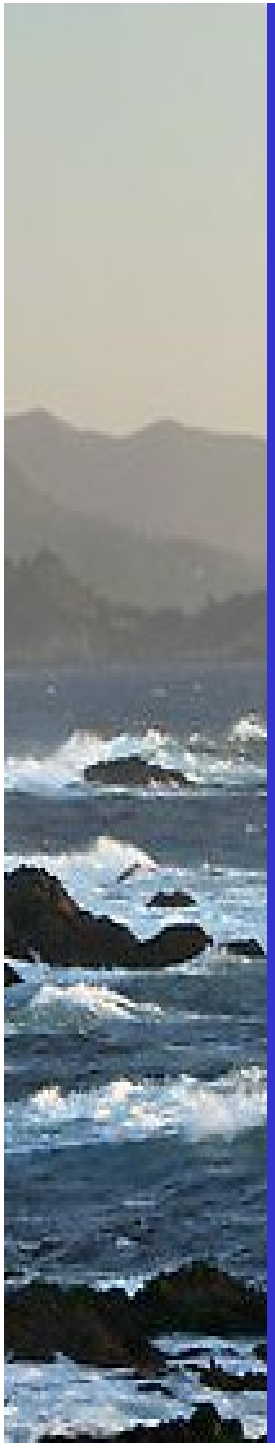
(1) Toxic substances shall not be discharged at levels that will bioaccumulate in aquatic resources to levels which are harmful to human health; and

(2) The concentration of toxic substances in the water column, sediment, or biota shall not adversely affect beneficial uses.



Beneficial Uses

Waterbody	Beneficial Use
San Diego Creek & tributaries	REC1, REC2, GWR, WARM, WILD
Upper Newport Bay	REC1, REC2, COMM, BIOL, WILD, RARE, SPWN, MAR, SHEL, EST
Lower Newport Bay	NAV, REC1, REC2, COMM, WILD, RARE, SPWN, MAR, SHEL



Weight of Evidence Approach

- Water column
- Sediment chemistry, toxicity & benthic community (sediment triad)
  - Direct toxic effects to aquatic life
- Fish tissue; bird egg tissue
  - Indirect adverse effects due to bioaccumulation

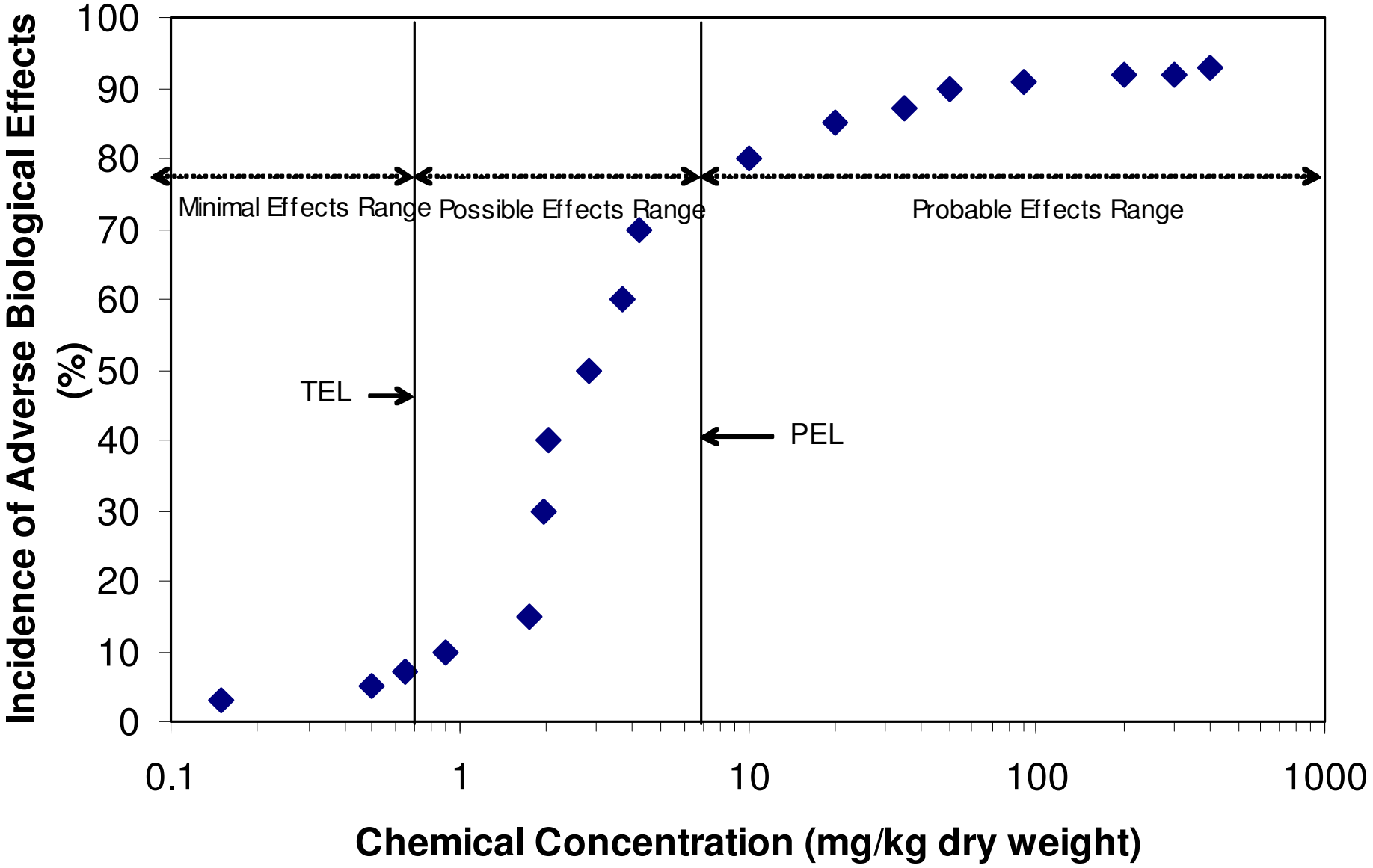
CTR Criteria for Organochlorine Compounds.

Pollutant	Ambient Water Quality (CTR)					
	Freshwater		Saltwater		Human Health (10^{-6} risk for carcinogens) For consumption of:	
	Criterion Maximum Concentration (CMC)	Criterion Continuous Concentration (CCC)	Criterion Maximum Concentration (CMC)	Criterion Continuous Concentration (CCC)	Water & Organisms	Organisms Only
	µg/L					
p,p-DDD					0.00083	0.00084
p,p-DDE					0.00059	0.00059
p,p-DDT	1.1	0.001	0.13	0.001	0.00059	0.00059
Dieldrin	0.24	0.056	0.71	0.0019	0.00014	0.00014
Chlordane	2.4	0.0043	0.09	0.004	0.00057	0.00059
Total PCBs[1]		0.014		0.03	0.00017	0.00017
Toxaphene	0.73	0.0002	0.21	0.0002	0.00073	0.00075

[1] PCBs value based on sum of seven Aroclors: 1242, 1254, 1221, 1232, 1248, 1268, 1016
Blank space indicates no data available.
"Water & Org" and "Org. Only" refer to human health criteria for consuming water and/or organisms from same water body.

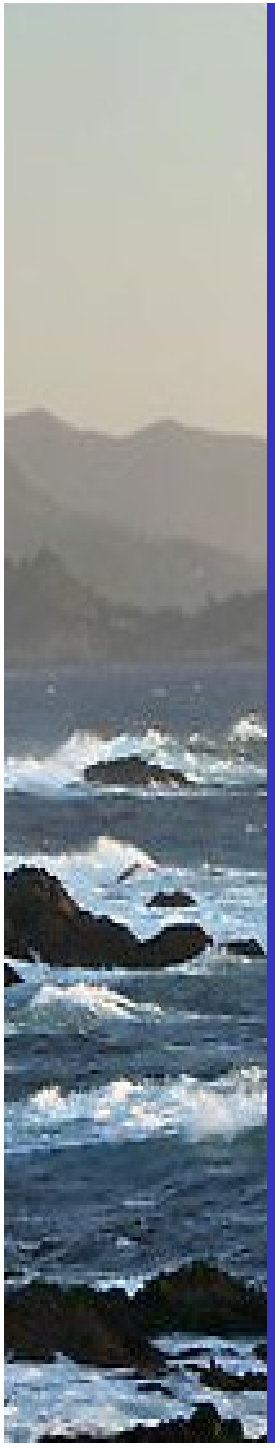
Sediment Quality Guidelines

	Freshwater Sediment				Marine and Estuarine Sediment					
Pollutant	TEL	PEL	TEC	PEC	TEL	PEL	ERL	ERM	Other SQG	SoCal ERM
	µg/kg dry wt				µg/kg dry wt					
p,p-DDD	3.54	8.51			1.22	7.81	2	20		2.5
p,p-DDE	1.42	6.75			2.07	374	2.2	27		12.2
p,p-DDT					1.19	4.77	1	7		1.9
o,p-DDE										
o,p-DDT										
Sum DDD			4.88	28.0						
Sum DDE			3.16	31.3						
Sum DDT			4.16	62.9						
Total DDT	6.98	4450	5.28	572	3.89	51.7	1.58	46.1		
Dieldrin	2.85	6.67	1.90	61.8	0.72	4.3	0.02	8		1.08
Chlordane	4.5	8.9	3.24	17.6	2.26	4.79	0.5	6		
Total PCBs	34.1	277	59.8	676	21.6	189	22.7	180	400	77.2
Toxaphene	0.1*									


Incidence of Adverse Biological Effects (%)
100
90
80
70
60
50
40
30
20
10
0
Minimal Effects Range
Possible Effects Range
Probable Effects Range
TEL
PEL
0.1
1
10
100
1000
Chemical Concentration (mg/kg dry weight)

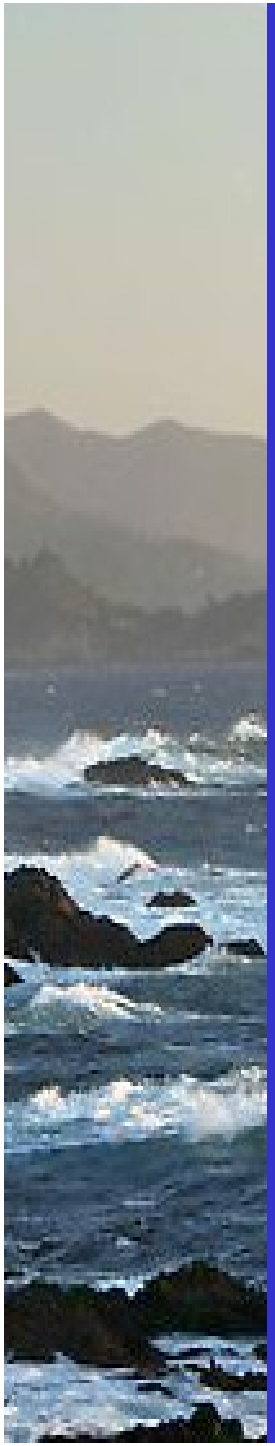
Fish Tissue Screening Values

Pollutant	Human Protection		Aquatic Life/Wildlife Protection		
	OEHHA	FDA	NAS		Environment Canada
			Freshwater	Marine	
	µg/kg wet wt		*µg/kg wet wt*		
p,p-DDD					
p,p-DDE					
p,p-DDT					
Total DDT	100		1,000	50	14 µg/kg diet wet wt
Dieldrin	2	300	100	5	
Total Chlordane	30		100	50	
Total PCBs	20	2000	500	500	*Mammalian*: 0.78 ng TEQ/kg diet ww *Avian*: 2.4 ng TEQ/kg diet ww
Toxaphene	30		100	50	6.3 µg/kg diet wet wt



Data Sources

- Toxic Substances Monitoring Program (TSMP)
- Bay Protection & Toxic Cleanup Program (BPTCP)
- Orange County RDMD monitoring data
- Irvine Ranch Water District (IRWD)
- Southern California Coastal Water Research Project (SCCWRP) Studies: Bay et al., 2004; Allen et al., 2004; Sutula et al., 2005
- OEHHA Coastal Fish Contamination Program, 1999
- Masters & Inman, 2000
- Bight '98 and '03



Impairment Assessment

- Impairment found when more than the required minimum number of exceedances occurred in water, sediment triad, or tissue
- Data evaluated from 1995-present; older data were not used

Minimum Number of Measured Exceedances to List

Null Hypothesis (H_o): Actual exceedance proportion ≤3 percent.
Alternate Hypothesis (H_a): Actual exceedance proportion > 18 percent. The minimum effect size is 15 percent.

Sample Size	List if the number of exceedances equals or is greater than
2-24	2
25-36	3
37-47	4
48-59	5
60-71	6
72-82	7
83-94	8
95-106	9
107-117	10
118-129	11

Impairment Results: San Diego Creek

Pollutant	Toxicity to Directly Exposed Organisms	Indirect Toxicity	
		Aquatic Life/Wildlife	Humans
Total DDT	Insufficient data	No	Insufficient Data
Chlordane	Insufficient data	No	Insufficient data
Total PCBs	Insufficient data	No	Insufficient data
Toxapahene	Insufficient data	Yes	Insufficient data

Impairment Results: Upper Newport Bay

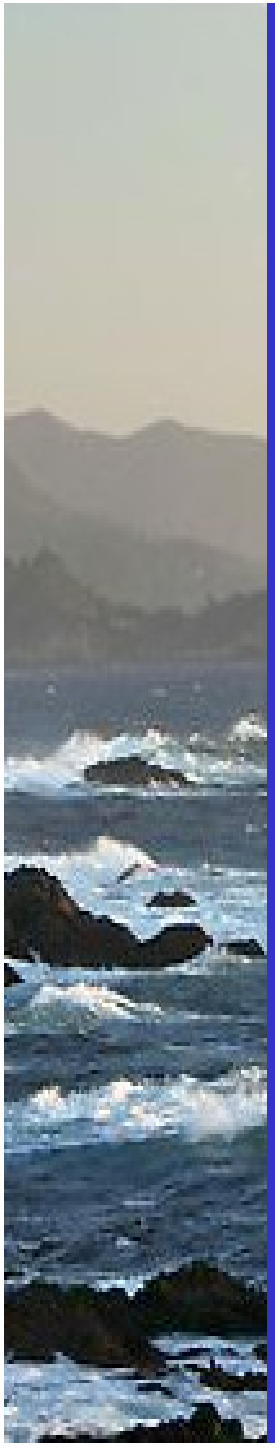
Pollutant	Toxicity to Directly Exposed Organisms	Indirect Toxicity	
		Aquatic Life/Wildlife	Humans
Total DDT	Yes	Yes	Yes
Chlordane	Yes	No	No
Total PCBs	No	No	Yes
Toxapahene	Insufficient Data	Insufficient Data	No

Impairment Results: Lower Newport Bay

Pollutant	Toxicity to Directly Exposed Organisms	Indirect Toxicity	
		Aquatic Life/Wildlife	Humans
Total DDT	Yes	Yes	Yes
Chlordane	Yes	No	No
Total PCBs	No	No	Yes
Toxapahene	Insufficient Data	Insufficient Data	Insufficient Data

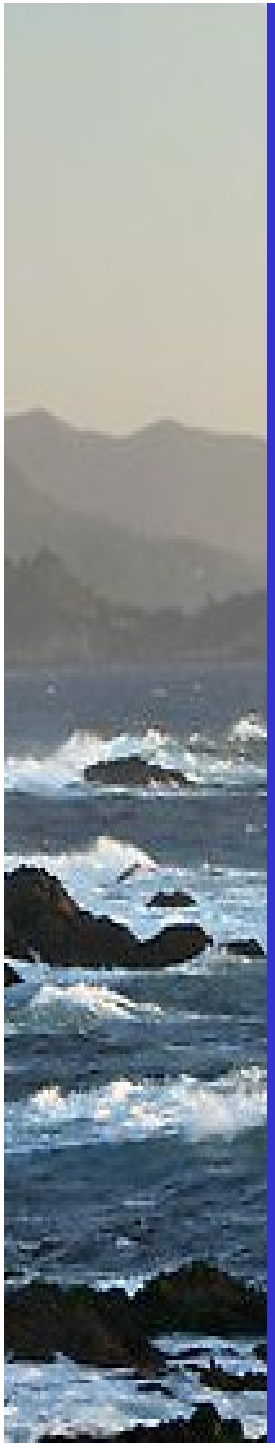
TMDL Constituent Comparison

Waterbody	USEPA (2002)	Regional Board Staff (2006)
San Diego Creek	**Chlordane, Dieldrin, DDT, PCBs, Toxaphene**	**Toxaphene, DDT** ***Chlordane, PCBs***
Upper Newport Bay	**Chlordane, DDT, PCBs**	**Chlordane, DDT, PCBs**
Lower Newport Bay	**Chlordane, Dieldrin, DDT, PCBs**	**Chlordane, DDT, PCBs**



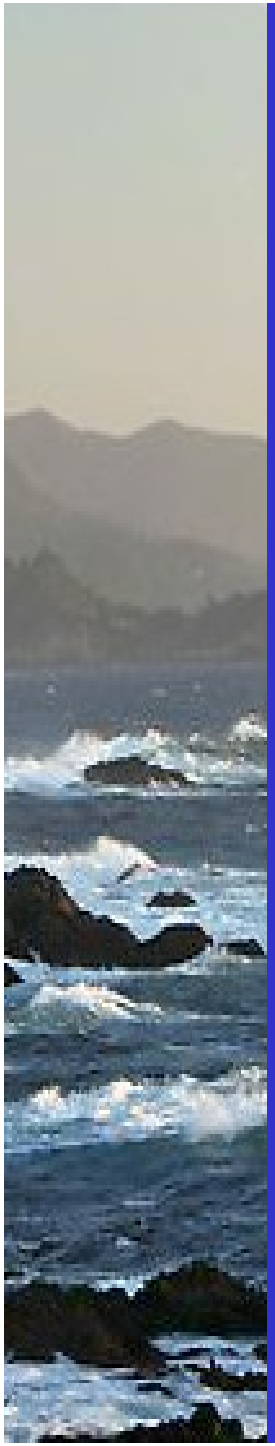
Areas of Controversy

- Stakeholder Concerns
  - NAS guidelines and OEHHA screening values are inappropriate thresholds
  - Alternative marine threshold for protection of aquatic life was proposed
  - Declining trends show problem no longer exists
  - Observed direct toxicity in Newport Bay is due to pyrethroids, not OCs.



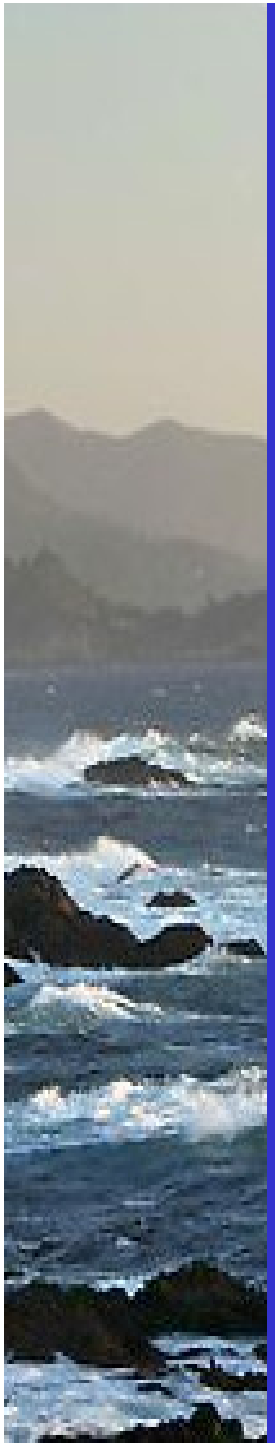
Staff's Position

- Use of OEHHA screening values and NAS guidelines are endorsed by the State
- Limited discretion to use alternative thresholds
  - Criteria exist for use of alternative thresholds
  - Proposed alternative thresholds do not meet criteria
  - NAS Guidelines were peer reviewed; alternative threshold was not



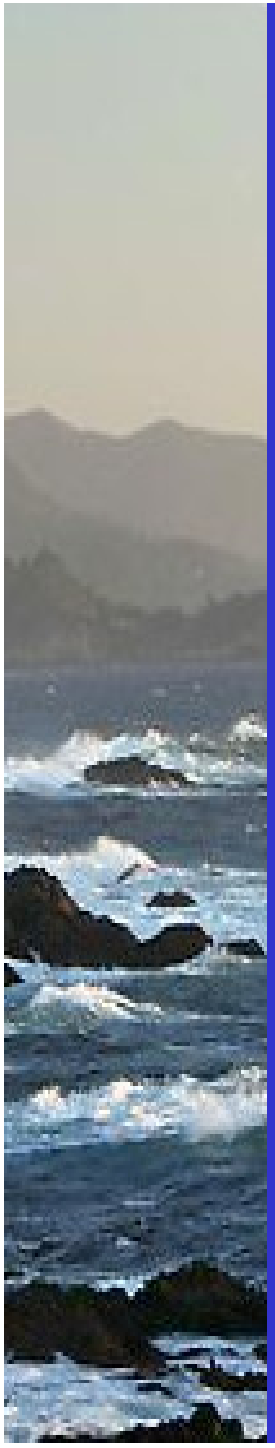
Staff's Position

- OEHHA Screening Values
  - OEHHA staff recognizes that screening values are used in assessments
  - Calculated for the 1:100,000 cancer risk for a 70 kg adult who eats 21 grams per day of fish over a period of 70 years



Staff's Position

- Staff agrees declining trends are statistically significant
- Staff recognizes that natural attentuation is occurring
- Trends alone cannot be used to delist

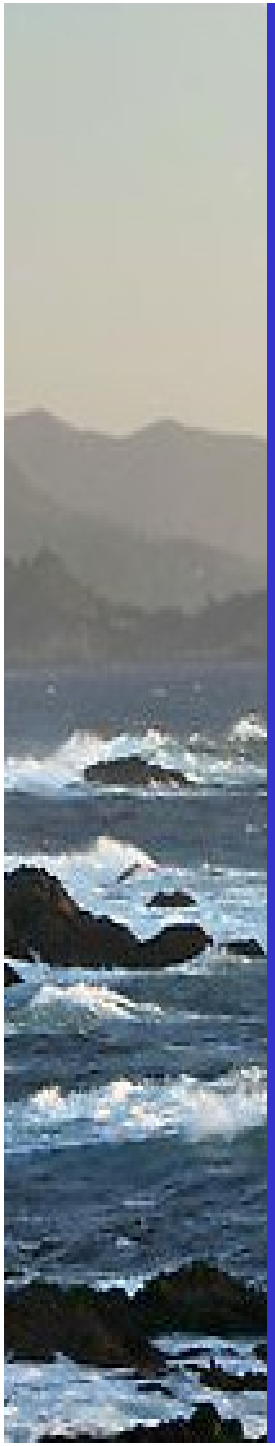


Staff's Position

- Staff agrees that the OCs are likely not the cause of direct toxicity in Bay sediment
- Data suggest that indirect toxic effects resulting from bioaccumulation are the primary threat to water quality
- Establishing OCs TMDLs is reasonable and necessary

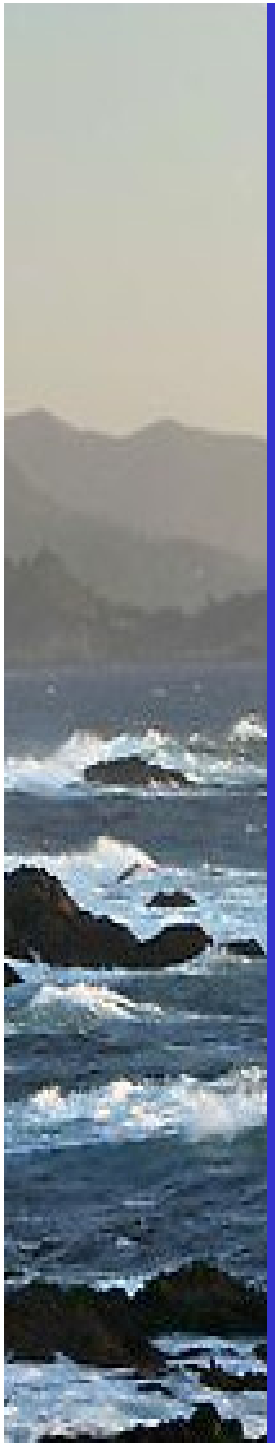
Proposed TMDLs

Waterbody	Pollutant
San Diego Creek	Toxaphene, DDT *Chlordane, PCBs*
Upper Newport Bay	Chlordane, DDT, PCBs
Lower Newport Bay	Chlordane, DDT, PCBs



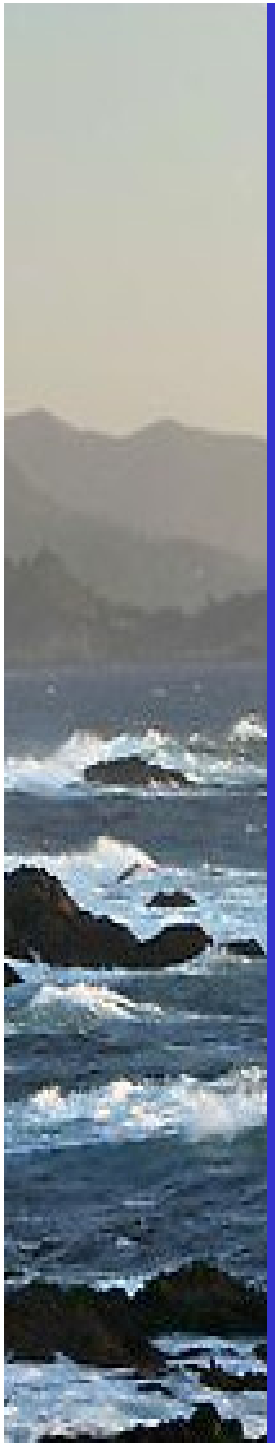
Numeric Targets

- Numeric targets identify endpoints that equate to attainment of water quality standards.
- Multiple targets may be appropriate
- Targets must address protection of aquatic organisms, wildlife, and human consumers of fish



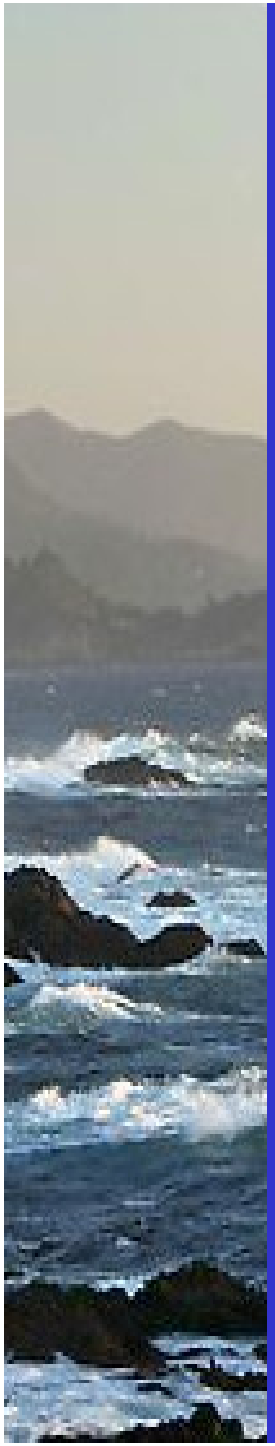
Numeric Targets (cont'd)

- For numeric water quality objectives, TMDL targets are set to that value
- Targets are translators of narrative objectives, not standards
- Alternative targets were considered; USEPA targets were selected



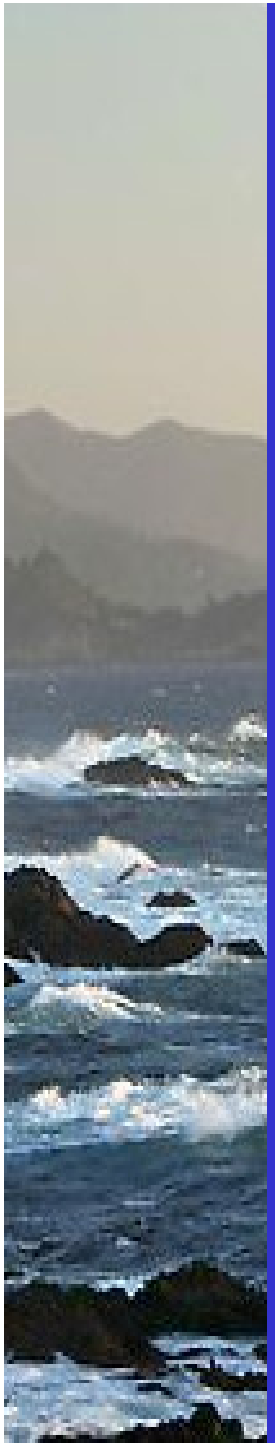
Targets

- Water Column Targets = CTR
- Fish Tissue Targets for Protection of Aquatic Life and Wildlife Beneficial Uses = NAS Guidelines
- Fish Tissue Targets for Protection of Fishing Beneficial Uses = OEHHA Screening Values
- Sediment Targets = Low Threshold Sediment Quality Guidelines (TELs)



Sediment Targets

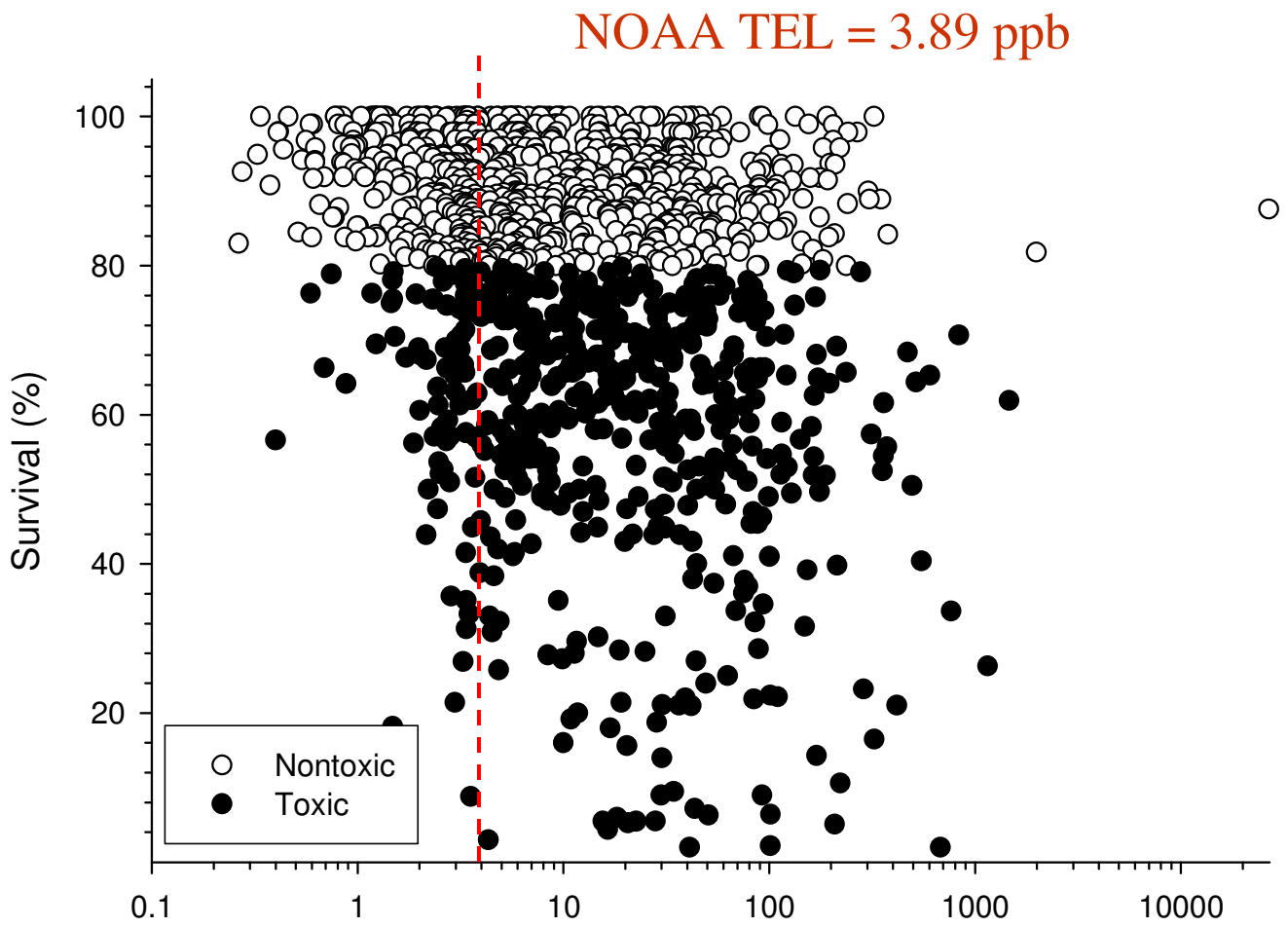
- TELs from National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQuiRTs)
- NOAA uses Sediment Quality Guidelines (SQGs) as preliminary screening values



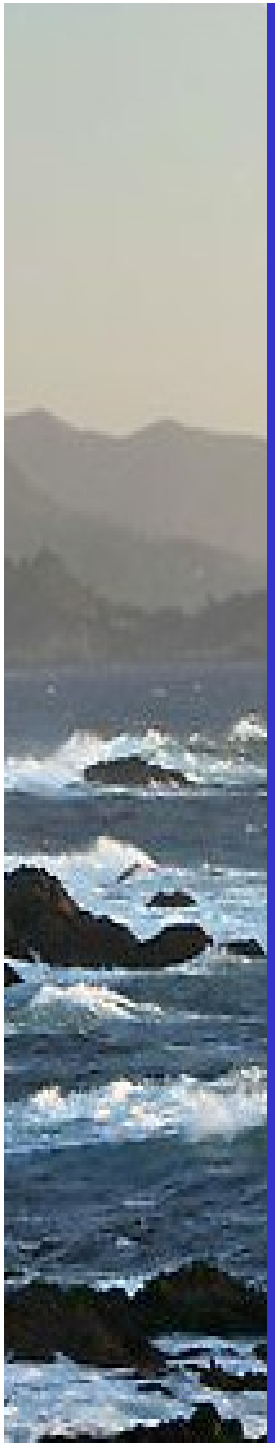
Sediment Targets

- TELs apply statistics to a nationwide data set
- Predict nontoxicity in sediment
- Based on toxicity to benthic organisms – not effects due to bioaccumulation

10-Day Amphipod Survival vs. DDT in Southern California Embayments

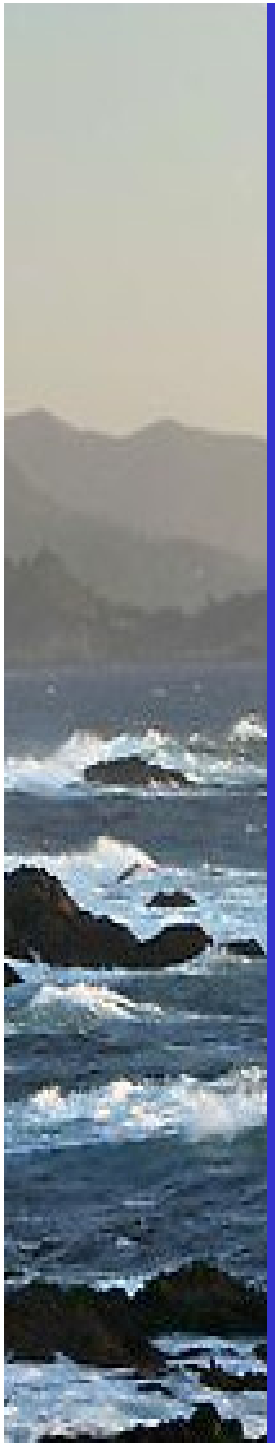


Graph provided by SCCWRP



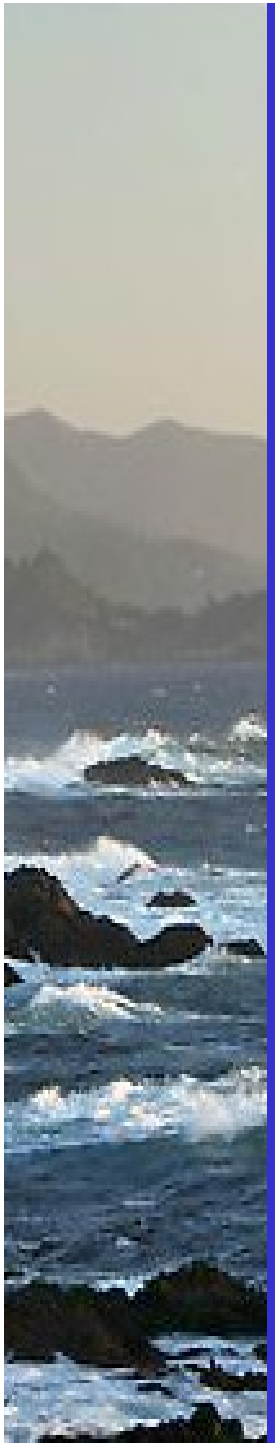
Sediment Targets

- Low threshold SQGs justified:
  - Direct link between biologic effects and sediment
  - Conservative
  - Commonly used in the scientific and regulatory community
  - Precedent for use



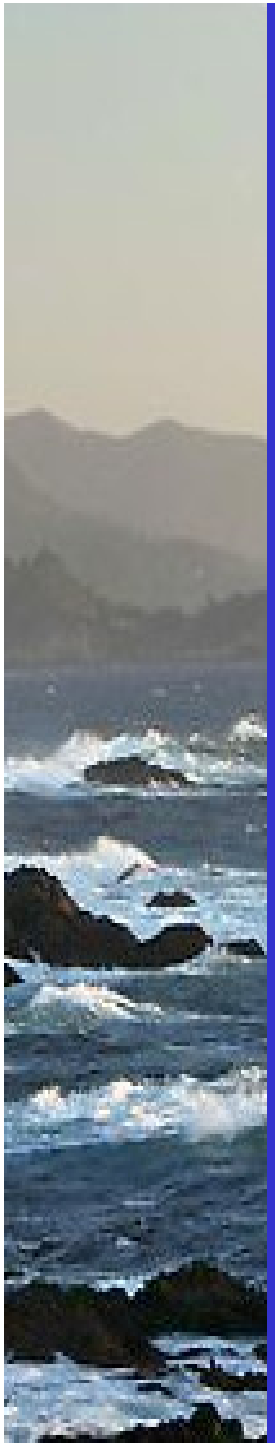
Sediment Targets

- Strengths and weaknesses are well understood
- Implementation tasks will address uncertainty
- Revised TMDLs will be based on risk to sensitive receptors to address bioaccumulation



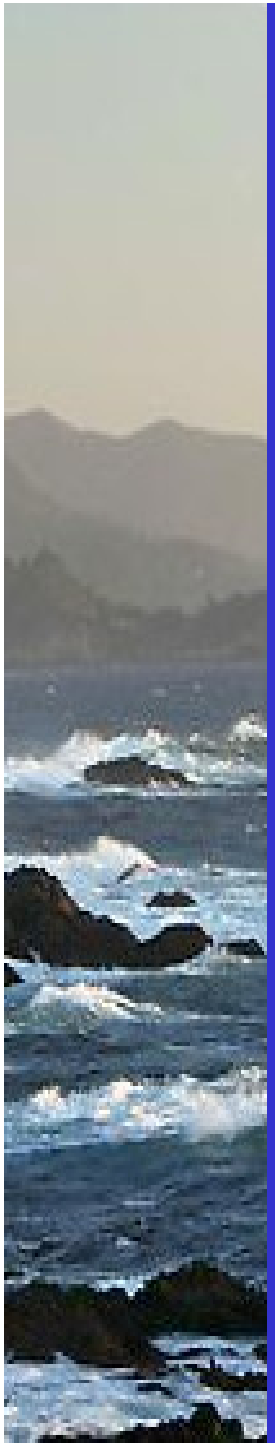
Sediment Targets

- USFWS Screening Level Risk Assessment – Selected results
  - DDT in Upper Newport Bay at levels of concern for avian species that eat benthic invertebrates (swallows, light-footed clapper rail, western snowy plover, Belding's savannah sparrow)
    - Protective sediment DDT targets were calculated: 2.0 ppb for small bird and 3.0 ppb for medium-size bird



Sediment Targets

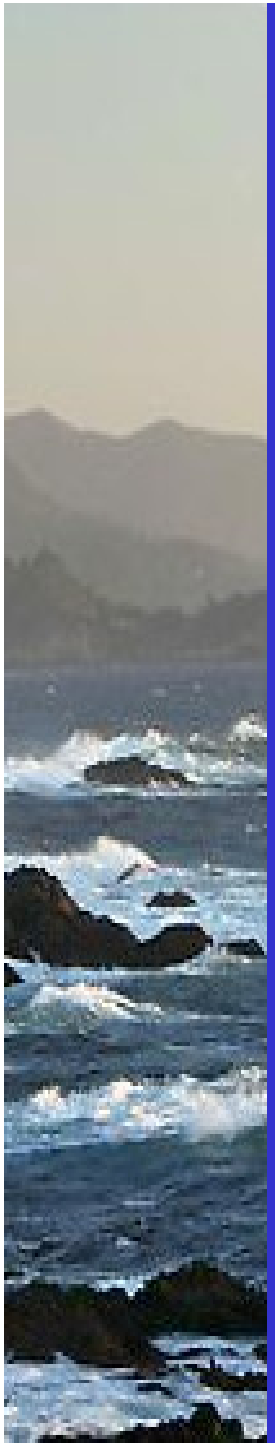
- DDT in Upper Newport Bay at levels of concern for avian species that eat fish (osprey, bald eagle, California least tern, brown pelican)
  - Protective sediment DDT targets calculated: 1.0 ppb for small birds and 3.0 ppb for medium-size birds that rely on forage fish for food
- During TMDL implementation, a more in-depth analysis may be warranted



Sediment Targets

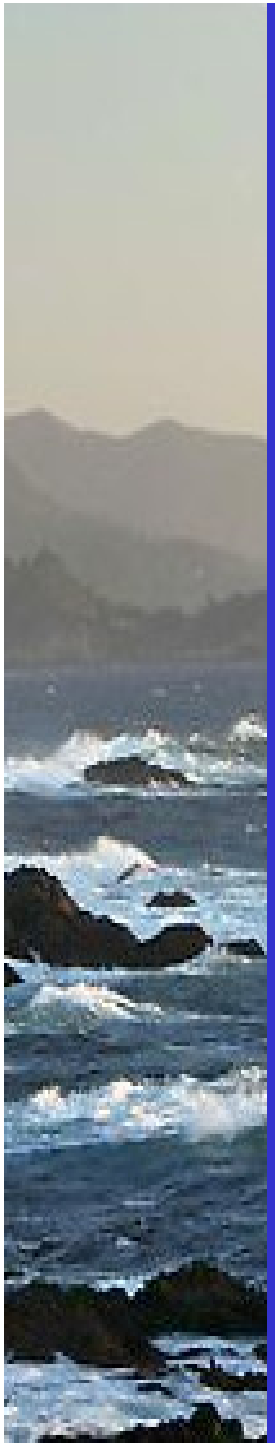
- Sediment targets considered primary targets because:
  - The OCs are directly associated with fine sediment
  - The OCs are primarily transported with sediment
  - Impacts to the biota occur through bioaccumulation and biomagnification; impacts can ultimately be related to sediment concentrations

Discharges of organochlorine pollutants are associated with discharges of contaminated sediments.



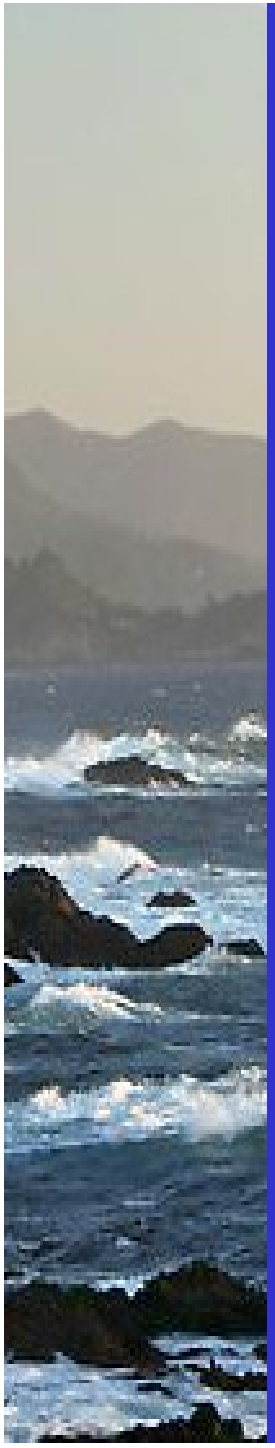
Sediment Targets

- Attainment of sediment targets should result in
  - Attainment of water column criteria and fish tissue targets
  - Protection of aquatic life, wildlife, and human health



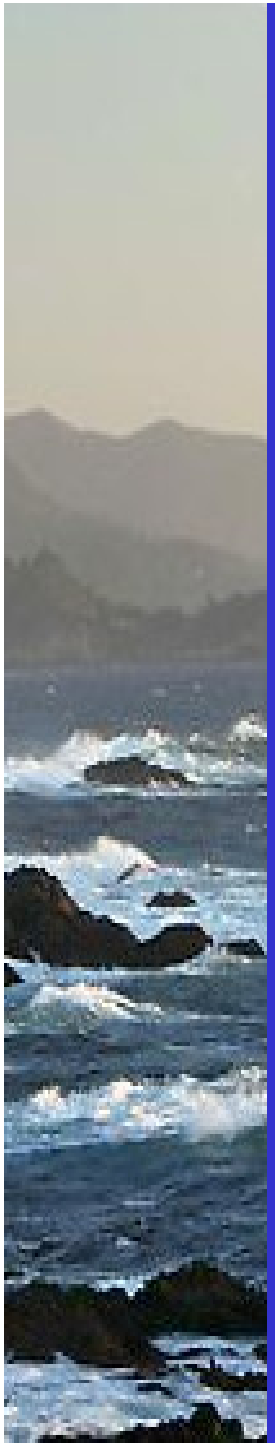
Areas of Controversy

- Use of OEHHA SVs, NAS guidelines, and sediment TELs are inappropriate for TMDL targets
  - Not meant for regulatory use
  - No cause and effect shown (TELs)
  - NAS guidelines are dated and in error
  - Sediment Quality Guidelines have associated error in their derivation



Staff's Position

- Use of OEHHA SVs, NAS Guidelines, and sediment TELs is reasonable and protective for Phase 1 Implementation
- TELs appear to be fairly good predictors of nontoxicity based on SoCal data
- Implementation tasks will reduce uncertainty and targets may be revised

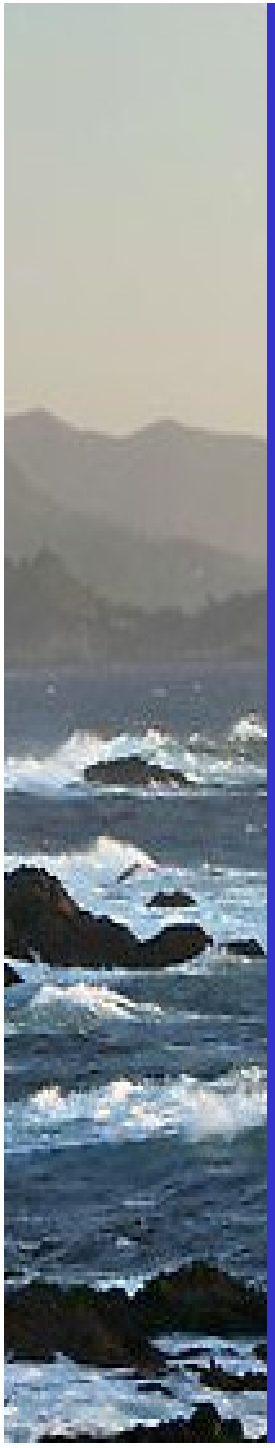


Staff's Position

- Same arguments (against targets) were made when USEPA promulgated technical TMDLs and (against impairment thresholds) when the recommendations for the 2006 CWA 303(d) List were circulated for public comment.

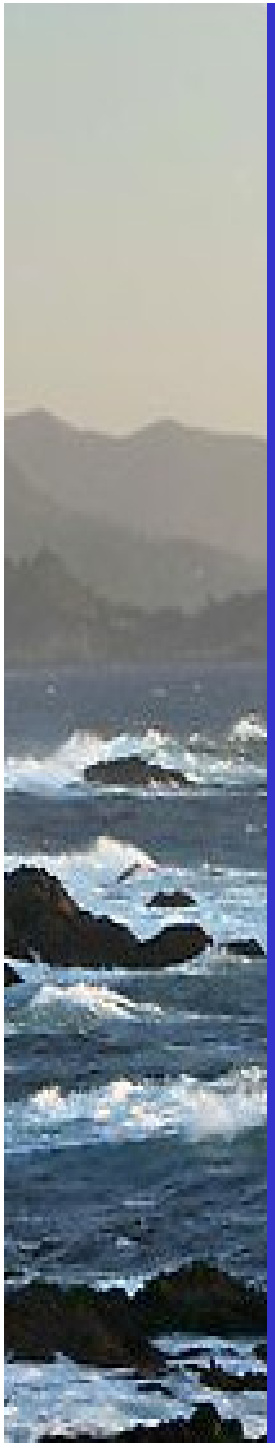
Numeric Targets

Sediment Targets	**Total DDT**	**Chlordane**	**Total PCBs**	**Toxaphene**
San Diego Creek and tributaries	6.98	*4.5**	*34.1**	0.1
Upper & Lower Newport Bay	3.89	2.26	21.5	
Fish Tissue Targets for Protection of Human Health[2]; units are µg/kg wet weight				
San Diego Creek and tributaries	100	*30**	*20**	30
Upper & Lower Newport Bay	100	30	20	
Fish Tissue Targets for Protection of Aquatic Life and Wildlife[3]; units are µg/kg ww				
San Diego Creek and tributaries	1000	*100**	*500**	100
Upper & Lower Newport Bay	50	50	500	
Water Column Targets for Protection of Aquatic Life, Wildlife & Human Health[4] (µg/L)				
San Diego Creek and tributaries				
Acute Criterion (CMC)	1.1	*2.4**		0.73
Chronic Criterion (CCC)	0.001	*0.0043**	*0.014**	0.0002
Human Health Criterion	0.00059	*0.00059**	*0.00017**	0.00075
Upper & Lower Newport Bay				
Acute Criterion (CMC)	0.13	0.09		
Chronic Criterion (CCC)	0.001	0.004	0.03	
Human Health Criterion	0.00059	0.00059	0.00017	



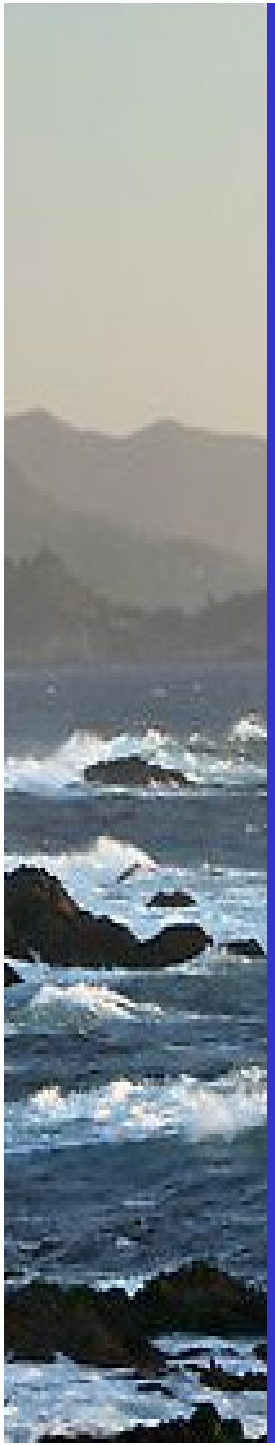
Sources

- Point Sources
  - Urban (MS4)
  - Commercial Nurseries
  - Roadway Discharges
  - Construction Activities
  - Other NPDES



Sources

- Nonpoint Sources
  - Agriculture
  - Open space
  - Channel erosion
- Background Sources
  - Aerial deposition



Relative Source Ranking

(1) Construction Activities

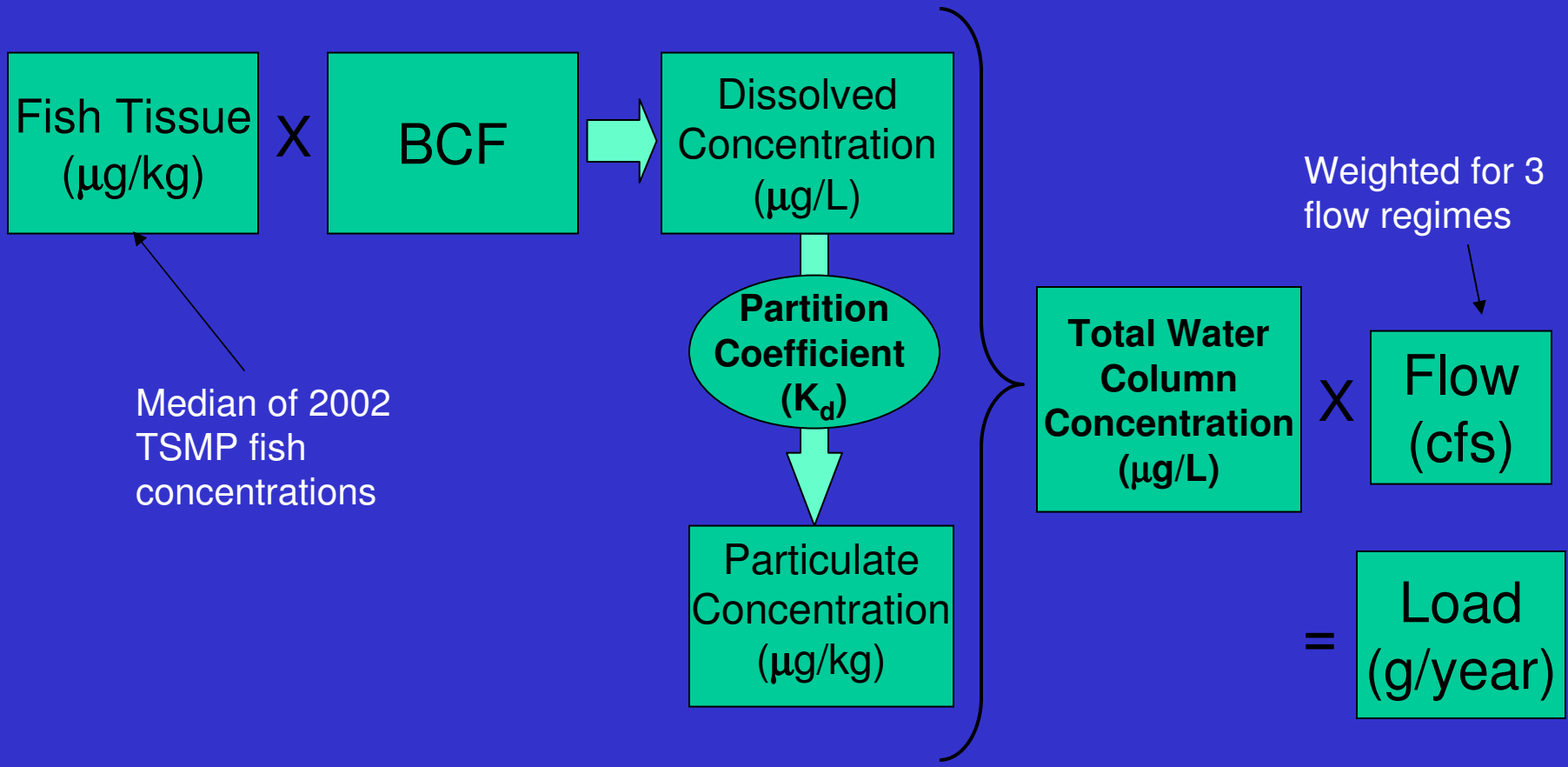
(2) Agriculture

(3) Channels and Streams

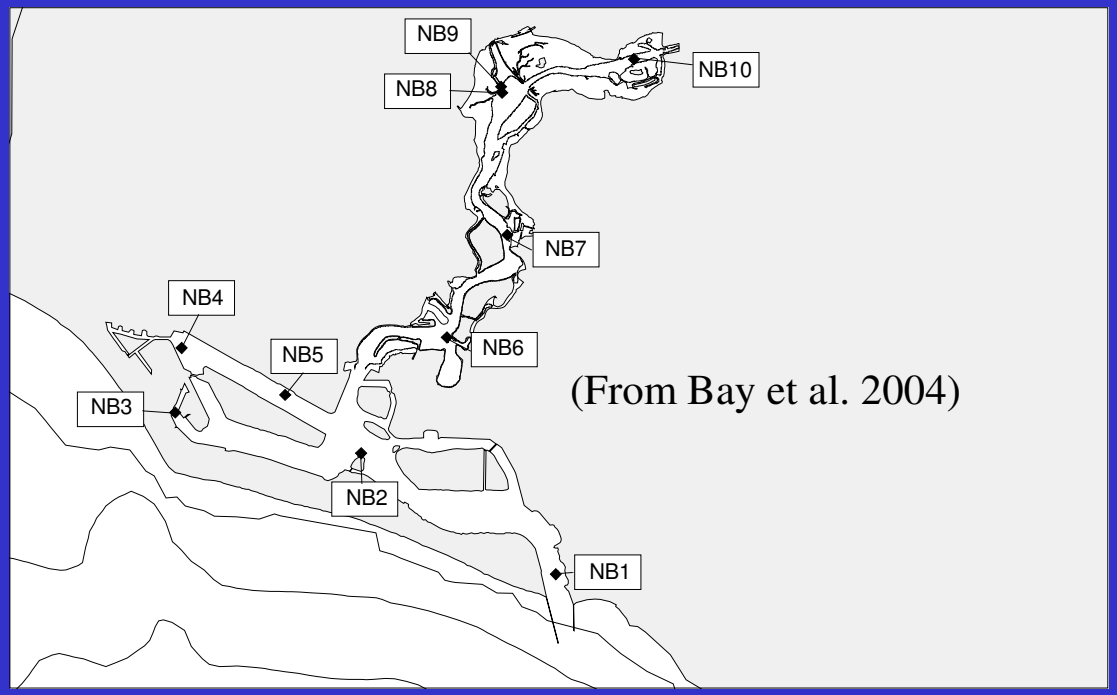
(4) Open Space

(5) Urban

Approach to Calculating Existing Loads – San Diego Creek

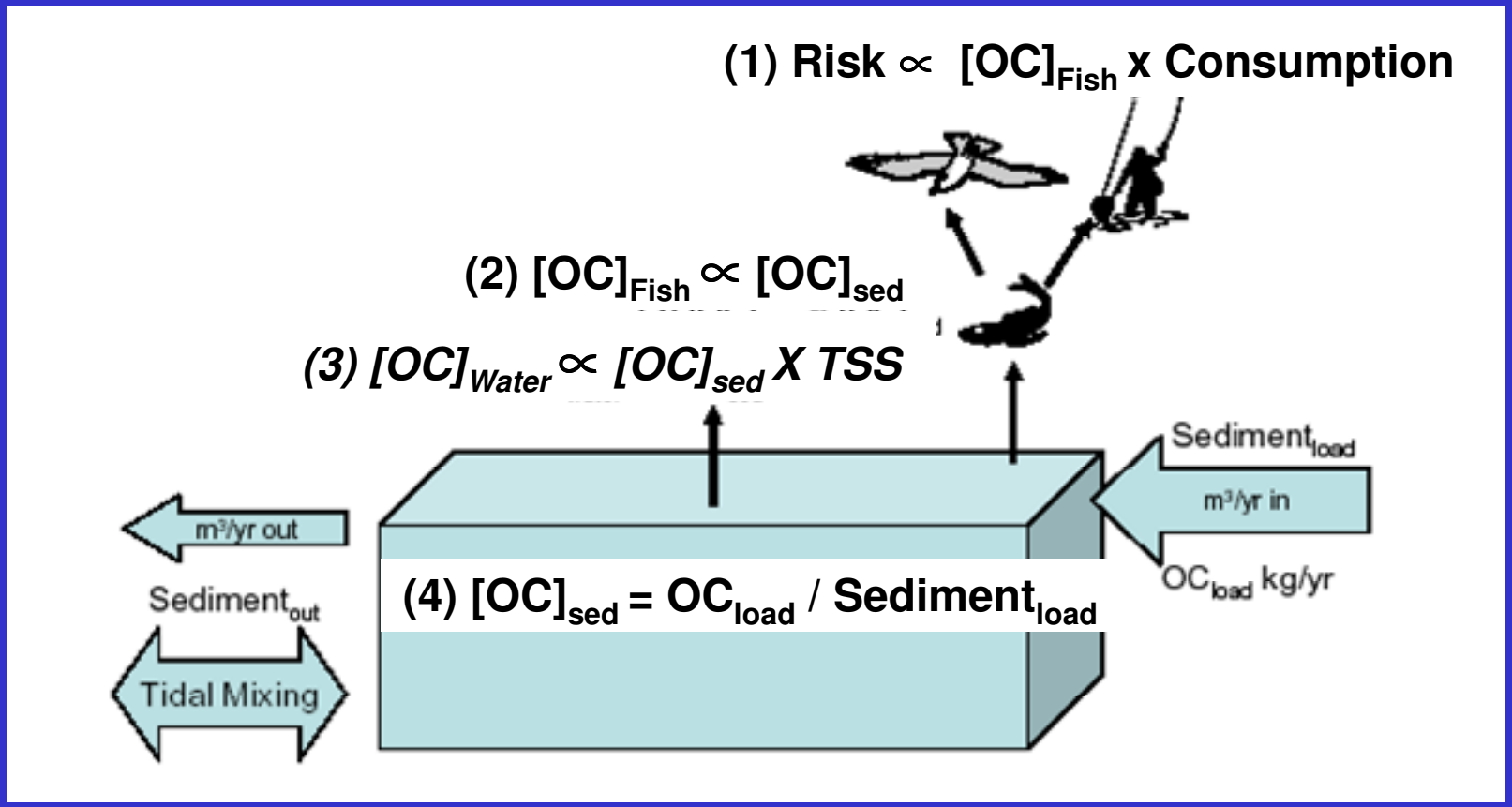


Approach to Calculating Existing Loads - the Bay

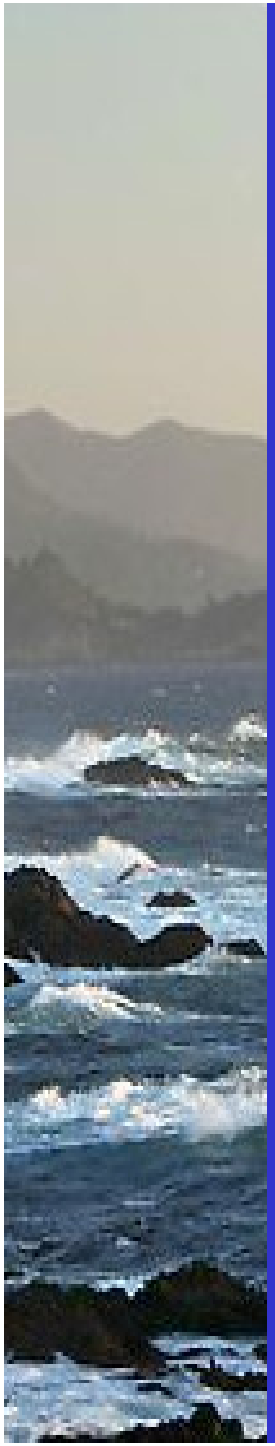


- Calculations used recent OCs concentrations in sediment, and modeled sediment deposition rates for discrete areas in the Bay, to estimate loads

Linkage Analysis



From Larry Walker and Associates, 2005



Loading Capacity

- Sediment TMDL Allowable Load x Sediment Target
  - 62,500 tons per year of sediment for Creek and 62,500 tons per year for Bay
- USEPA did not consider sediment TMDLs

Load Comparison

San Diego Creek

Constituent	USEPA Loading Capacity	USEPA Existing Load	Revised Loading Capacity	Revised Existing Load
Total DDT	432.6	3733.8	396	1026.5
Chlordane	*314.7*	*615.7*	*255*	*321.2*
Toxaphene	8.9	582.1	5.67	42.8
Total PCBs	*2226*	*282.1*	*1933*	*137.1*

Units are grams per year.
Chlordane and PCBs TMDLs are for informational purposes only.

Load Comparison

Upper Newport Bay

Constituent	USEPA Loading Capacity	USEPA Existing Load	Revised Loading Capacity	Revised Existing Load
Total DDT	276.5	1080.2	160.0	2319
Chlordane	160.6	290.7	93.0	455
Total PCBs	1528.2	858.7	884.0	92

Units are grams per year

Load Comparison

Lower Newport Bay

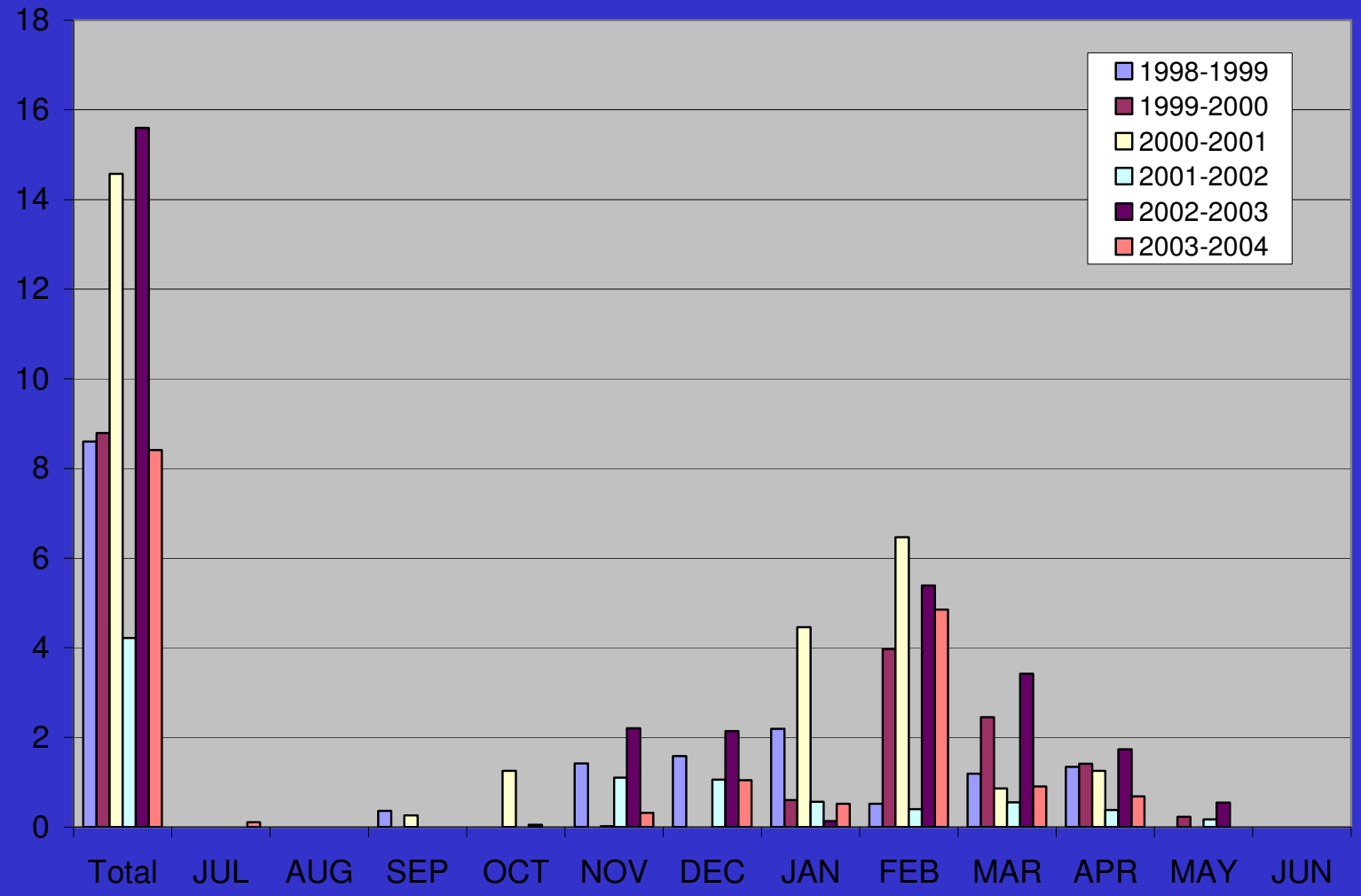
Constituent	USEPA Loading Capacity	USEPA Existing Load	Revised Loading Capacity	Revised Existing Load
Total DDT	101.85	438.4	59	656
Chlordane	59.2	50.2	34	36
Total PCBs	562.95	409.8	326	241

Units are grams per year

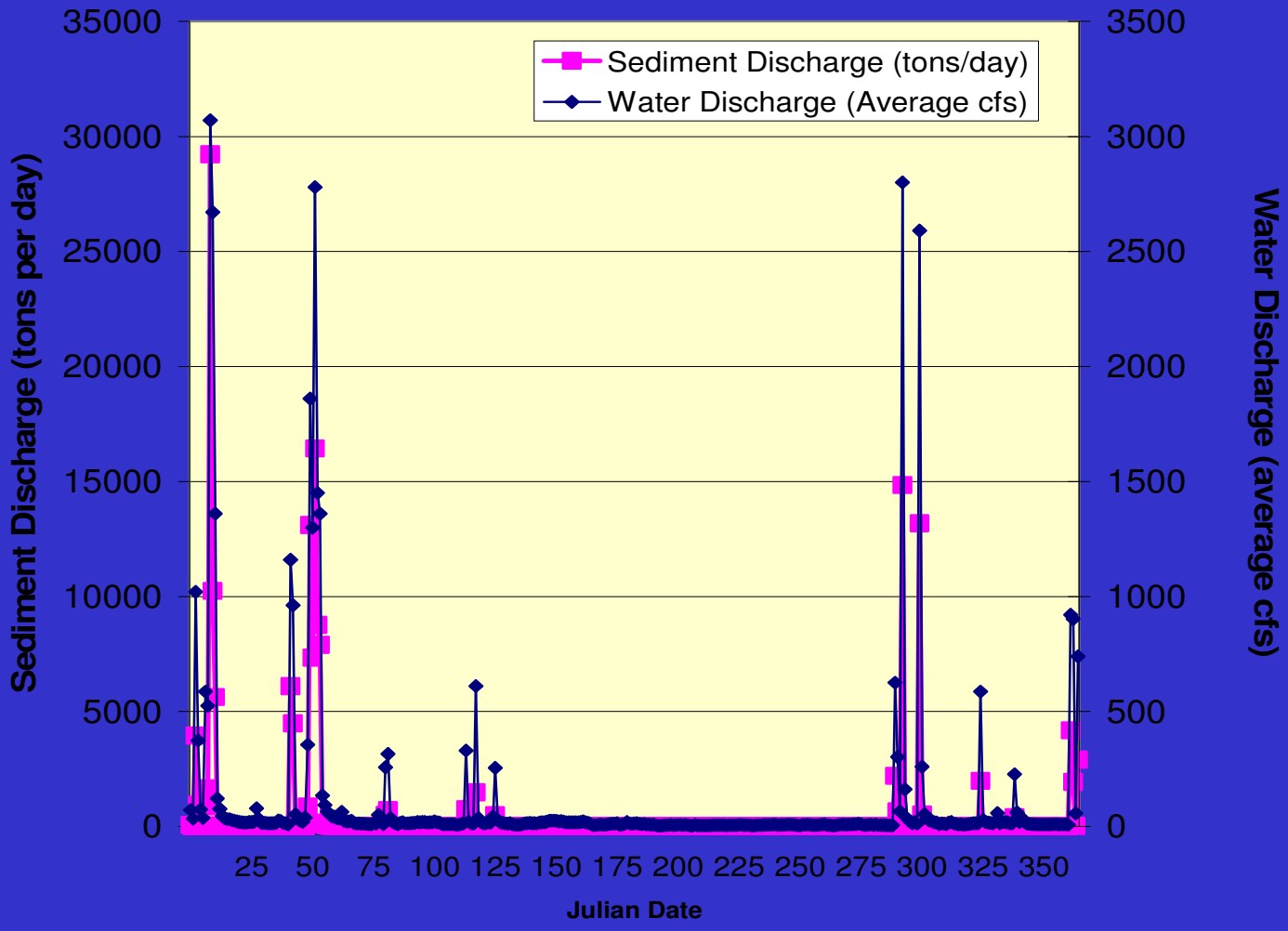
Existing Loads, Loading Capacities, TMDLs and Needed Reductions for San Diego Creek, Upper and Lower Newport Bay (expressed on a "daily" basis)

Water Body	Pollutant	Existing Load	Loading Capacity	TMDL	Needed Reduction
		average grams per day			
San Diego Creek and Tributaries	Total DDT	2.8	1.08	1.08	1.73
	Chlordane	*0.88*	*0.70*	*0.70*	*0.18*
	Toxaphene	0.12	0.02	0.02	0.10
	*Total PCBs**	*0.38*	*5.30*	*0.38*	*Not Required*
Upper Newport Bay	Total DDT	6.35	0.44	0.44	5.92
	Chlordane	1.25	0.25	0.25	0.99
	Total PCBs	0.25	2.42	0.25	Not Required
Lower Newport Bay	Total DDT	1.80	0.16	0.16	1.64
	Chlordane	0.10	0.09	0.09	0.01
	Total PCBs	0.66	0.89	0.66	Not Required

Monthly Precipitation (inches) 1999-2004

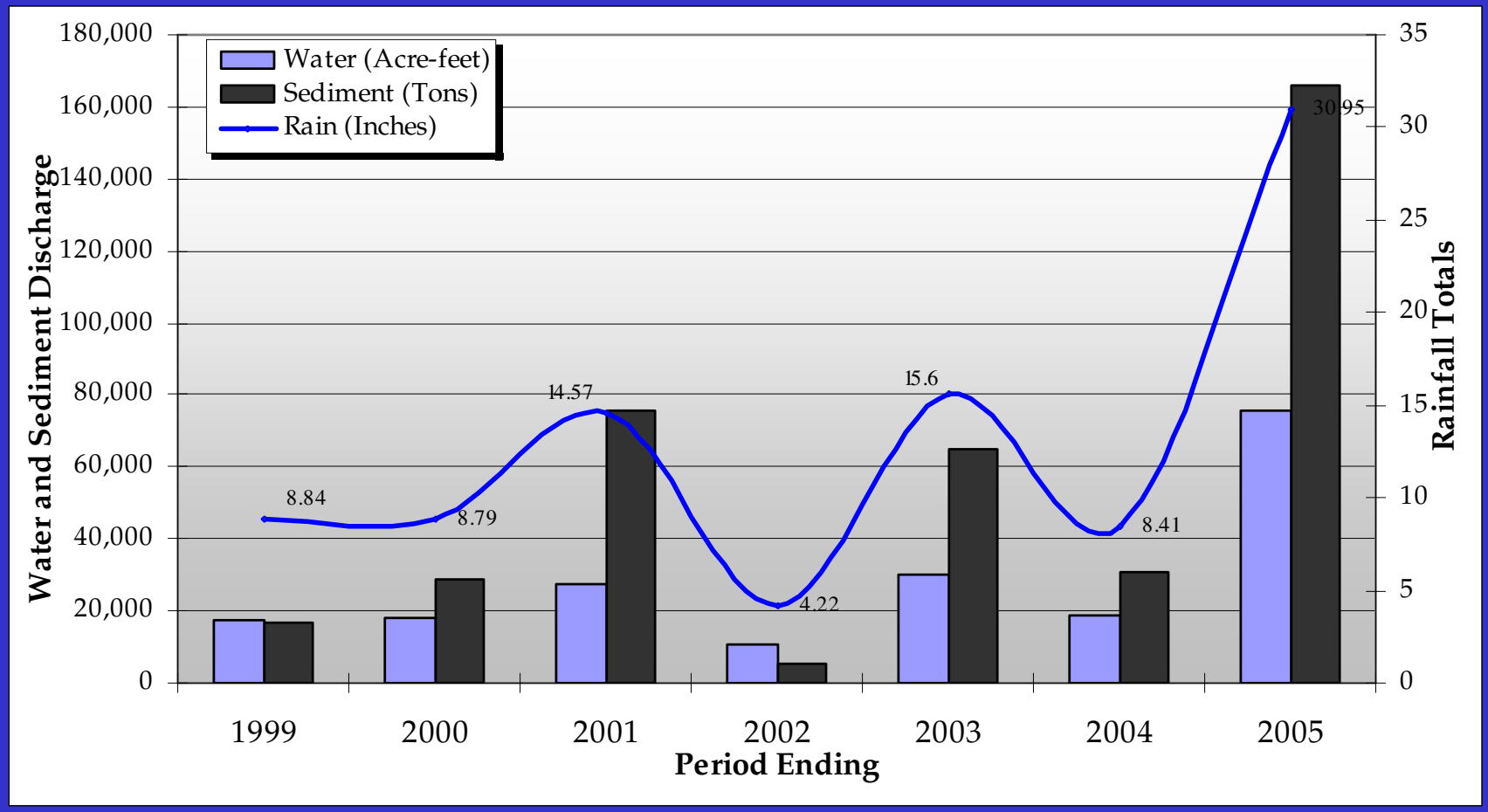


Daily Sediment & Water Discharge San Diego Creek at Campus Drive 2004-2005



Comparison of Annual Sediment and Streamflow Discharges v. Rainfall:

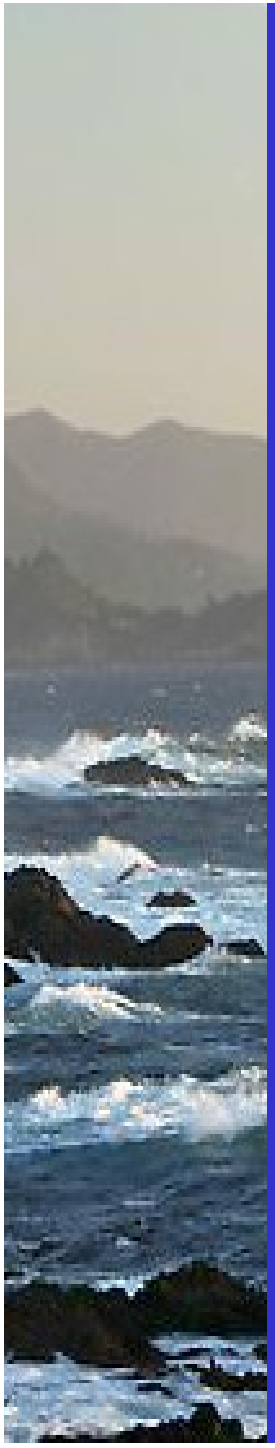
San Diego Creek at Campus Drive 1999-2005



Graph from County of Orange

Existing Loads, Loading Capacities, TMDLs and Needed Reductions for San Diego Creek, Upper and Lower Newport Bay (expressed on an "annual" basis)

Water Body	Pollutant	Existing Load	Loading Capacity	TMDL	Needed Reduction
		grams per year			
San Diego Creek and Tributaries	Total DDT	1027	396	396	631
	*Chlordane**	*321*	*255*	*255*	*66*
	Toxaphene	42.8	6	*6*	*37*
	*Total PCBs**	*137*	*1933*	*137*	*Not required*
Upper Newport Bay	Total DDT	2319	160	160	2159
	Chlordane	455	93	93	362
	Total PCBs	92	884	92	Not required
Lower Newport Bay	Total DDT	656	59	59	597
	Chlordane	36	34	34	2
	Total PCBs	241	326	241	Not required



TMDLs and Allocations

- TMDL = WLA + LA + MOS
  - MOS – Explicit 10%
  - WLA = Point Source Allocations (79%)
    - Urban (MS4) (36%)
    - Caltrans (11%)
    - Construction (28%)
    - Commercial Nurseries (4%)
  - LA = Non-point Source Allocations (21%)
    - Agriculture (5%)
    - Open Space (9%)
    - Streams and Channels (2%)
    - Undefined (5%)

Allocations – San Diego Creek

Category	Type	Total DDT	*Chlordane*	*Total PCBs*	Toxaphene
		(grams per year)			
San Diego Creek					
WLA	Urban Runoff – County MS4 (36%)	128.3	82.6	44.4	1.9
	Construction (28%)	99.8	64.3	34.5	1.5
	Commercial Nurseries (4%)	14.3	9.2	4.9	0.2
	Caltrans MS4 (11%)	39.2	25.2	13.6	0.6
	Subtotal – WLA (79%)	**281.6**	**181.3**	**97.5**	**4.3**
LA	Agriculture (5%) (excludes nurseries under WDRs)	17.8	11.5	6.2	0.3
	Open Space (9%)	32.1	20.7	11.1	0.5
	Streams & Channels (2%)	7.1	4.6	2.5	0.1
	Undefined (5%)	17.8	11.5	6.2	0.3
	Subtotal – LA (21%)	**74.8**	**48.2**	**25.9**	**1.1**
MOS (10% of Total TMDL)		**40**	**26**	**14**	**0.6**
Total TMDL		**396**	**255**	**137**	**6**

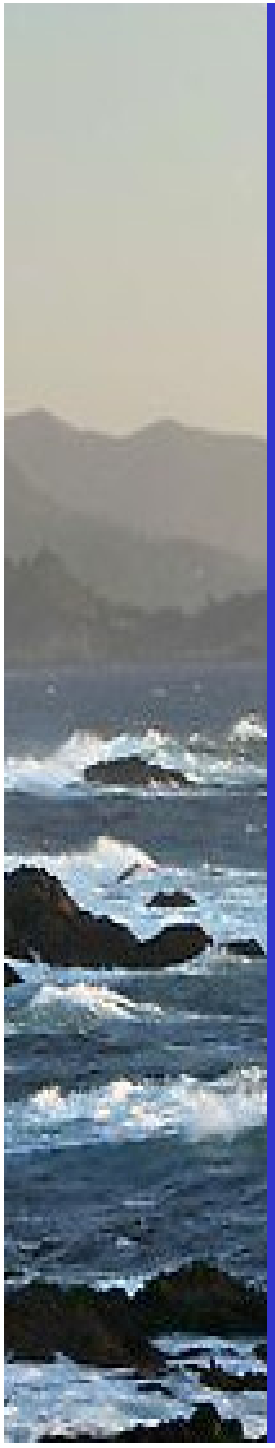
Chlordane and PCBs TMDLs are for informational purposes only.

Allocations – Upper Newport Bay

		Total DDT	Chlordane	Total PCBs	Toxaphene
Category	**Type**	**grams per year**			
Upper Newport Bay					
WLA	Urban Runoff – County MS4 (36%)	51.8	30.1	29.8	
	Construction (28%)	40.3	23.4	23.2	
	Commercial Nurseries (4%)	5.8	3.3	3.3	
	Caltrans MS4 (11%)	15.8	9.2	9.1	
	Subtotal – WLA (79%)	**113.8**	**66.1**	**65.4**	
LA	Agriculture (5%) (excludes nurseries under WDRs)	7.2	8	7	
	Open Space (9%)	13.0	7.6	7.5	
	Streams & Channels (2%)	2.9	1.7	1.7	
	Undefined (5%)	7.2	4.2	4.2	
	Subtotal – LA (21%)	**30.2**	**21.4**	**20.3**	
MOS (10% of Total TMDL)		**16**	**9**	**9**	
Total TMDL		**160**	**93**	**92**	

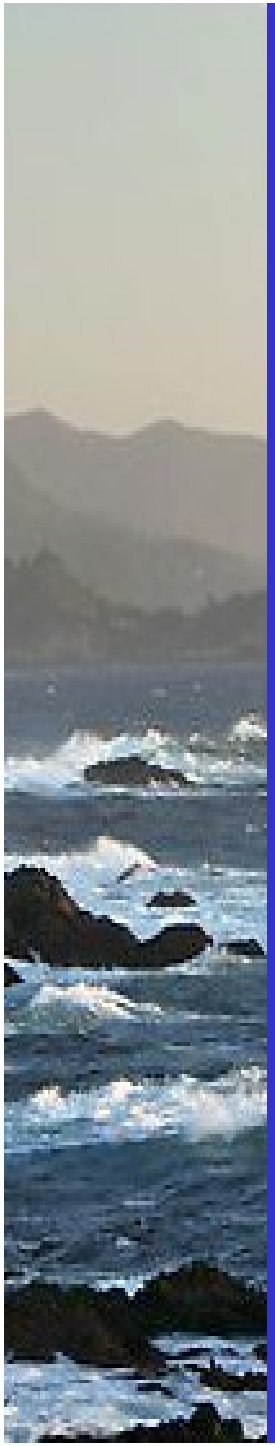
Allocations – Lower Newport Bay

		Total DDT	Chlordane	Total PCBs	Toxaphene
Category	**Type**	**grams per year**			
Lower Newport Bay					
WLA	Urban Runoff – County MS4 (36%)	19.1	11.0	78.1	
	Construction (28%)	14.9	8.6	60.7	
	Commercial Nurseries (4%)	2.1	1.2	8.7	
	Caltrans MS4 (11%)	5.8	3.4	23.9	
	Subtotal – WLA (79%)	**41.9**	**24.2**	**171.4**	
LA	Agriculture (5%) (excludes nurseries under WDRs)	2.7	1.5	10.8	
	Open Space (9%)	4.8	2.8	19.5	
	Streams & Channels (2%)	1.1	0.6	4.3	
	Undefined (5%)	2.7	1.5	10.8	
	Subtotal – LA (21%)	**11.2**	**6.4**	**45.5**	
MOS (10% of Total TMDL)		**5.9**	**3.4**	**24**	
Total TMDL		**59**	**34**	**241**	



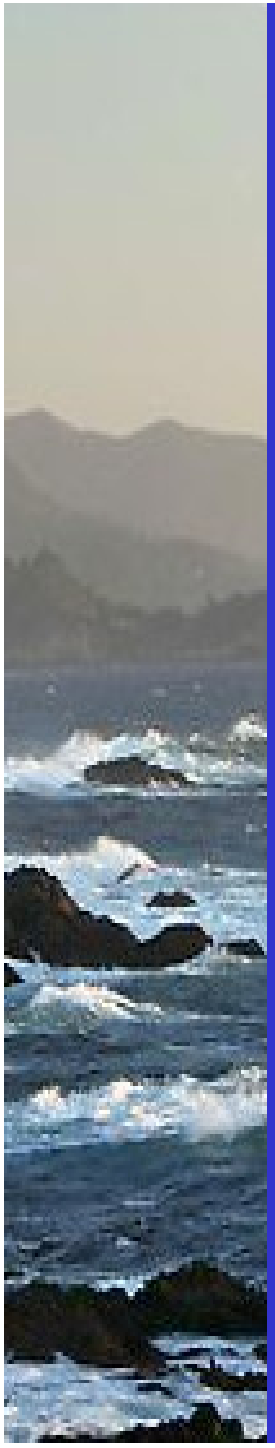
Uncertainties

- Bay bathymetry and patterns of sediment deposition following dredging
- TOC assumptions may result in calculated existing loads that are either too high or too low
- Existing loads calculations relied on 2002 fish tissue data that may or may not reflect current conditions



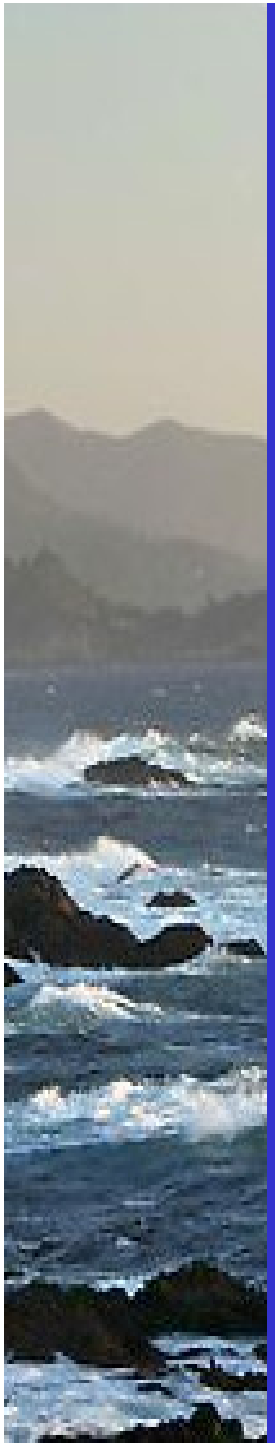
Margin of Safety

- Required to account for uncertainty
- Applied a 10% margin of safety



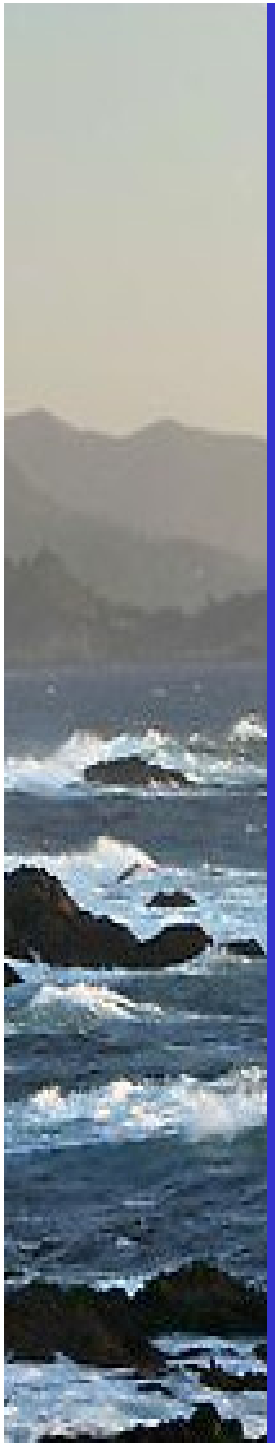
Conservative Approaches

- Use of TELs as sediment targets
- Linking loading capacities to sediment TMDL targets
- Setting TMDLs at existing load levels when existing load<loading capacity
- Use of sediment model to estimate existing loads



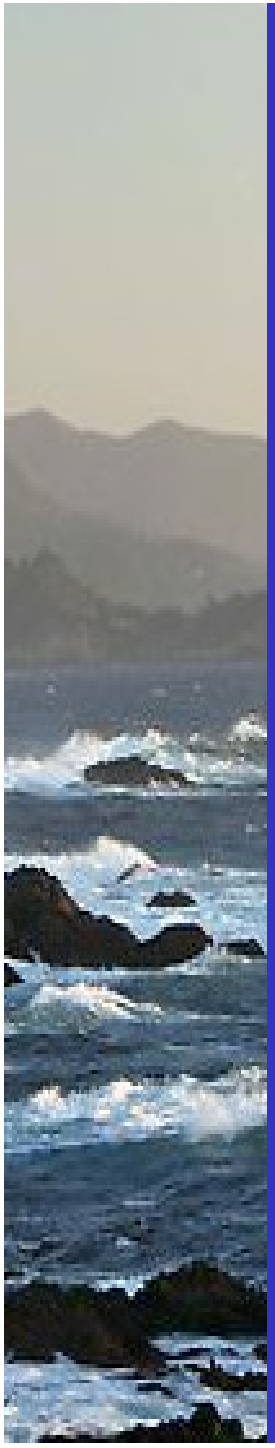
Implementation Plan

- Federal regulations require TMDLs to be incorporated into water quality management plans
- TMDL Basin Plan Amendments must include a program of implementation:
  - Actions necessary to achieve objectives
  - A time schedule for actions
  - Monitoring



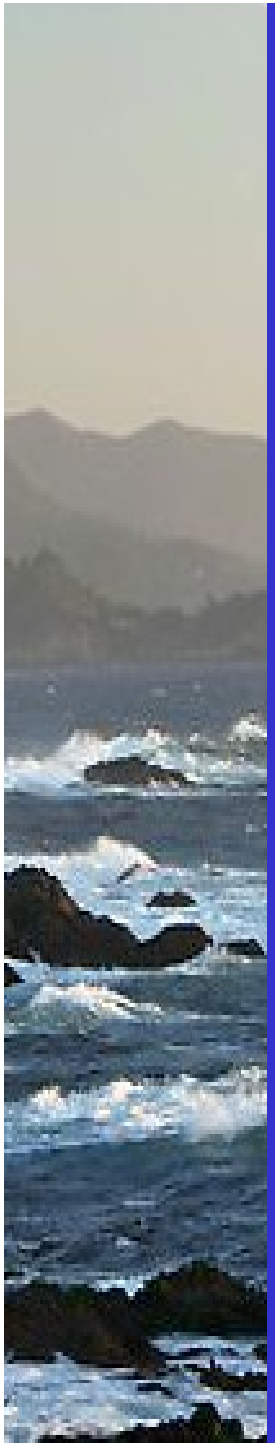
Implementation Plan

- Recognizes
  - Natural attenuation
  - Uncertainties – e.g., targets
  - Primary sources being reduced
- TMDLs proposed as Phased TMDLs



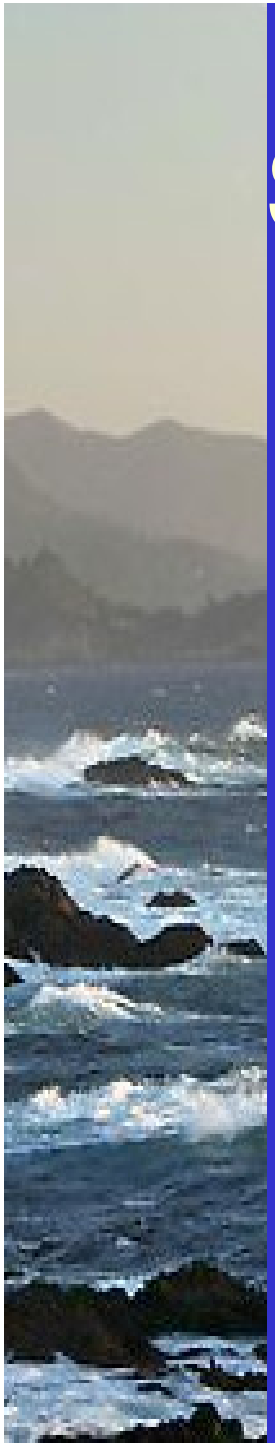
Phased TMDLs

- Appropriate when TMDLs need to be established despite substantial uncertainty
- Allows for time to conduct further monitoring and assessment
- Special studies and additional monitoring are expected to lead to future revisions of TMDLs



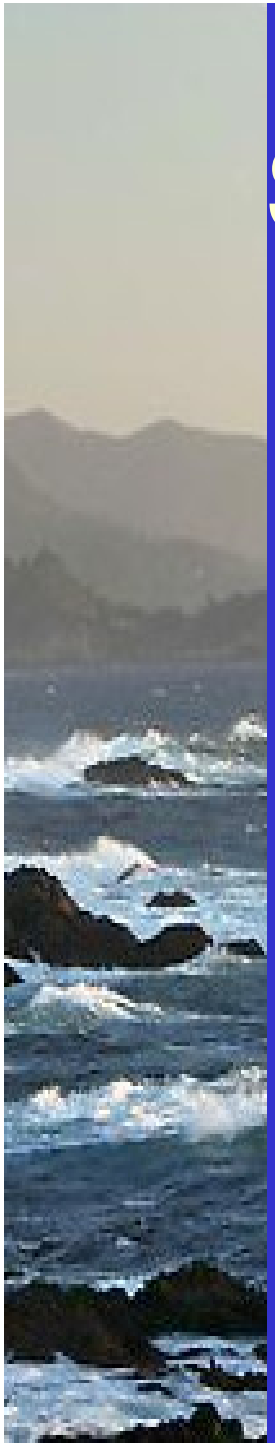
Implementation Plan

- General approach
  - Source control activities
  - BMPs for agriculture and construction
  - Special studies
    - Some are already underway
  - Monitoring



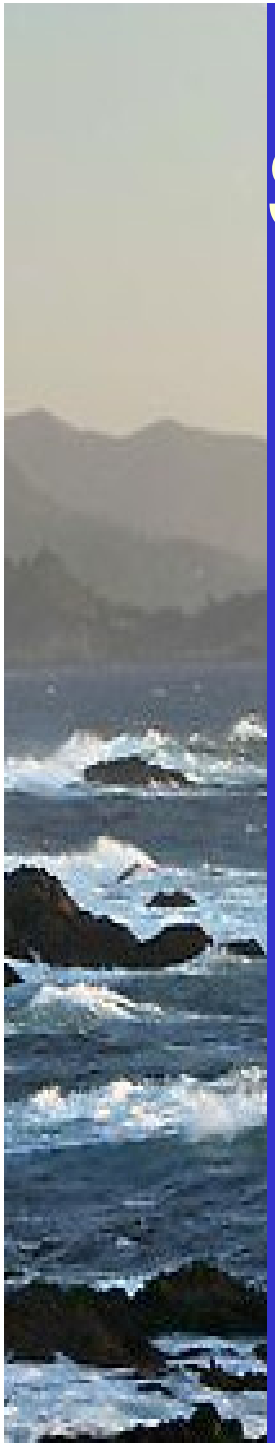
Specific Implementation Tasks

1. Revise existing WDRs and NPDES Permits
2. Develop and Implement an Agricultural BMP and Monitoring Program
3. Identify Parties Responsible for Open Space Areas; Develop and Implement an OCs Monitoring Program to Assess Open Space Discharges



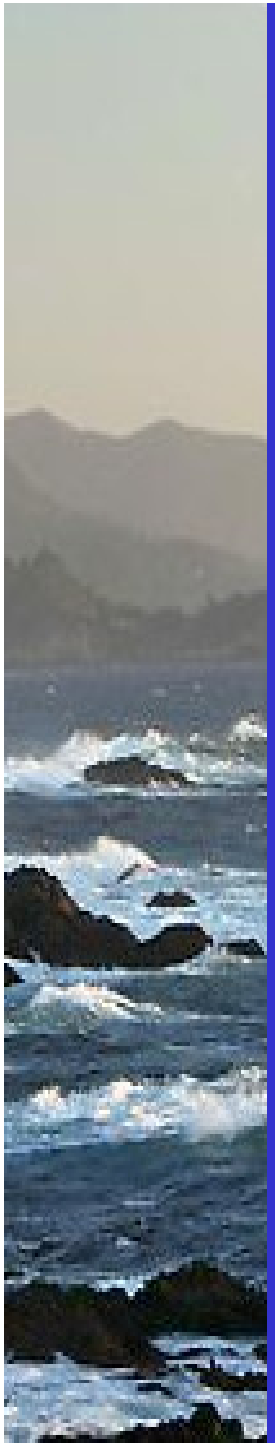
Specific Implementation Tasks

4. Implement effective sediment and erosion control BMPs for construction
5. Evaluate Sources of OCs; Develop and Implement BMPs
6. Evaluate Feasibility/Funding for Future Dredging
7. *Develop a workplan to meet and prioritize implementation tasks*



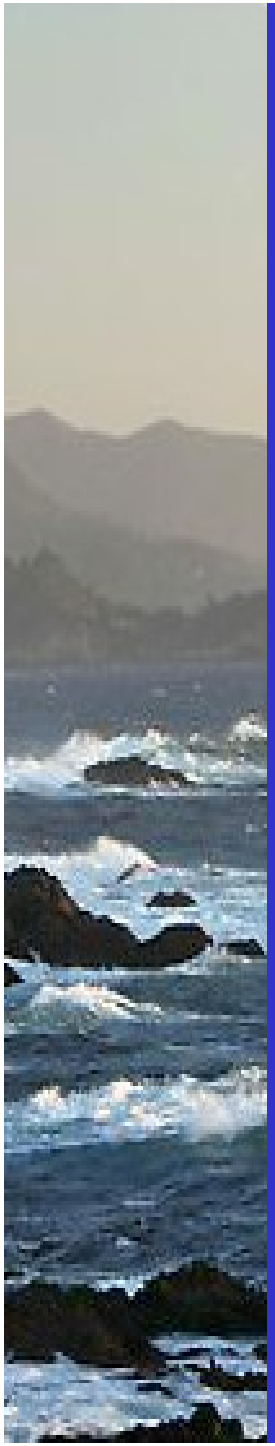
Specific Implementation Tasks

8. Revise Regional Monitoring Program
9. Conduct special studies
10. Phase II - TMDL Reopener



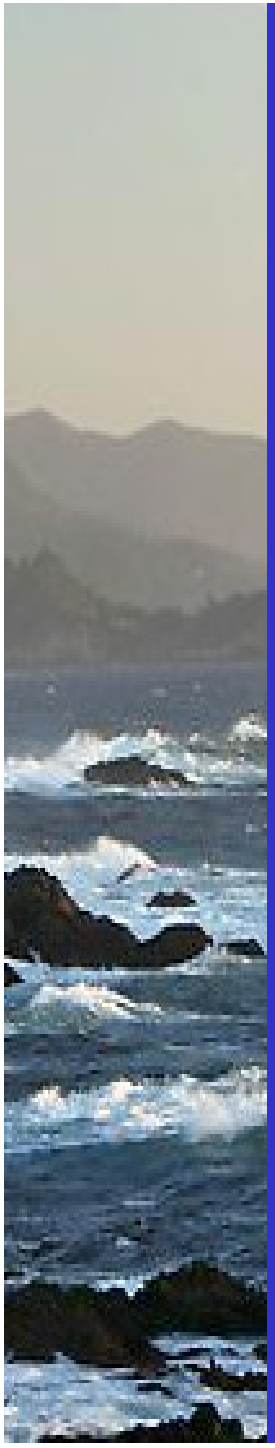
Compliance Schedule

- Staff proposes that TMDLs, including waste load allocations and load allocations, be met no later than December 31, 2015



Economic Considerations

- Must be evaluated when new performance standards or treatment requirements are established
- Must be evaluated prior to implementation of any agricultural water quality control program
  - Total cost of program
  - Identification of potential sources of financing



Cost Estimates

- Agricultural BMPs:
  - $1,000 per acre for vegetating drainages
  - $5,000-$15,000 for building sediment basins
  - Workplan will provide cost details
- Development of Workplan: approx. $65,000
- Funding opportunities include State TMDL funds, State bond funds; Federal 319(h) funds

Methods of Compliance & Costs

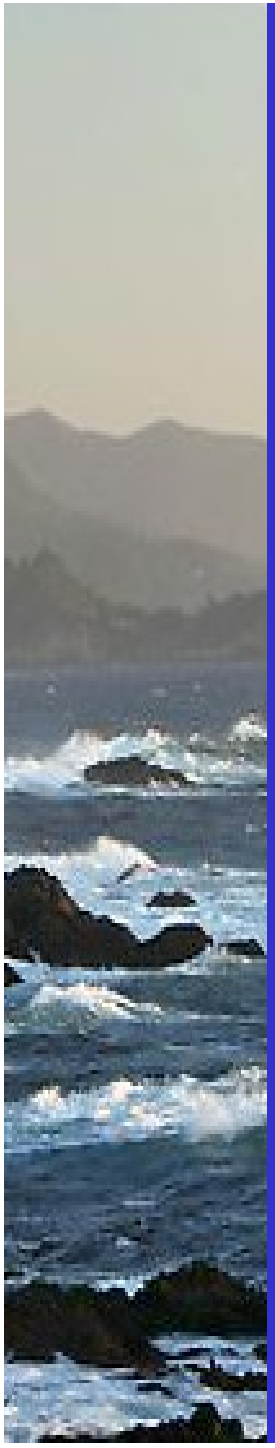
Implementation Action	Estimated Cost
Schedule grading to reduce erosion potential	No direct costs; other costs may increase
Polyacrylamide monomer	$1.30 to $5.50 per pound
Preservation of existing veg.	Minimal
Earth dikes & drainage swales	$15-$55 per foot
Construction of sediment basins	$.73 per cf for <50,000 cf $.36 per cf for >50,000 cf
Sediment dredging	$15 per cy Dredging basins to design capacity est. $32 million
Pesticide collection program Storm water training program	Minimal, if incorporated into existing program

Costs from CASQA Construction BMP Handbook

Methods of Compliance & Costs

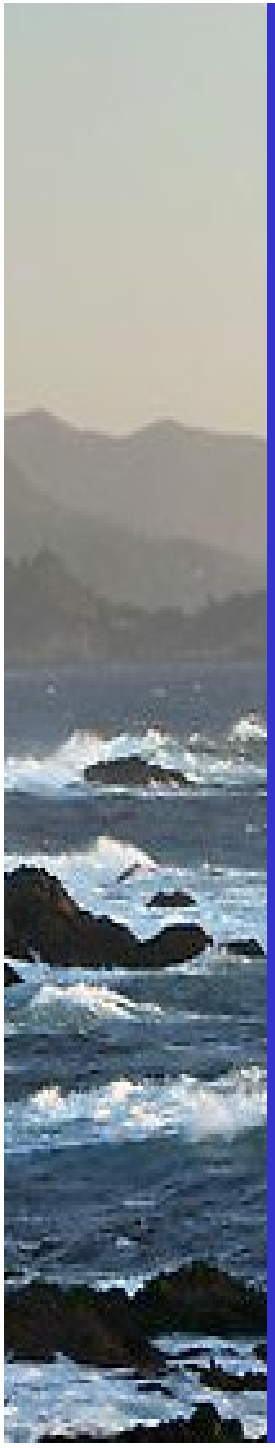
Implementation Action	Estimated Cost
Special studies	Estimated at <$50,000 to the hundreds of thousands of dollars each
Analytical costs:	
OCs in water	EPA method 625 est. $150 ea.
OCs in sediment	?
OCs in fish tissue	?
Benthic community evaluation	?
Total suspended solids	$15 each
Total organic carbon	$30 each

The public is encouraged to submit cost estimates for compliance measures



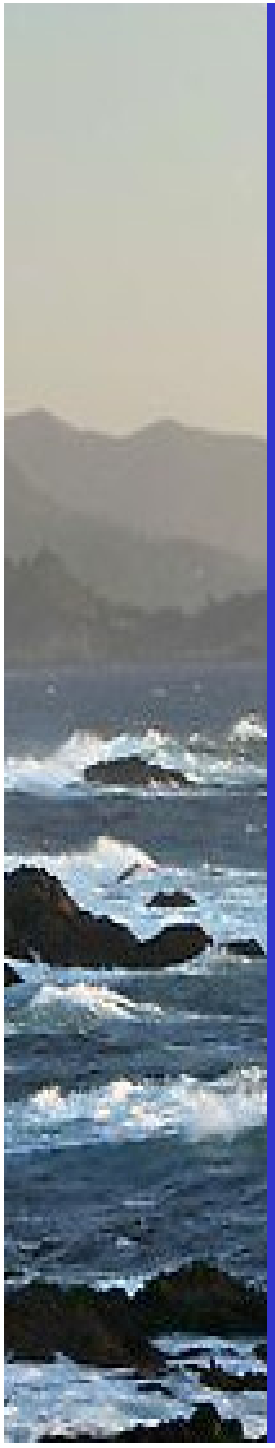
California Environmental Quality Act (CEQA)

- Basin planning process is subject to CEQA requirements
- Basin Planning "functionally equivalent" to CEQA
  - Exempt from requirement to prepare an Environmental Impact Report or Initial Study and Negative Declaration (CCR Title 14, §15251(g))



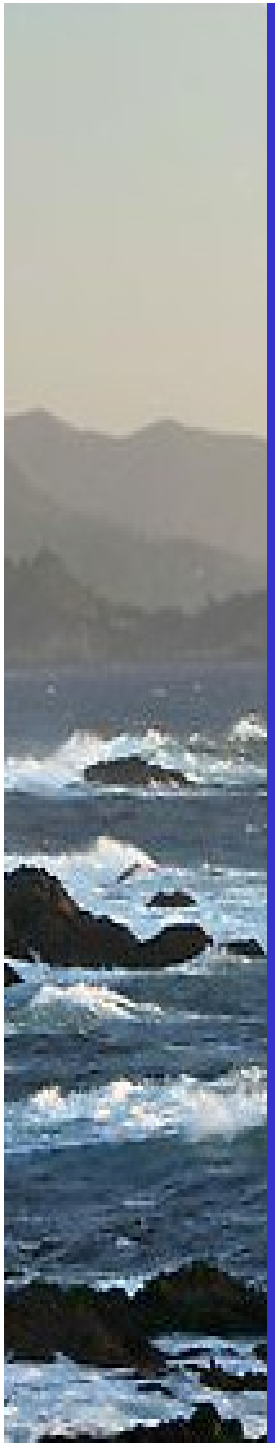
CEQA (cont'd)

- Environmental documents required for basin planning actions are:
  - A technical staff report
  - A draft of the Basin Plan Amendment
  - A completed Environmental Checklist
- Overall effect of implementing TMDLs is improved water quality



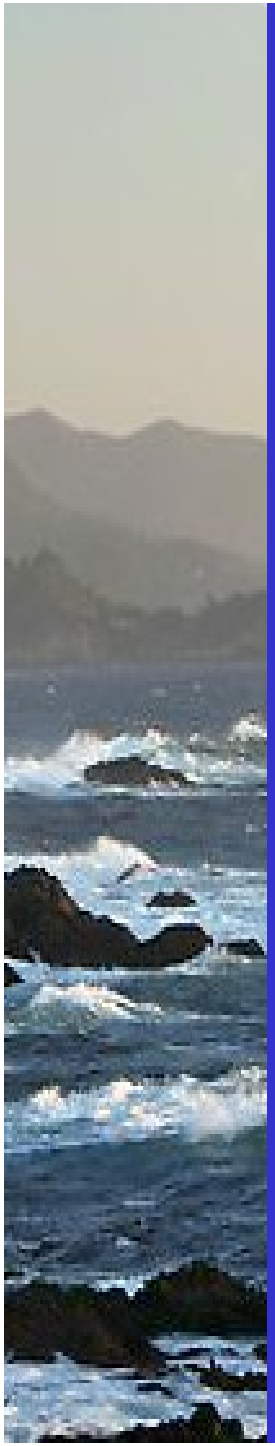
Alternatives Considered

- No action alternative not considered to address impairment
- Alternatives considered in TMDL development:
  - Alternative impairment thresholds
  - Alternatives to TMDL development where there was no impairment finding
  - Alternative numeric targets



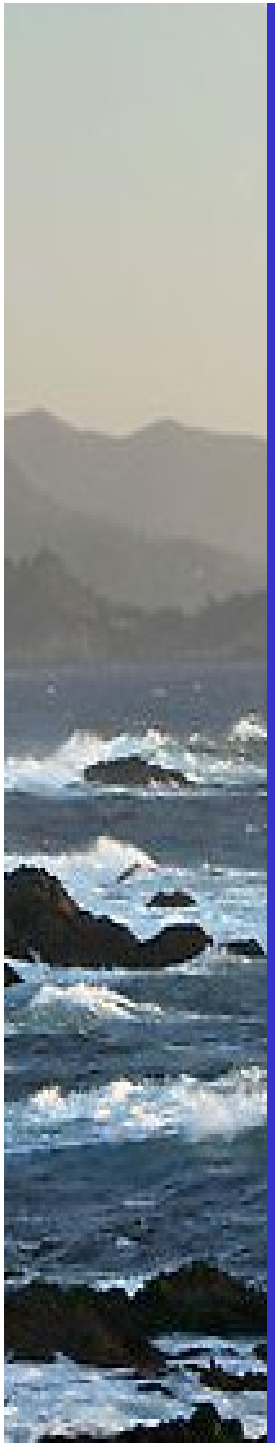
CEQA

- Environmental Checklist
  - Biological Resources: Less than significant with mitigation
    - Mitigate impacts by timing, avoidance, minimization, or alternatives
    - Individual projects subject to CEQA
    - TMDL approval by USEPA subject to Section 7 consultation with USFWS



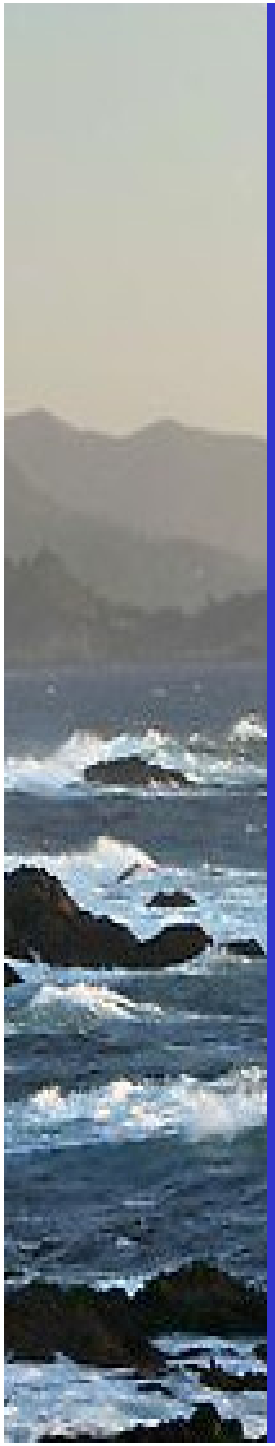
CEQA

- Hydrology & Water Quality - Less than significant impacts with mitigation
  - Management measures may include use of chemical flocculants; proper use to mitigate potential impacts
- Air Quality - Less than significant
  - Potential impacts from dredging, construction of regional BMPs



Public Participation

- Two CEQA scoping meetings
- Separate meeting on Implementation Plan
- Several meetings held with the Irvine Company and other stakeholders
- Worked with Technical Advisory Committee



Schedule

- Public Hearing: March 2007
- Request written comments by January 5, 2007
  - Comments may be submitted up to and including the time of the public hearing