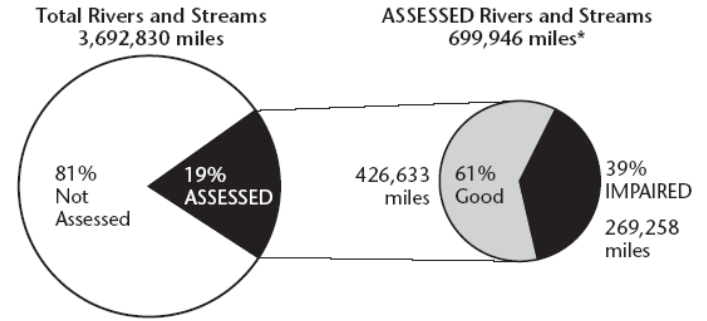
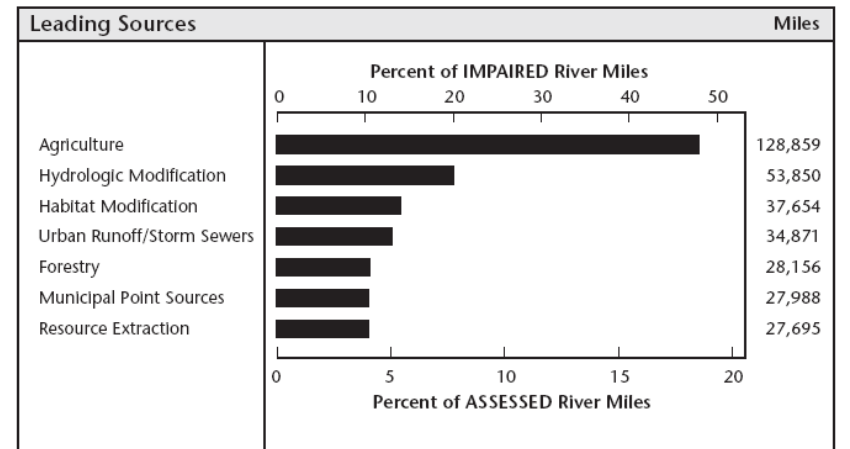
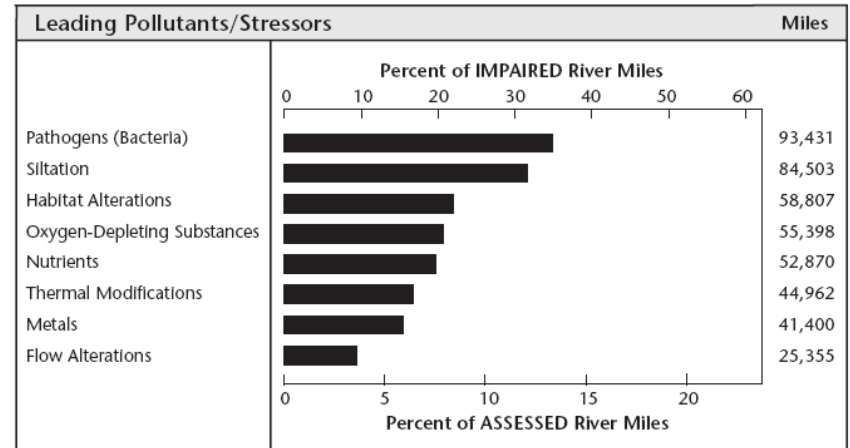


Leading POLLUTANTS in Impaired Rivers and Streams



The Scope of Water Pollution: 2000 Water Quality Inventory



Clean Water Act of 1972

Legislative History

- Water pollution control started at municipal level, in reaction to massive public health epidemics (e.g., cholera in 1830s); started with building of drinking water systems and then sewer systems
- States followed cities; many state level programs were used as model for federal programs
- Federal Water Pollution Control Act of 1948: System of federal subsidies to state and local governments
- Water Quality Act of 1965: Required identification of beneficial uses and supporting water quality standards for interstate waters
- Federal Water Pollution Control Act of 1972 (Amended 1977, 1987)

Original Goals

- Zero discharge by 1985 (Failed!)
- Fishable and swimmable waters by 1983 (Failed!)
- No toxic discharges in toxic amounts (Failed!)
- Secondary treatment for all publicly owned treatment works (almost!)

CWA Administration

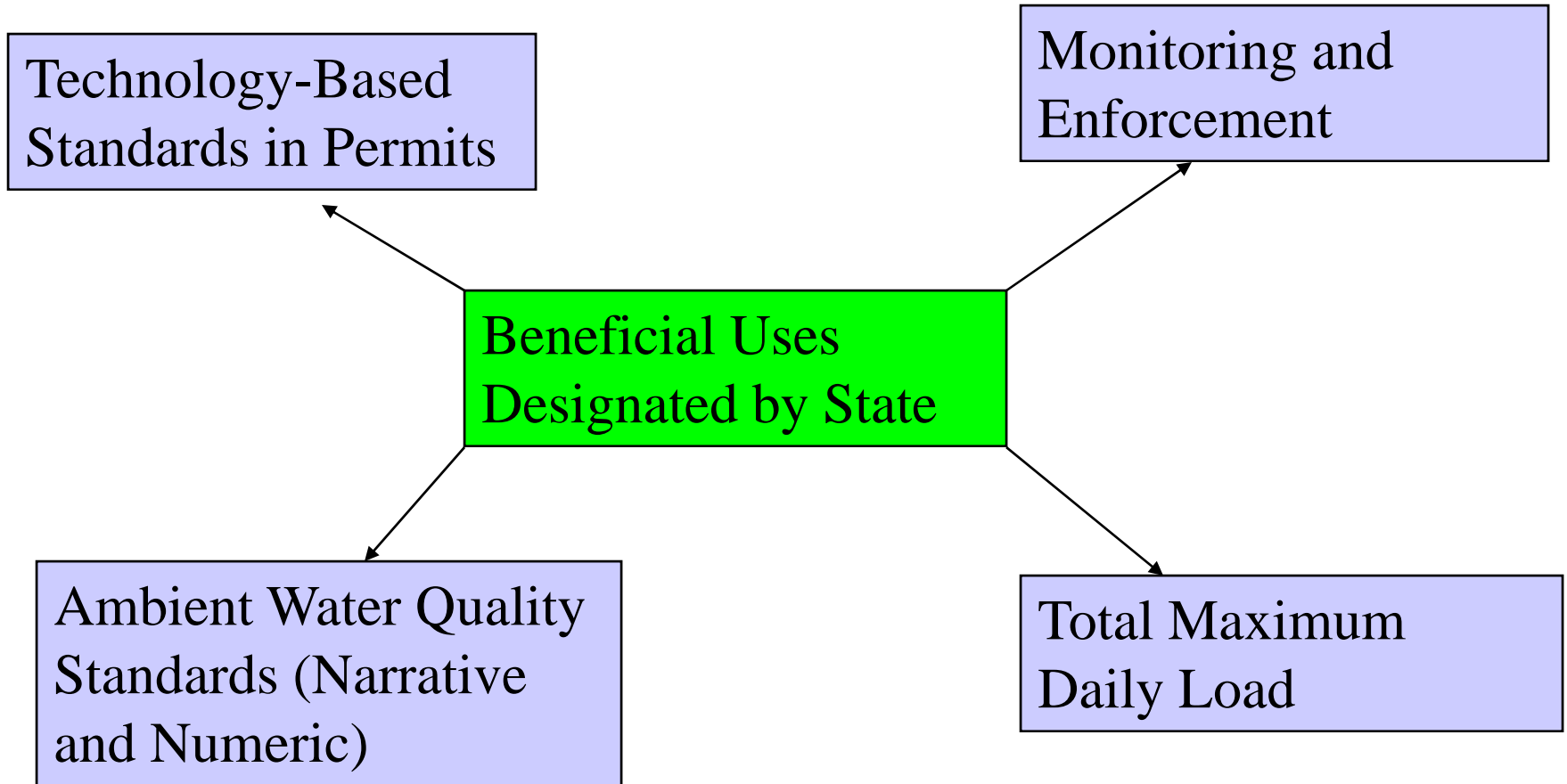
Federal Administrative Structures

- Environmental Protection Agency; regional organization
- Primacy: State level implementation; 44 states have primacy

California Administrative Structures

- 1969 Porter-Cologne Water Quality Control Act
- CALEPA, State Water Quality Control Board, 9 Regional Water Quality Control Boards
- Basin planning and Waste Discharge Requirements

Key Elements of CWA Implementation



What is a Point Source?

CWA definition: “Any discernable, confined and discrete conveyance, including but not limited to any pipe, ditch...concentrated animal feeding operation..from which pollutants are or may be discharged. ...Does not include agricultural stormwater discharges and return flow from irrigated agriculture.”



National Pollution Discharge Elimination System

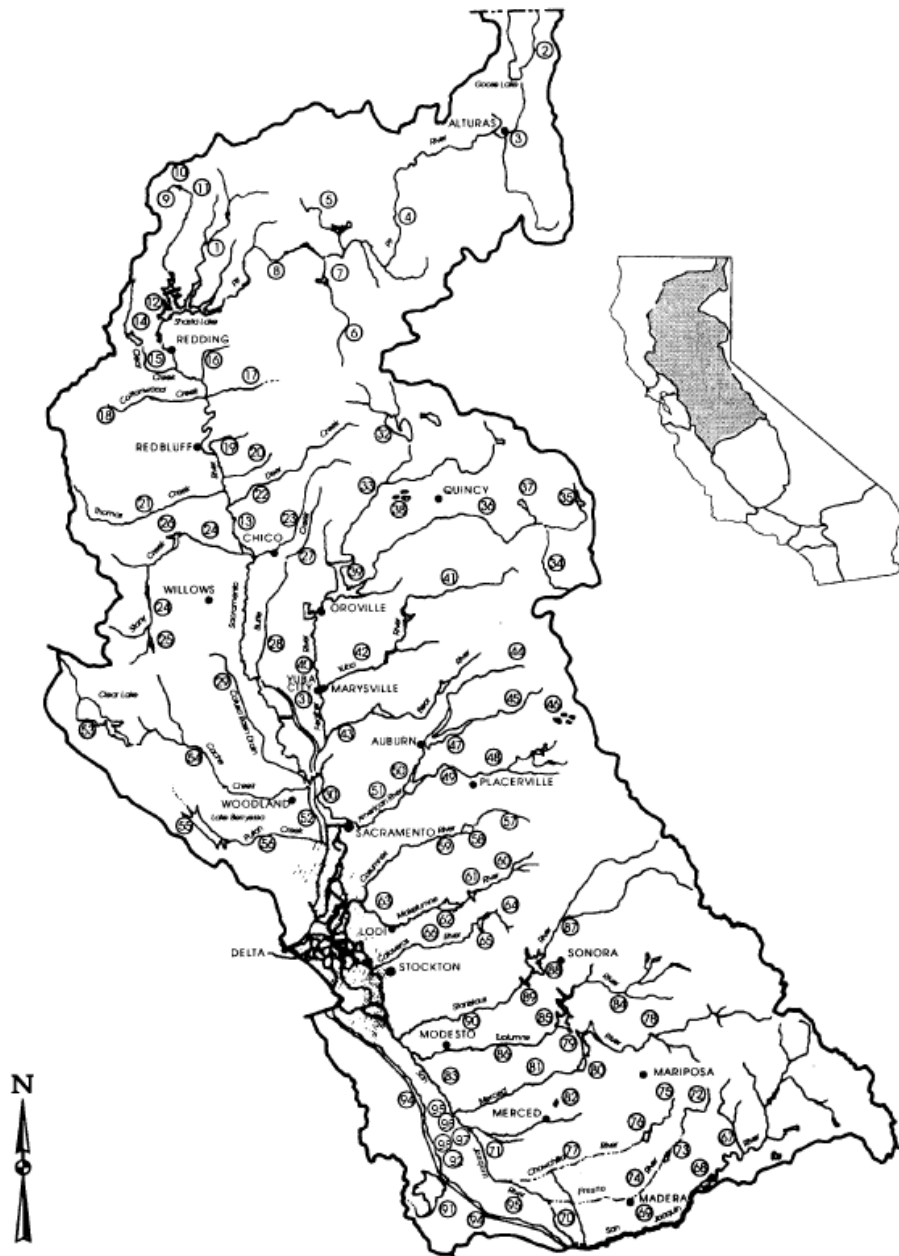
NPDES Permit Basics

- NPDES is the classic command-and-control system
- All point sources in US must have an NPDES permit issued at 5-year intervals
- Over 200,000 NPDES permits in US
- Most industrial dischargers, publicly owned treatment works (POTW),
- EPA establishes national effluent guidelines for each industry based on “best practicable technology” or “best available technology economically achievable” (BAT guidelines)
- POTW must achieve “secondary treatment”
- Permits contain technology and effluent limitations, and monitoring and reporting requirements

Designated Uses

- Under section 305 (b), states specify designated uses for each waterbody based on “existing uses” (includes past uses)
- Designated use usually includes fishable/swimable designation; many others (e.g., industrial)
- Biennial 305(b) reports show whether designated uses are fully supported, fully supported but threatened, partially supported, or impaired
- Economic considerations allowed in setting DU

SURFACE WATER BODIES AND BENEFICIAL USES



**Designated Uses:
Sacramento and San
Joaquin Basins**

SURFACE WATER BODIES AND BENEFICIAL USES

| | SURFACE WATER BODIES (1) | HYDRO UNIT NUMBER | MUN | AGRI-CULTURE | | INDUSTRY | | | RECREATION | | | FRESHWATER HABITAT (2) | | MIGRATION | | SPAWNING | | WILD | NAV |
|----|---|-------------------|-----|-------------------------------|------------|----------------|---------|----------------|------------|---------|--------------------------|------------------------|------|-----------|----------|----------|----------|------|-----|
| | | | | AGR | | PROC | IND | POW | REC-1 | | REC-2 | WARM | COLD | MIGR | | SPWN | | | |
| | | | | MUNICIPAL AND DOMESTIC SUPPLY | IRRIGATION | STOCK WATERING | PROCESS | SERVICE SUPPLY | POWER | CONTACT | CANOEING (1) AND RAFTING | OTHER NONCONTACT | WARM | COLD | WARM (3) | COLD (4) | WARM (3) | | |
| 1 | McCLOUD RIVER | 505. | E | | | | | | | | | | | | | | | | |
| 2 | GOOSE LAKE | 527.20 | | E | E | | | | | | | | | | | | | | |
| 3 | PIT RIVER | | | | | | | | | | | | | | | | | | |
| 3 | NORTH FORK, SOUTH FORK, PIT RIVER | 525.00 | E | E | E | | | | | | | | | | | | | | |
| 4 | CONFLUENCE OF FORKS TO HAT CREEK | 525.35 | E | E | E | | | | | | | | | | | | | | |
| 5 | FALL RIVER | 525.41 | E | E | E | | | | | | | | | | | | | | |
| 6 | HAT CREEK | 525.30 | | E | E | | | | | | | | | | | | | | |
| 7 | BAUM LAKE | 525.34 | | E | E | | | | | | | | | | | | | | |
| 8 | MOUTH OF HAT CREEK TO SHASTA LAKE | 525 | F | E | E | | | | | | | | | | | | | | |
| 9 | SACRAMENTO RIVER | | | | | | | | | | | | | | | | | | |
| 9 | SOURCE TO BOX CANYON RESERVOIR | 525.22 | | E | E | | | | | | | | | | | | | | |
| 10 | LAKE GISKEYOU | 525.22 | | | | | | | | | | | | | | | | | |
| 11 | BOX CANYON DAM TO SHASTA LAKE | 525.2 | | E | E | | | | | | | | | | | | | | |
| 12 | SHASTA LAKE | 508.10 | E | E | E | | | | | | | | | | | | | | |
| 13 | SHASTA DAM TO COLUSA BASIN DRAIN | | E | E | E | | E | | | | | | | E | E | | | | E |
| 14 | WHISKEY TOWN RESERVOIR | 524.61 | | E | E | | | | | | | | | | | | | | |
| 15 | CLEAR CREEK BELOW WHISKEYTOWN RESERVOIR | 524.62 | E | E | E | | | | | | | | | | | | | | |
| 16 | COW CREEK | 507.3 | P | E | E | | | | | | | | | | | | | | |
| 17 | BATTLE CREEK | 507.12 | | E | E | | | | | | | | | | | | | | |
| 18 | COTTONWOOD CREEK | 524.3 | E | E | E | P | P | | | | | | | | | | | | |
| 19 | ANTELOPE CREEK | 509.63 | E | E | E | | | | | | | | | | | | | | |
| 20 | MILL CREEK | 509.42 | E | E | E | | | | | | | | | | | | | | |
| 21 | THOMAS CREEK | 523.10 | | E | E | | | | | | | | | | | | | | |
| 22 | DEER CREEK | 509.20 | E | E | E | | | | | | | | | | | | | | |
| 23 | BIG CHICO CREEK | 509.14 | | E | E | | | | | | | | | | | | | | |
| 24 | STONY CREEK | 522.00 | | E | E | | | | | | | | | | | | | | |
| 25 | EAST PARK RESERVOIR | 522.33 | | | | | | | | | | | | | | | | | |
| 26 | BLACK BUTTE RESERVOIR | 522.12 | | E | E | | | | | | | | | | | | | | |
| 27 | BUTTE CREEK | | | | | | | | | | | | | | | | | | |
| 27 | SOURCES TO CHICO | 521.30 | E | E | E | | | | | | | | | | | | | | |
| 28 | BELOW CHICO INCLUDING BUTTE SLOUGH | 520.40 | | E | E | | | | | | | | | | | | | | |
| 29 | COLUSA BASIN DRAIN | 520.21 | | E | E | | | | | | | | | E | | | | | |

Technology Based Performance Standards

Technology Based Effluent Limitations

- Numerical limitations established by EPA and placed on certain pollutants from certain sources.
- Applied to industrial and municipal sources through numerical effluent limitations (performance standards) in discharge permits
- Technology-based performance standards are required regardless of quality of receiving water
- Best practicable technology (BPT) for conventional pollutants; best available technology (BAT) for toxics
- Ambient water quality standards kick in when technology based standards are not met

Water Quality Standards

Ambient Water Quality Standards

- Designated uses specify water quality criteria, which guide NPDES permits
- Narrative criteria describe conditions in words; e.g., no unsightly oil
- Numeric criteria specify pollutant concentrations (e.g., mg/l)
- Only scientific criteria allowed; no economic costs
- State WQ standards must be at least as protective as EPA guidelines
- Anti-degradation policies prohibit degradation of water bodies that exceed standards

Monitoring and Enforcement

Monitoring and Enforcement: Beneficial Uses

- 305 (b) reports for attainment of beneficial uses
- Non-attainment triggers the TMDL process

Monitoring and Enforcement: NPDES

- Self-monitoring through “discharge monitoring reports”, backed by periodic inspections
- Three enforcement levels: informal, administrative orders, judicial referral
- Civil fines can be as high as \$25,000 per day of violation; criminal fines can be as high as \$50K per day and 3 years in jail

“Pragmatic Enforcement”

Table 3.1

Types and Frequencies of Enforcement Actions Conducted by EPA Officials, 1975–1988

| Action | Frequencies | Percentage |
|---|-------------|------------|
| (0) Comment, no action warranted, permit modification requests, or reissue | 5,927 | 21.6 |
| (1) Telephone calls, director's letters, enforcement notice letters, permit modifications, meetings with the permittee | 2,282 | 8.3 |
| (2) Warning letters, notices of violation, final orders of the board, and other state orders | 11,031 | 40.2 |
| (3) Plans for administrative orders, MCP and CCP actions, and other formal letters | 2,201 | 8.0 |
| (4) Enforcement conference agreement, show cause hearing | 122 | 0.4 |
| (5) Administrative orders, referrals to higher level review, judicial action planned, and penalties recommended | 3,870 | 14.1 |
| (6) Civil action filed, consent decrees, judicial action pending, judicial decrees, sewer bans, NPDES penalties pending, stipulation orders | 1,904 | 6.9 |
| (7) Contempt action, civil action, and NPDES Penalty Category II penalties filed | 102 | 0.4 |
| N = 27,439 | | |

Table 3.4

Mean Severity of Enforcements by Region, 1975–1988

| Region | Number of actions | Mean severity level | Standard deviation | Nonprimacy states | Territories |
|--------|-------------------|---------------------|--------------------|-------------------|-------------|
| 1 | 1,481 | 1.57 | 2.34 | 3 | 0 |
| 2 | 13,231 | 1.64 | 1.54 | 0 | 1 |
| 3 | 366 | 3.87 | 1.70 | 0 | 0 |
| 4 | 2,321 | 4.24 | 1.44 | 1 | 0 |
| 5 | 3,215 | 2.73 | 2.16 | 0 | 0 |
| 6 | 5,984 | 2.59 | 1.43 | 4 | 0 |
| 7 | 190 | 4.11 | 1.33 | 0 | 0 |
| 8 | 123 | 2.58 | 1.71 | 1 | 0 |
| 9 | 141 | 3.85 | 1.16 | 1 | 4 |
| 10 | 388 | 3.39 | 2.02 | 2 | 0 |

State Water Resources Control Board Enforcement Actions

Types and Classifications of Enforcement Actions

| Types of Enforcement Action | Descriptions | Classifications |
|--|---|-----------------|
| Verbal Communication | Any communication regarding the violation that takes place in person or by telephone. | Informal |
| Staff Enforcement Letter | Any written communication regarding violations and possible enforcement actions that is signed at the staff level. | Informal |
| Notice of Violation | A letter officially notifying a discharger of violations, possible enforcement actions, penalties, and liabilities that is signed by the Executive Officer. | Informal |
| Notice to Comply | Issuance of a Notice to Comply per Water Code Section 13399. | Formal |
| 13267 Letter | A letter using Water Code Section 13267 authority to require further information or studies. | Formal |
| Clean-up and Abatement Order | Any order pursuant to Water Code Section 13304. | Formal |
| Cease and Desist Order | Any order pursuant to Water Codes Sections 13301-13303. | Formal |
| Time Schedule Order | Any order pursuant to Water Code Section 13300. | Formal |
| Administrative Civil Liability (ACL) Complaint | ACL Complaint issued by the Executive Officer for liability pursuant to Water Code 13385. | Formal |
| Administrative Civil Liability (ACL) Order | An ACL Order that has been imposed by the State or Regional Water Board. | Formal |
| Settlement | A settlement agreement per California Government Code Section 11415.6 | Formal |
| Referral | Referral to the District Attorney, Attorney General, or US EPA. | Formal |
| Referred to a Task Force | Any referral of a violation to an environmental crimes task force. | Formal |
| Referral to Other Agency | Any referral to another State agency. | Formal |
| Third Party Action | An enforcement action taken by a non-governmental third party and to which the State or Water Board is a party. | Formal |
| Waste Discharge Requirements | Any modification or rescission of Waste Discharge Requirements in response to a violation. | Formal |

Figure 9

Five Core Regulatory Programs Expenditures by Region
FY 2006-2007

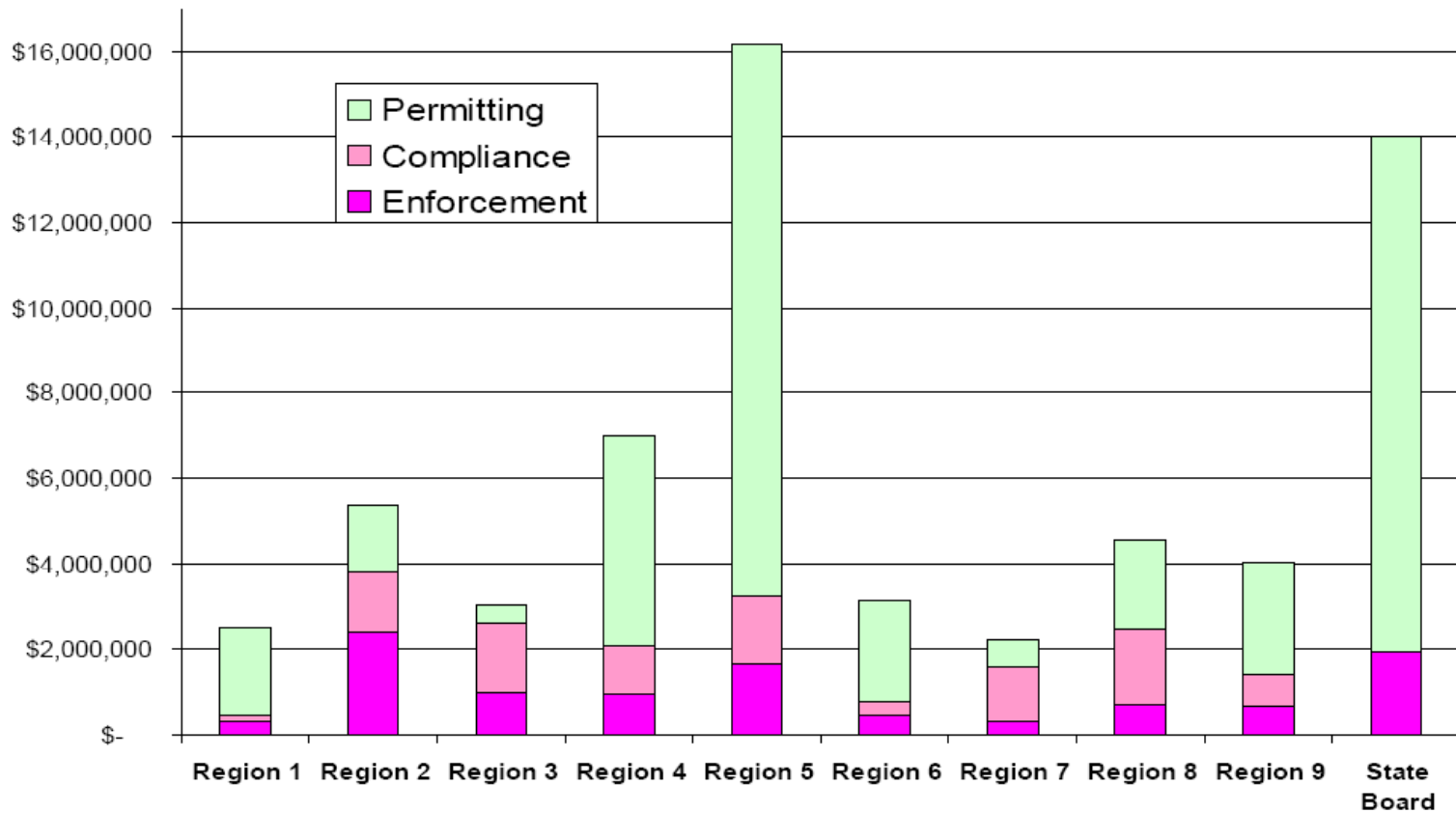


Figure 10

Five Core Regulatory Programs, Expenditures and Permits, by Regional Board FY 2006-2007

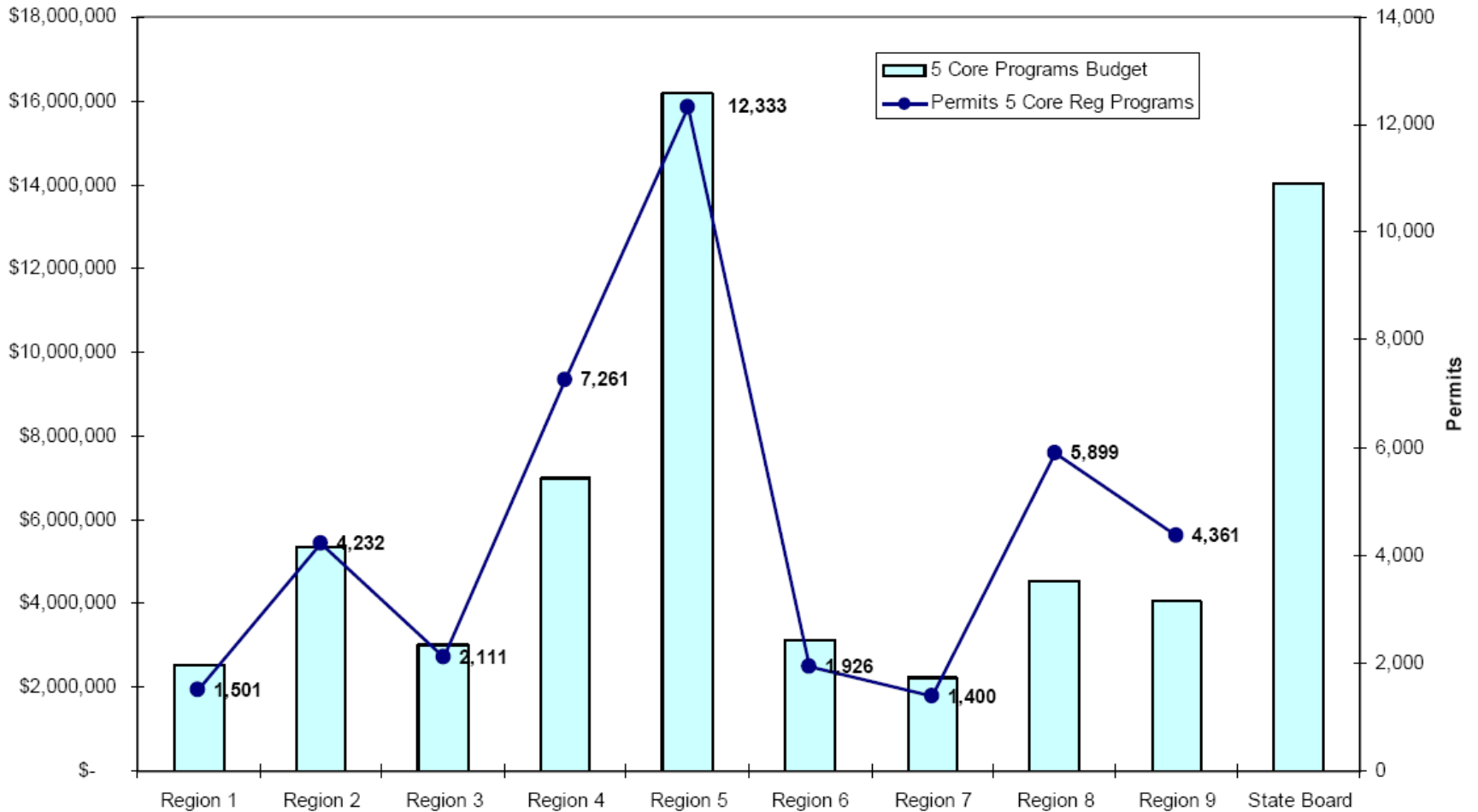


Table 5 – NPDES Compliance and Enforcement Outputs FY 2006-2007

| Regional Board | No. of Facilities | Inspections Conducted | Violations | | | Violations Subject to Mandatory Minimum Penalties | | |
|----------------|-------------------|-----------------------|------------------|-----------------------|---------------------------------------|---|---|---|
| | | | Total Violations | Receiving Enforcement | % of violations Receiving Enforcement | Total MMP Violations | Receiving a Penalty at or Above Minimum | % of MMP Violations Receiving Mandatory Enforcement |
| 1 | 78 | 45 | 97 | 47 | 48% | 37 | 22 | 59% |
| 2 | 298 | 50 | 242 | 101 | 42% | 35 | 22 | 63% |
| 3 | 130 | 51 | 410 | 228 | 56% | 77 | 1 | 1% |
| 4 | 728 | 171 | 2,281 | 697 | 30% | 1,196 | 5 | 0% |
| 5 | 478 | 88 | 493 | 280 | 56% | 98 | 40 | 41% |
| 6 | 34 | 2 | 22 | 11 | 50% | 8 | 0 | 0% |
| 7 | 69 | 11 | 244 | 238 | 97% | 154 | 23 | 15% |
| 8 | 436 | 17 | 94 | 85 | 90% | 4 | 4 | 100% |
| 9 | 149 | 40 | 249 | 229 | 92% | 50 | 24 | 48% |
| Totals | 2,400 | 475 | 4,132 | 1,916 | 46% | 1,659 | 141 | 8% |

Table 19

NPDES WASTEWATER COMPLIANCE RATE FY 2006/ 2007

| Region | Number of Facilities | Facilities with one or more violations in the period | Percentage of Facilities in Violation | Total Violations | Total Facilities With Priority Violations | Percentage of Facilities with priority violations | Total Priority Violations | # of Facilities with 1-10 violations | # of Facilities with 11-25 violations | # of Facilities with >25 violations | Average # of Violations per Facility In violation |
|--------------|----------------------|--|---------------------------------------|------------------|---|---|---------------------------|--------------------------------------|---------------------------------------|-------------------------------------|---|
| 1 | 79 | 21 | 27% | 142 | 8 | 10% | 51 | 17 | 3 | 1 | 6.8 |
| 2 | 293 | 48 | 16% | 245 | 15 | 5% | 68 | 41 | 3 | 4 | 5.1 |
| 3 | 130 | 47 | 36% | 454 | 32 | 25% | 149 | 38 | 5 | 4 | 9.7 |
| 4 | 733 | 345 | 47% | 2,569 | 167 | 23% | 831 | 281 | 53 | 11 | 7.4 |
| 5 | 482 | 54 | 11% | 487 | 6 | 1% | 30 | 43 | 8 | 3 | 9.0 |
| 6 | 34 | 5 | 15% | 22 | 2 | 6% | 7 | 4 | 1 | 0 | 4.4 |
| 7 | 69 | 21 | 30% | 247 | 14 | 20% | 102 | 14 | 5 | 2 | 11.8 |
| 8 | 436 | 15 | 3% | 94 | 4 | 1% | 5 | 13 | 1 | 1 | 6.3 |
| 9 | 148 | 21 | 14% | 249 | 8 | 5% | 61 | 16 | 4 | 1 | 11.9 |
| Total | 2,404 | 577 | 24% | 4,509 | 256 | 11% | 1,304 | 467 | 83 | 27 | 7.8 |

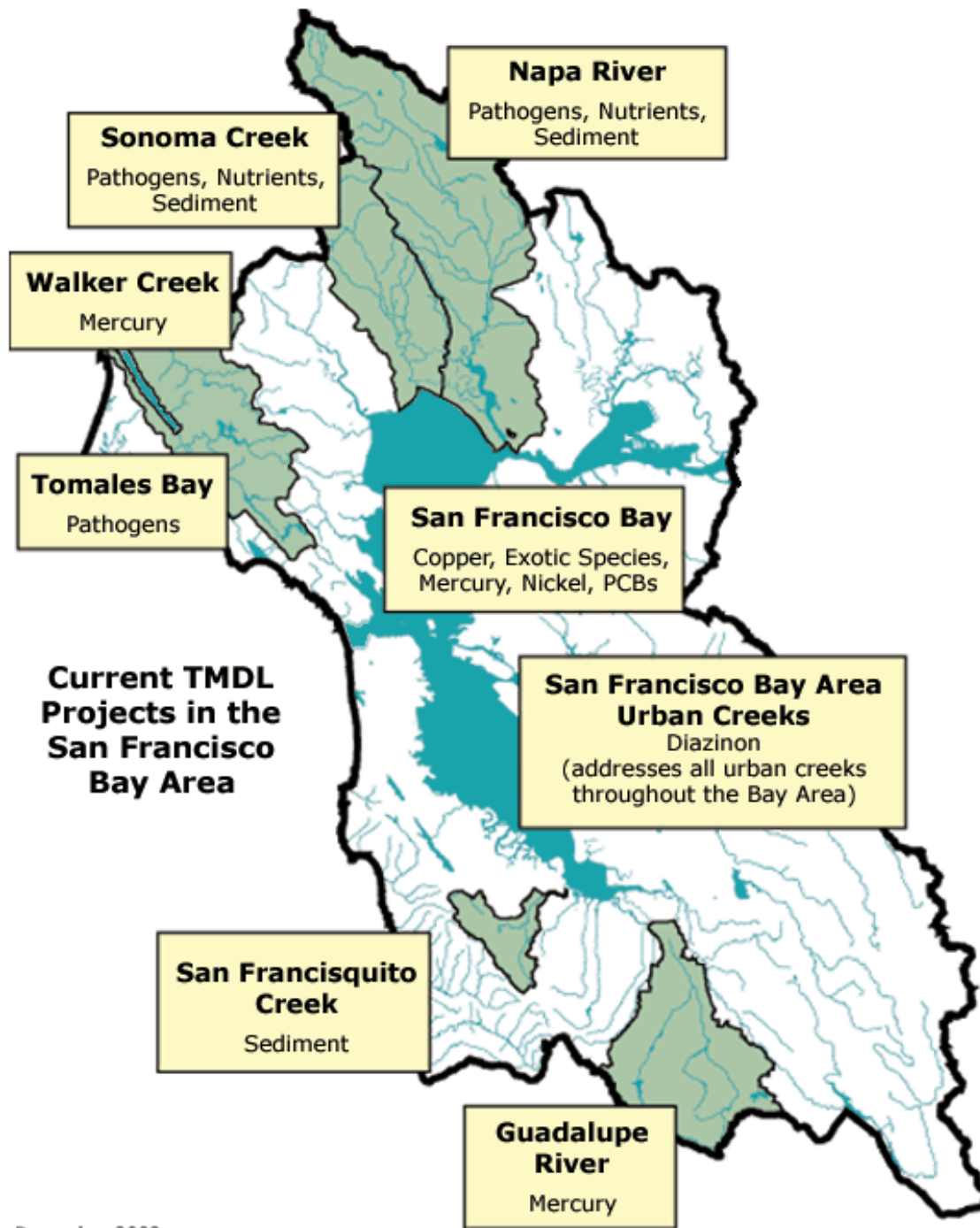
Non-Point Source Pollution and TMDL

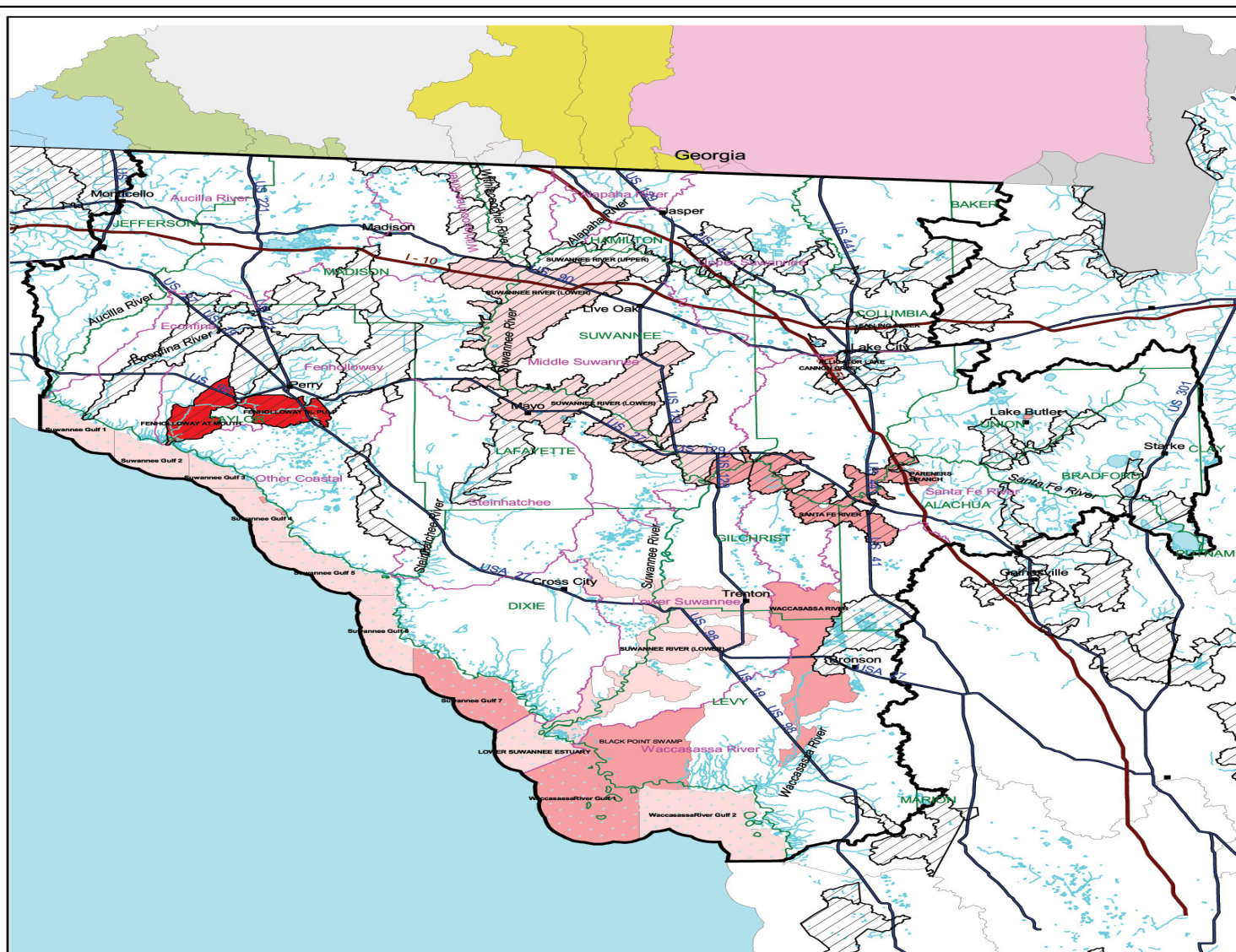
Total Daily Maximum Loads

- States are supposed to identify waters not meeting WQ standards; so-called 303(d) list (pollutant-water body pairs)
- TMDL set the maximum amount of pollution that a water body can receive without violating water quality standards, including margin of safety
- Requires identification of both point and non-point sources, and load assessment; develop “budget” for reductions
- States were ignoring TMDL for a long time; 40 lawsuits in 38 states changed that

Implementing TMDL Plans

- TMDL implementation requires adjustment of NPDES permits, and also use of non-point source assistance tools
- Funding mechanisms: Section 319h (states required in 1987 amendments to have non-point source program), State Clean Water Revolving Funds, Farm Bill EQIP





Suwannee River Group 1 Basin

Verified Listed Waters
by TMDL Priority



Map prepared March 3, 2003 by the Bureau of Watershed Management, Division of Water Resource Management. This map is a representation of ground conditions and is not intended for delineations or analysis of the features shown. For more information or copies, contact Janis Faulson at (850) 245-8543, or janis.faulson@dep.state.fl.us. Location: FHB5701 E:/basin_rotation/assess_at.apr

Legend

- Cities
- Interstates
- FDOT US Routes
- Water Lines
- Water Bodies
- Suwannee Basin Boundary
- County Boundary
- Planning Unit Boundary
- 1998 303(d) Listed Waters
- Verified Impaired Waters by TMDL Priority Year**
- TMDL Due in 2002
- TMDL Due in 2007
- TMDL Due in 2011

NPDES Implementation Problems

- Combined sewer overflows/indirect dischargers
- Many dischargers have no permits/permit backlogs
- Administrative overload and monitoring
- Slow pace of BAT guideline development
- Lacks vigorous enforcement
- Political control of enforcement
- Regional variation

Municipal Wastewater Treatment Grants

Direct Grants

- Title II of 1972 Clean Water Act
- Federal formulas for allocating grant money to states
- Feds pay 55% of costs; 75% of cost for innovative technology

State Water Pollution Control Revolving Funds

- Replaced grant program starting 1989
- Federal money capitalizes fund with state matching funds
- Loans instead of grants; recipients supposed to repay loans to make the fund “revolve”
- Smaller grant recipients have difficulty repaying loans
- Overall, this program is very popular with Congress because it represents delivery of local benefits
- Funding issues: EPA estimates \$390 billion needed to replace aging infrastructure, with \$148 billion needed for operation/maintenance. Estimates \$6 billion dollar annual gap between actual and needed expenditures

Agricultural Runoff

Non-Point Source Pollution

- Definition: Pollution from multiple, dispersed sources that generally has a large cumulative impact on water quality
- Agricultural runoff is worst, urban runoff too
- Difficult to identify and control sources; often outside existing regulatory structures
- Pesticides, sediment, nutrients from fertilizer, irrigation return flows
- Not regulated under the Clean Water Act of 1972
- 1969 Porter-Cologne Act authorizes regulation of ag. discharge, but has passed waivers until just recently

Challenges of Managing Agricultural Runoff

- Ag. Industry resistance: The politics of denial
- Lack of technical solutions
- Lack of monitoring
- No regulatory tools
- Low public awareness
- Difficult to pinpoint sources, invisible

Examples of Agricultural Runoff Programs

Agricultural Waivers, CA

- Original Ag. Waivers in California expired in 2003
- New “Waivers” passed by regional boards require farmers to join a “Coalition Group” or apply for individual permit
- Coalition Group monitors, addresses problems
- Enviro. Groups are litigating right now

Suwannee River Partnership, FL

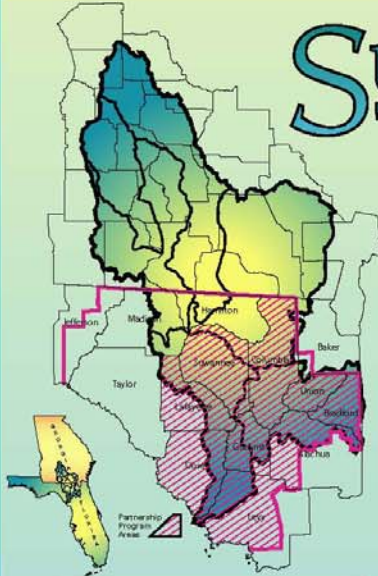
- Collaborative partnership
- Voluntary implementation of BMP through federal Farm Bill programs
- Provides one way to prevent TMDL regulations

Everglades Agricultural Area, FL

- Permits requiring water management/monitoring plans
- Monitoring of phosphorous in EAA basin outflows; 25% reduction is compliance goal; 10 parts per billion is numerical goal for overall Everglades
- Basin-wide monitoring vs. on-farm implementation
- Similarity of ag. Non-point source problems across country

Suwannee River Partnership

WATERSHED MANAGEMENT APPROACH



Poultry BMPs



Litter storage, dead bird disposal, and litter use

Human Waste BMPs

- On-site wastewater disposal management
- Alternative systems



Dairy BMPs



Manure collection, transportation, storage, and utilization

Row Crop, Forage, and Vegetable BMPs



Nutrient and irrigation water management

Suwannee River Partnership
45 Members

Florida Department of Agriculture and Consumer Services (Chair)
Florida Department of Environmental Protection
Florida Department of Health
Florida Department of Community Affairs
Suwannee River Water Management District
U.S. Environmental Protection Agency
U.S. Department of Agriculture, Natural Resources Conservation Service
U.S. Geological Survey, Water Resources Division
Florida Agricultural and Mechanical University
University of Florida, Institute for Food and Agricultural Sciences
Florida Rural Water Association
Suwannee County Commission
Suwannee County Conservation District
Lafayette County Commission
Lafayette Soil and Water Conservation District
Suwannee River Resource Conservation and Development Council, Inc.
Gold Hill, Inc.
Sunshine State Hills Producers
Florida Farm Bureau Federation
Florida Cattlemen's Association
Florida Fertilizer and Ag-Chemical Association
Florida Forestry Association
Florida Poultry Federation, Inc.
Florida Septic Tank Association
Gibsonville County Commission
Gibsonville Soil and Water Conservation District
Levy Soil and Water Conservation District
Stark Soil and Water Conservation District
Alachua Soil and Water Conservation District
City of Jacksonville
Columbia County Commission
Levy County Commission
Dixie County Commission
Bradford County Commission
Union County Commission
Dixie Soil and Water Conservation District
City of High Springs
City of Fanning Springs
Town of Suwannee
City of Trenton
Santa Fe Springs/Working Group
Adopt-A-River
Lake City
City of Starke

This Farm CARES

County Alliance for Responsible Environmental Stewardship

Suwannee River Partnership

The Johnson Family Farm

Suwannee River Partnership supports Florida Farm Bureau's CARES program for recognizing and certifying participating farms

BMP Quality Assurance

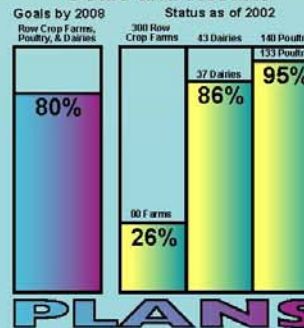
- Tracking BMP operation and maintenance
- Technical assistance
- Annual BMP Status Review

Verifies BMPs are operated and maintained, and helps resolve problems

Agricultural Cost Share Funds



Goals and Results



Maintaining System



Manure Application Recordkeeping



BMP Research

Verify BMP effectiveness in protecting water quality under farm scale conditions



Keys to Success

- Best Management Practices
- Non-regulatory Approach
- Cost Share Programs
- BMP Research
- BMP Quality Assurance
- Stakeholder Involvement
- Leadership

Mission Statement

Assess sources of nutrient loading to the Suwannee River Basin and optimize reductions in loading to the waters of the basin emphasizing voluntary, incentive-based programs for protection of the environment and public health.

Strategy

- Promotes the voluntary, incentive based philosophy
- Involves all stakeholders
- Implements best management practices (BMP)
- Promotes cost share programs
- Verifies BMP effectiveness by research
- Verifies BMPs are maintained (BMP Quality Assurance)

Sacramento Valley Water Quality Coalition SWRCB Region 5

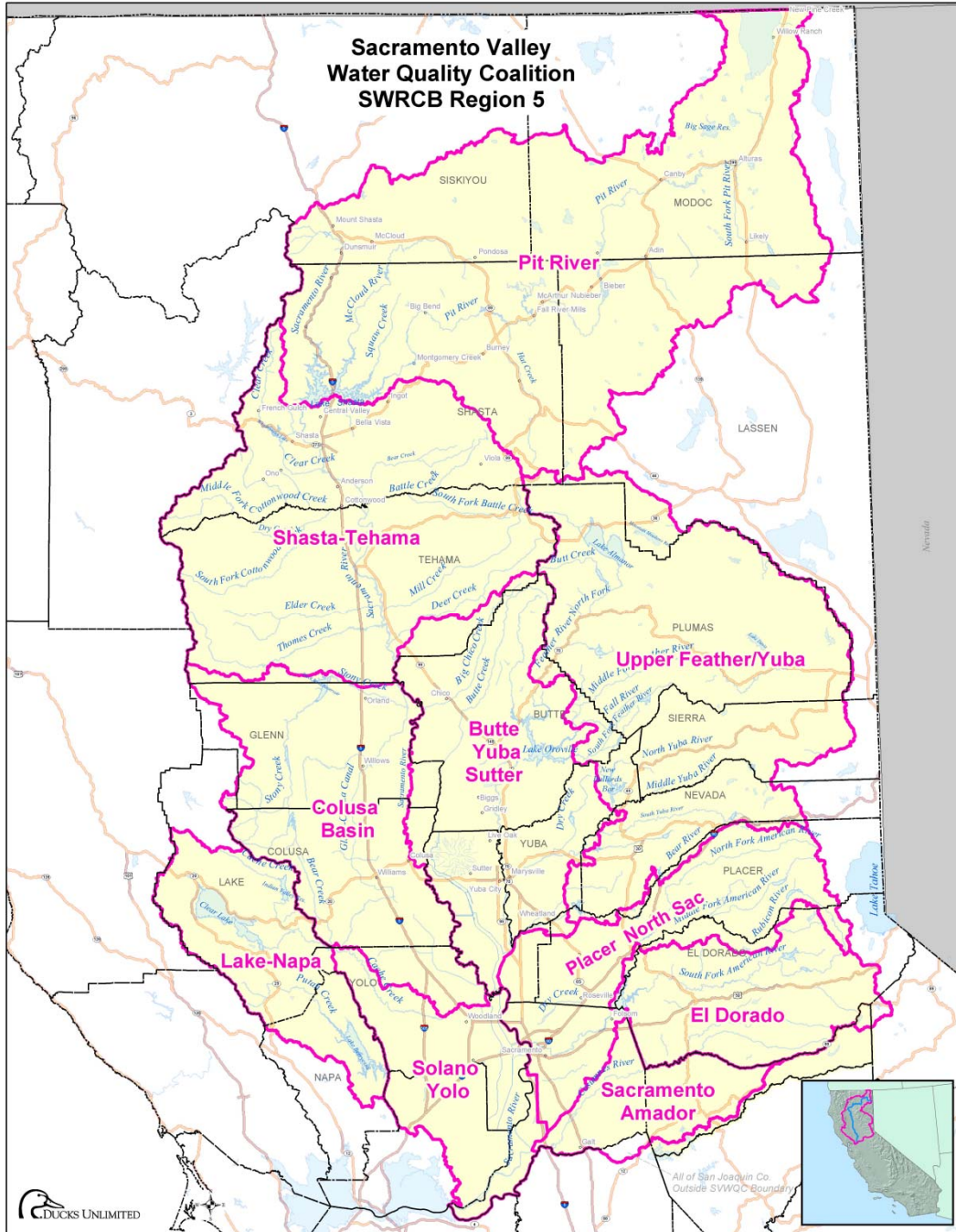
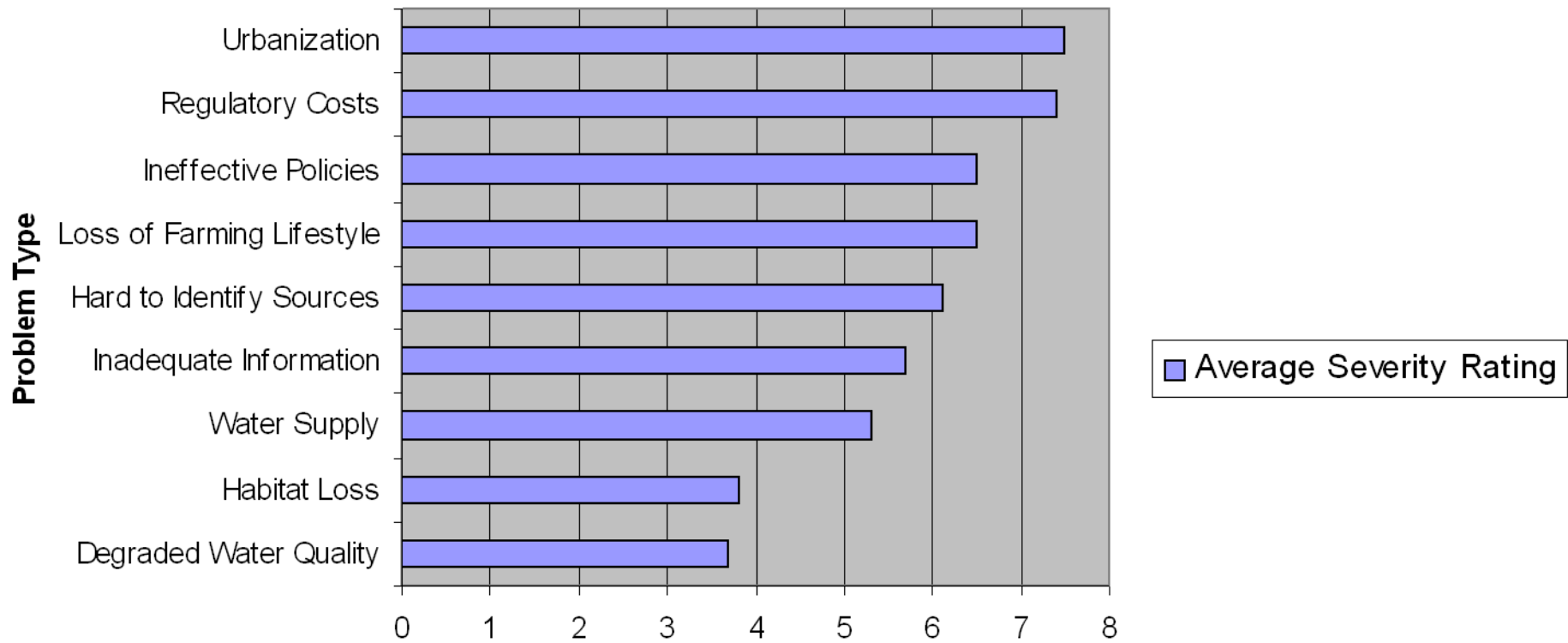
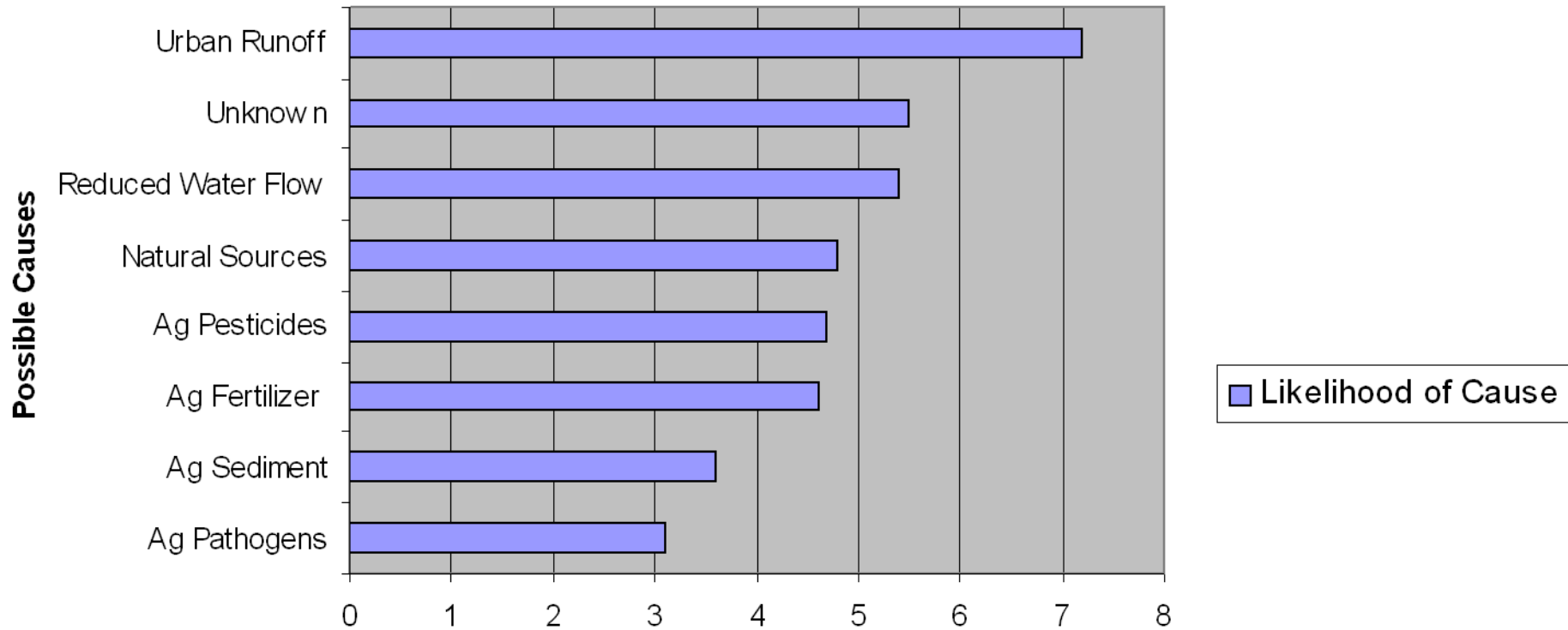


Figure 4: Perceived Severity of Water Quality Management Problems



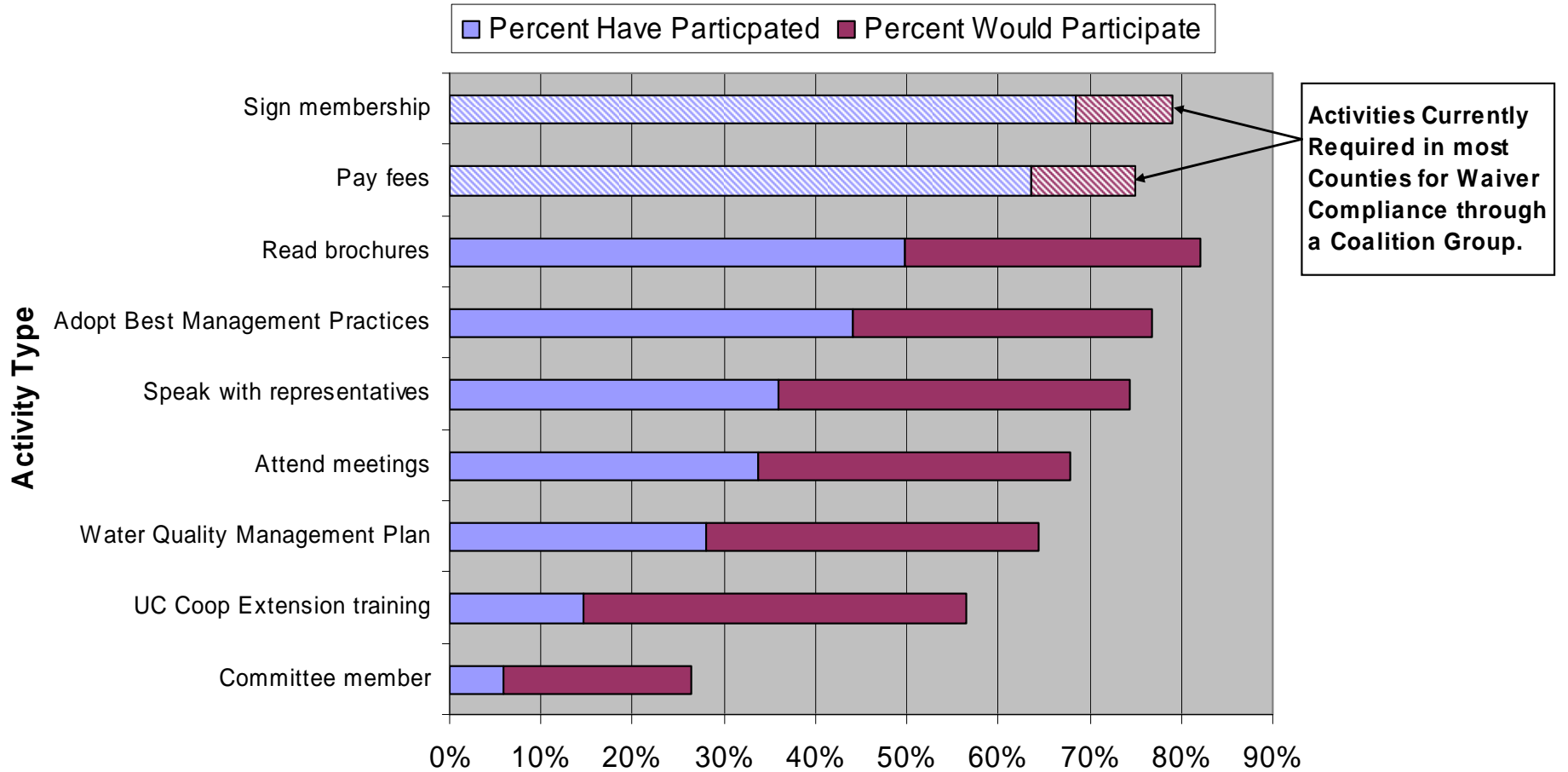
Question: The list below displays several items that have been suggested as current problems related to water quality management in the Sacramento River Watershed. Indicate your assessment of the severity of each problem by choosing an number between 1(not severe) and 10 (extremely severe)

Figure 5: Perceived Causes of Water Quality Management Problems



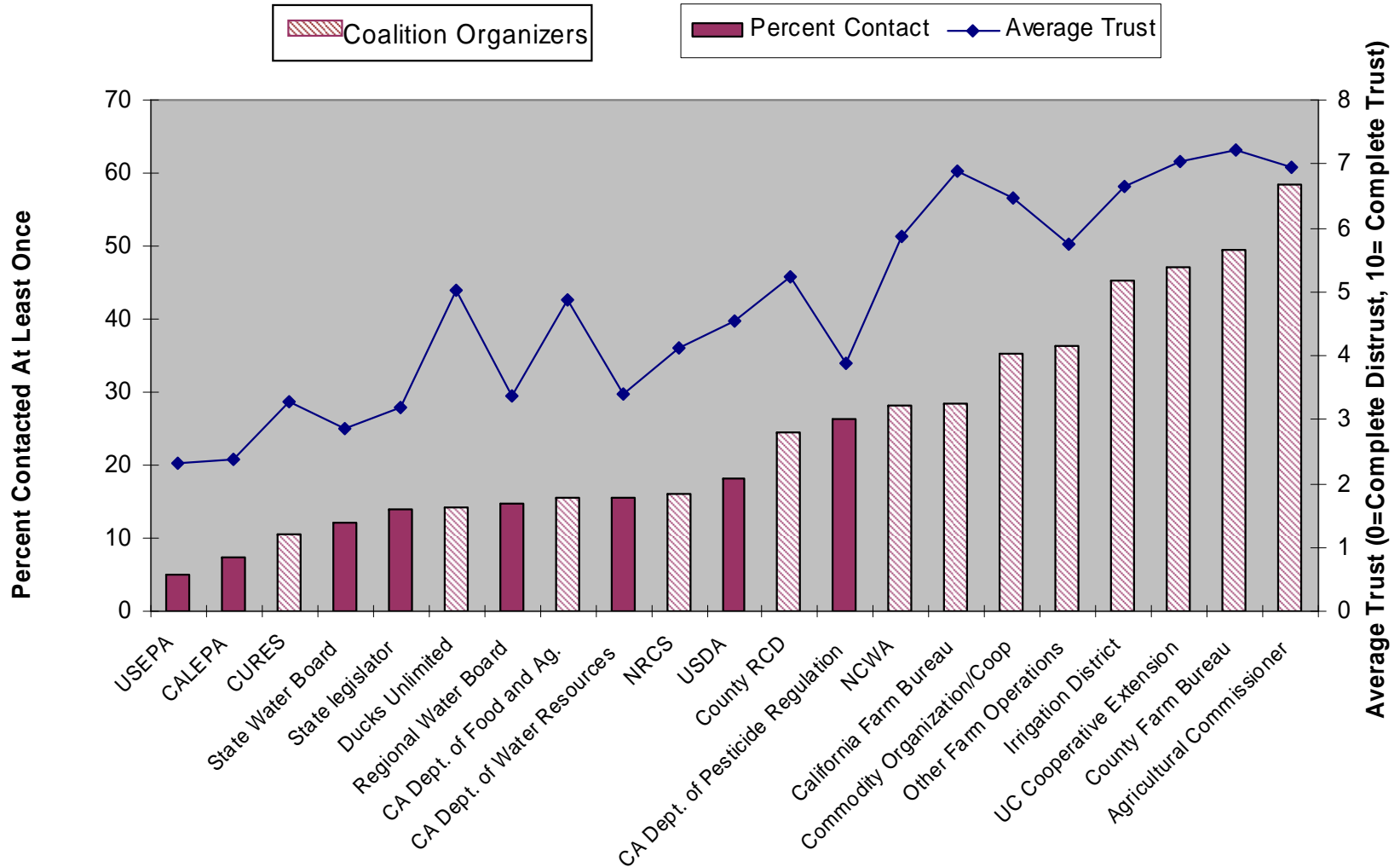
Question: There are different opinions about the current possible causes of water quality problems in the Sacramento River. Please indicate your assessment of the possible causes by choosing a number between 1 (not a cause) and 10 (a major cause).

Figure 3: Participation in Coalition Group Activities

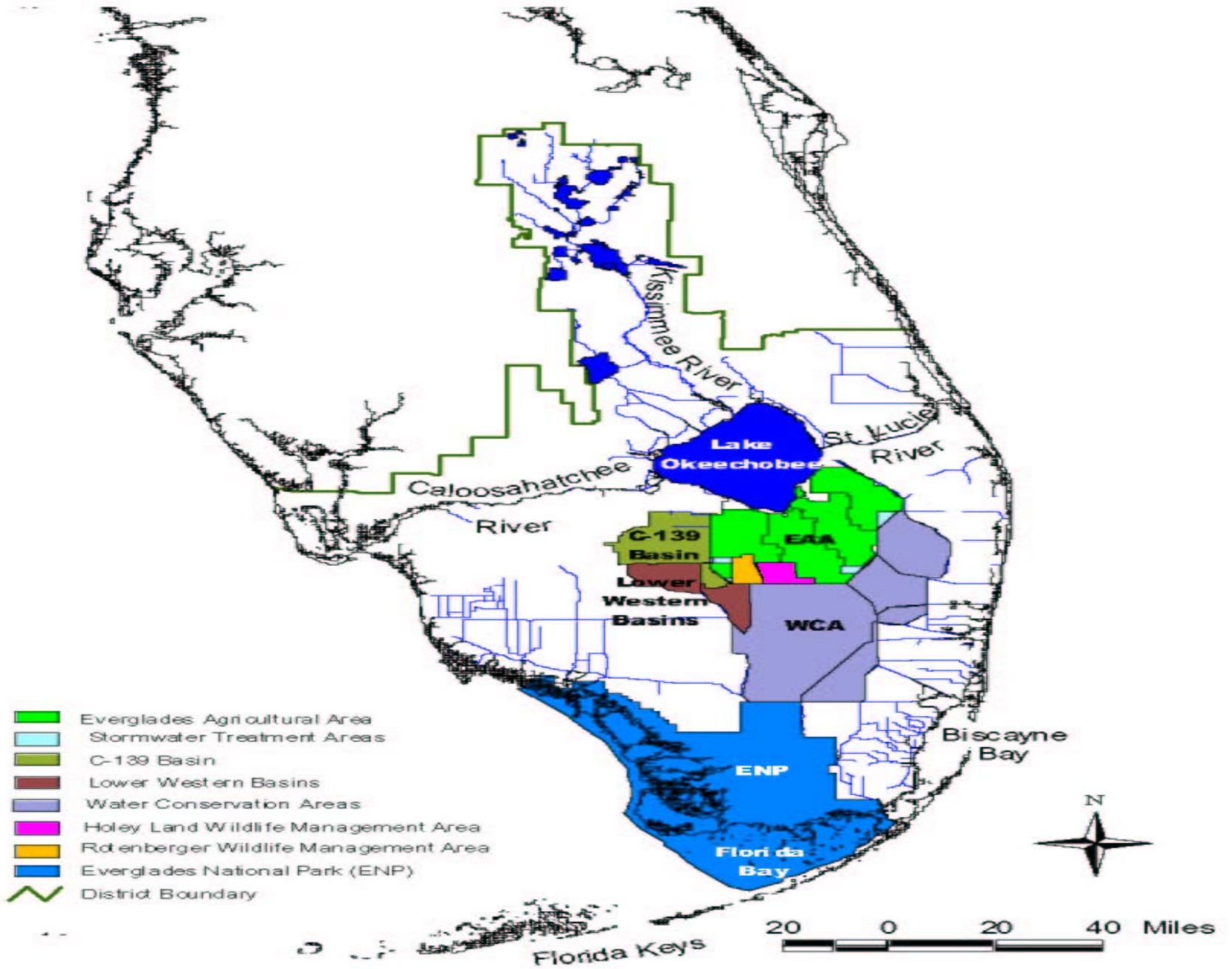


Question: The new coalition groups intend to provide a number of services. Which of the following services have you participated in, would you be willing to participate in if offered by the Coalition Groups, or would you never participate in?

Figure 6: Trust and Contact with Water Quality Management Organizations



Question: Below is a list of organizations (or types of organizations) that have been active in the Sacramento River watershed in water quality management. In the last year, how frequently did you speak with each of the organizations--daily, weekly, monthly, annually, none? Please indicate your level of trust for each organization by entering a number between 0 (complete distrust) and 10 (complete trust).



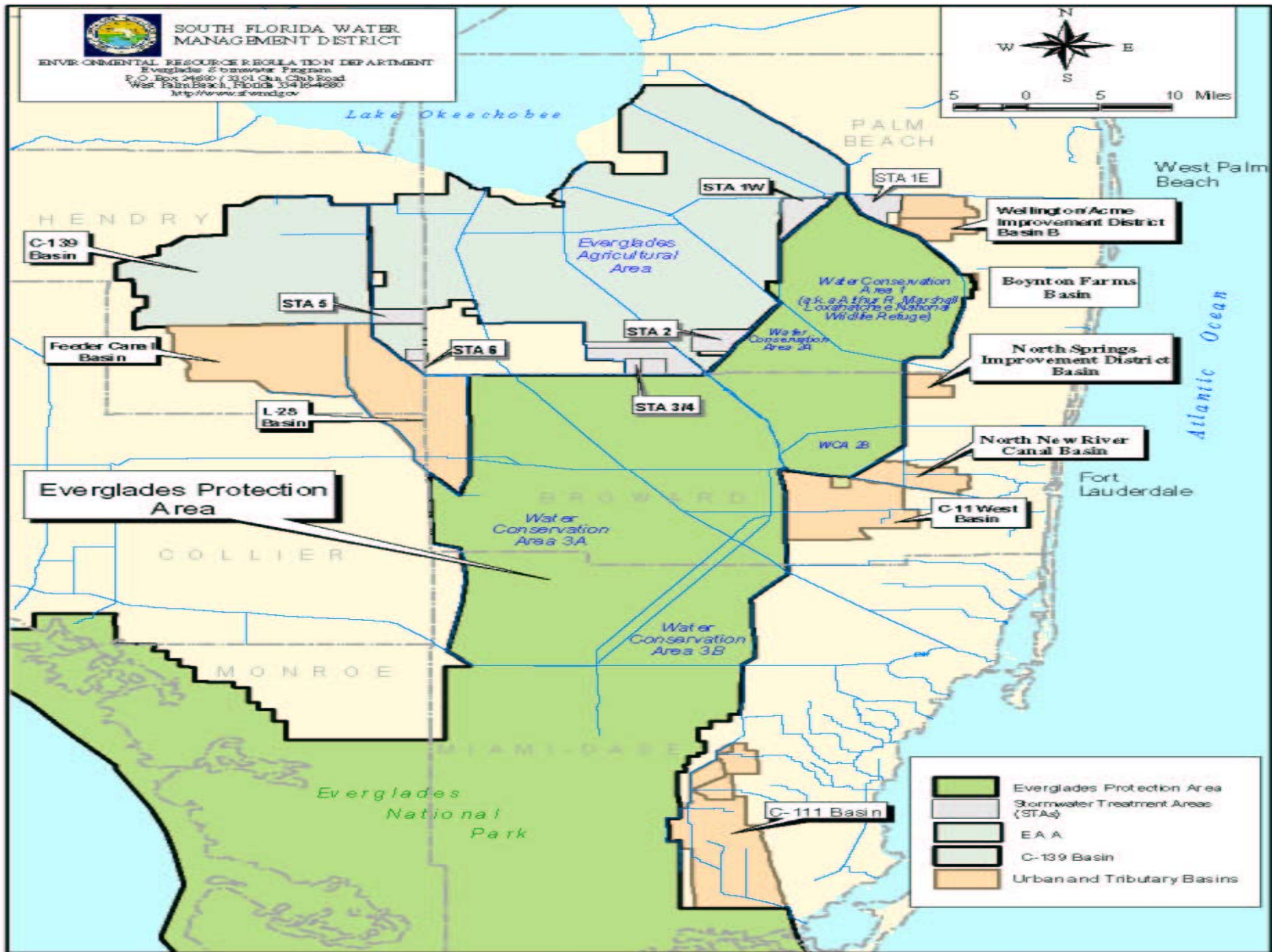
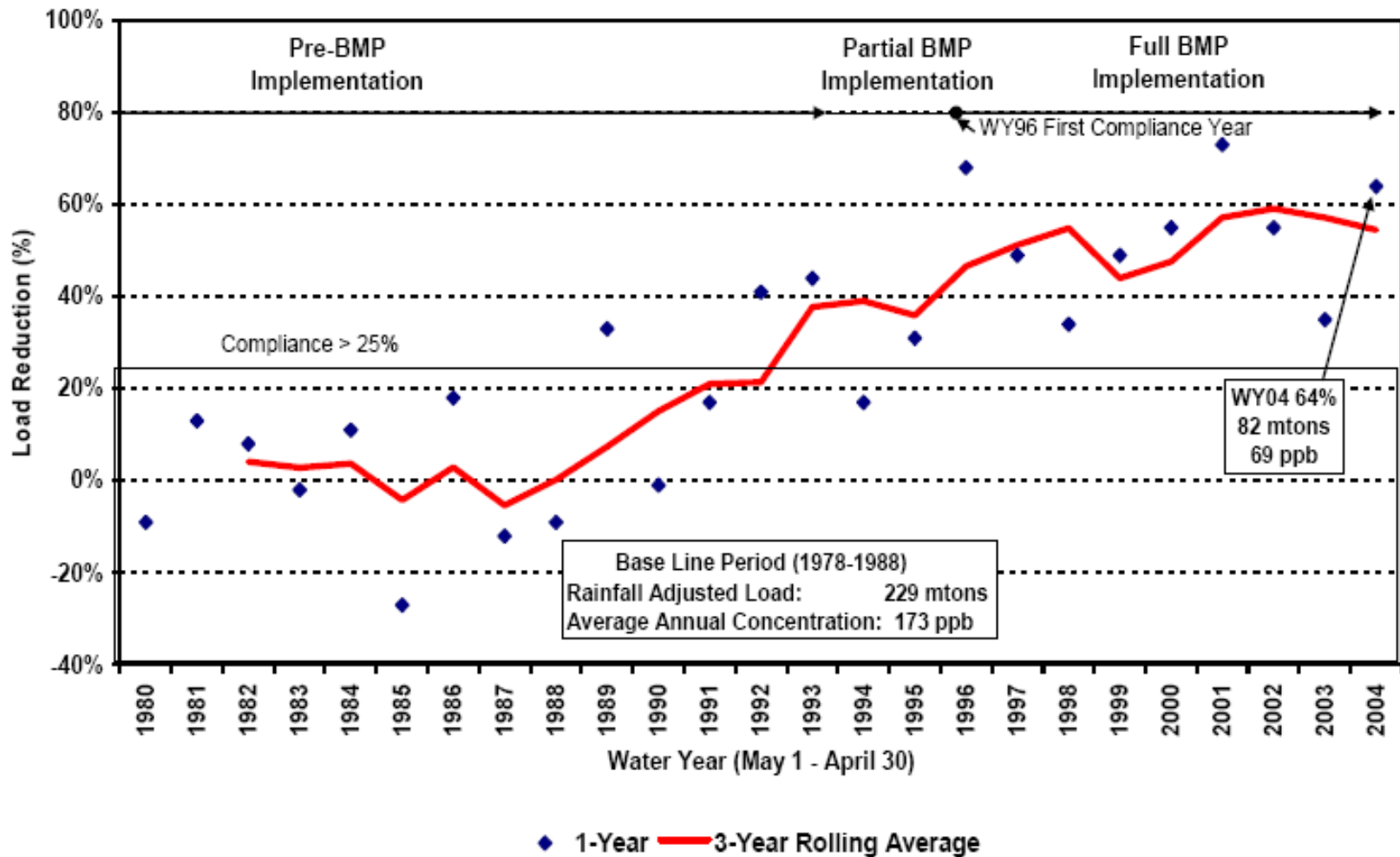
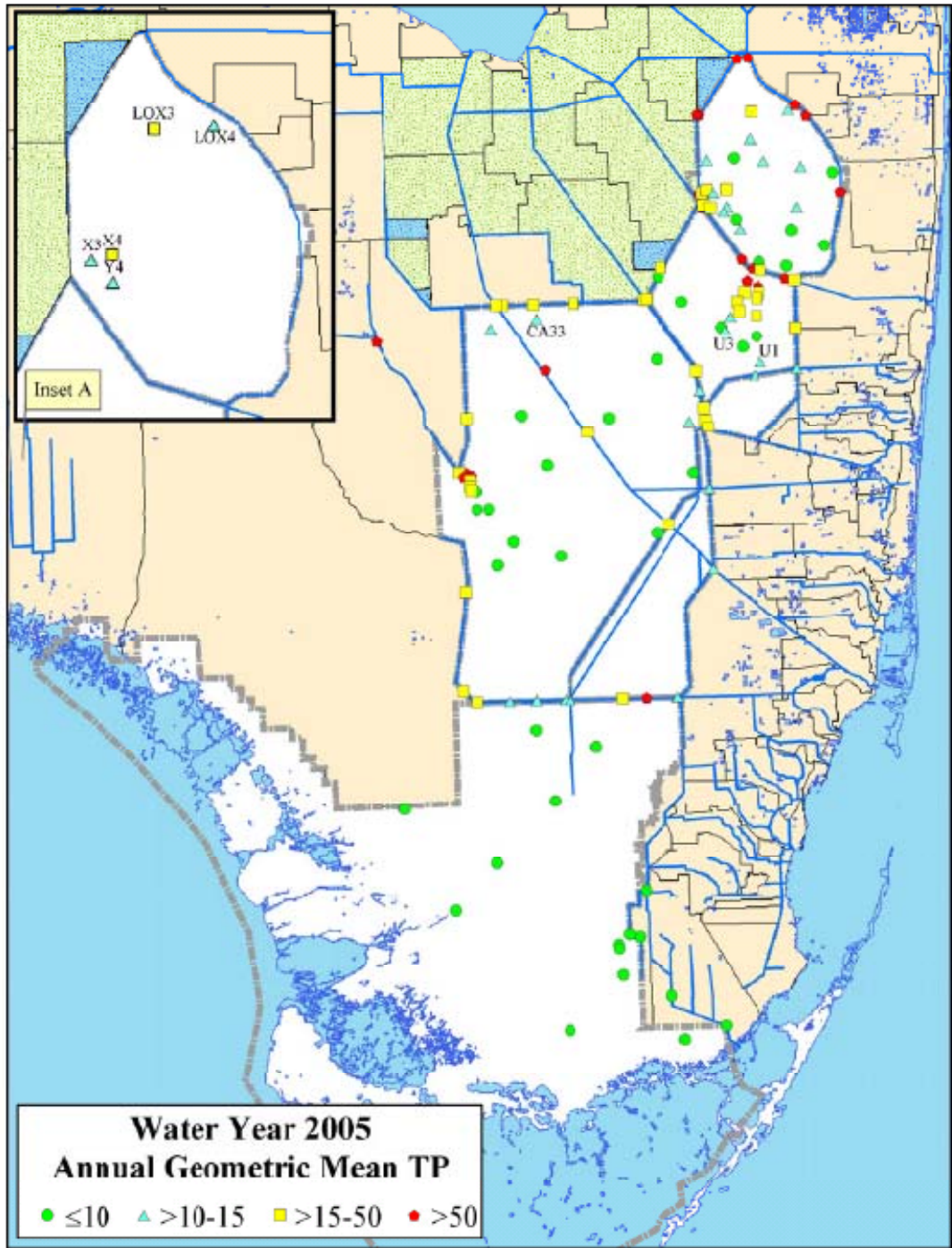


Figure 1 – Location of Basins, Tributary to the EPA

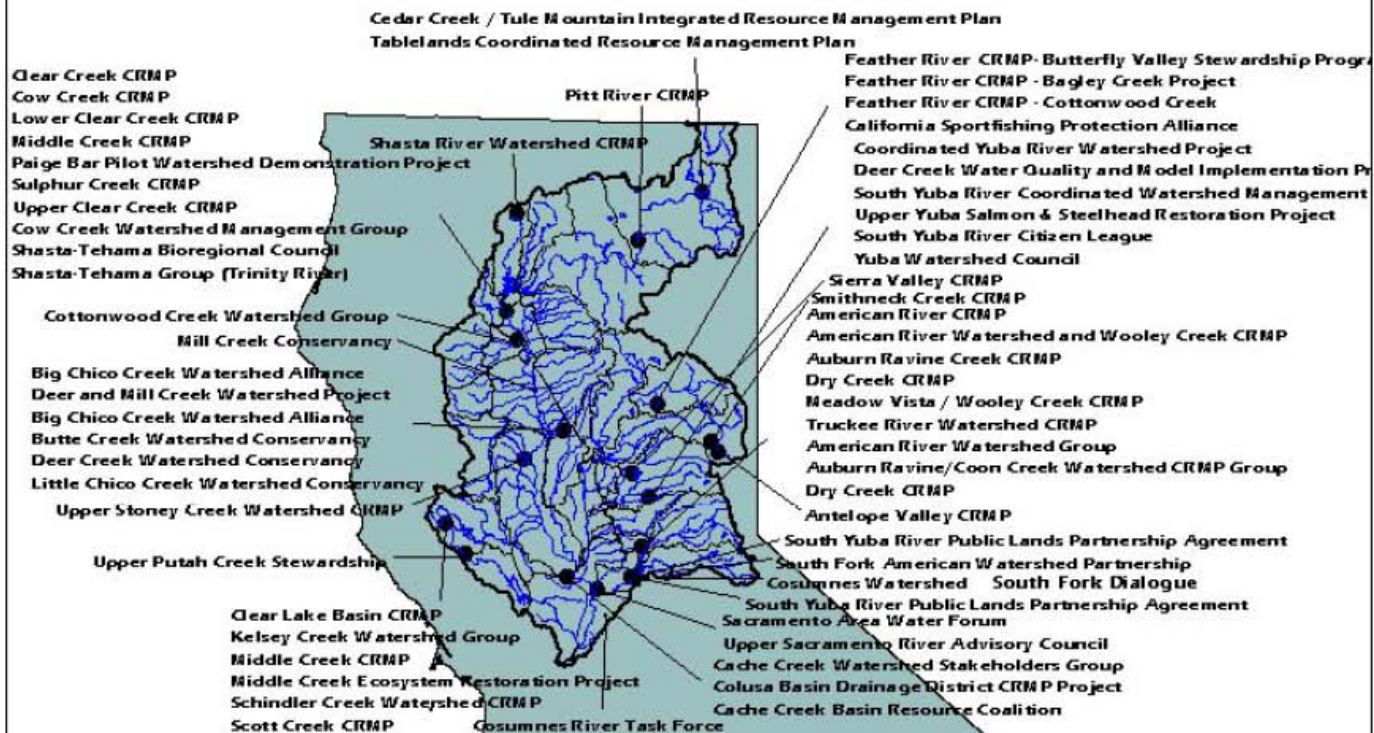




Innovations: Watershed Partnerships

- Collaborative policy-making, watershed focus, multiple stakeholders, creation of social capital, consensus decision-making
- Seen as remedy to command-and-control
- Known success factors: science, local conflict resolution, trust, fairness, congruent social values
- Many properties of Ostrom's long-enduring CPR institutions
- Symbolic policy, or real progress? No information on environmental outcomes

Watershed Partnerships in the North Central Valley Region



Innovations: Water Quality Trading

- Market based approaches thought save money; e.g. EPA estimates market based approach could save \$200 million for TMDL
- Credits based on allowable load allocation; in CT, total annual nitrogen reduction costs are approx \$4.7 million per year for 2.8 million pounds of nitrogen reduction; credit price of \$1.65 per pound
- Trading provisions implemented into NPDES permits; local variation in trading program designs
- Offsetting for point and non-point sources; e.g. point sources paying for BMP implementation in NC
- Credits can be purchased and permanently retired by enviro. groups
- Currently 37 projects in TMDL listed watersheds; EPA providing technical and financial assistance

Is the Clean Water Act Effective?

Uncertainty

- Yes! We don't have cholera etc; water pollution control in the US is one of the grand accomplishments of civilization!
- No! Despite all our efforts, significant problems remain
- Overall, data is very inconsistent

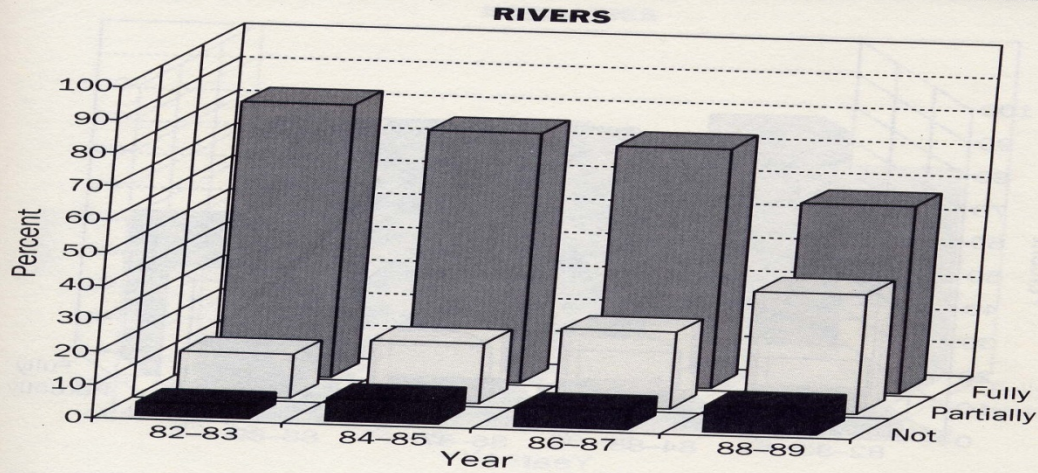
Trends in Water Quality Outcomes (not Outputs!)

- Attainment of designated uses (decline)
- Shellfish bed closures (increase)
- USGS Water Quality Monitoring—little change
- Increase in water treatment
- Increase in pollution control expenditures; 1.82 billion in '73; 5.8 billion in '86 (ok, one output)

TWENTY YEARS LATER

FIGURE 2.1A

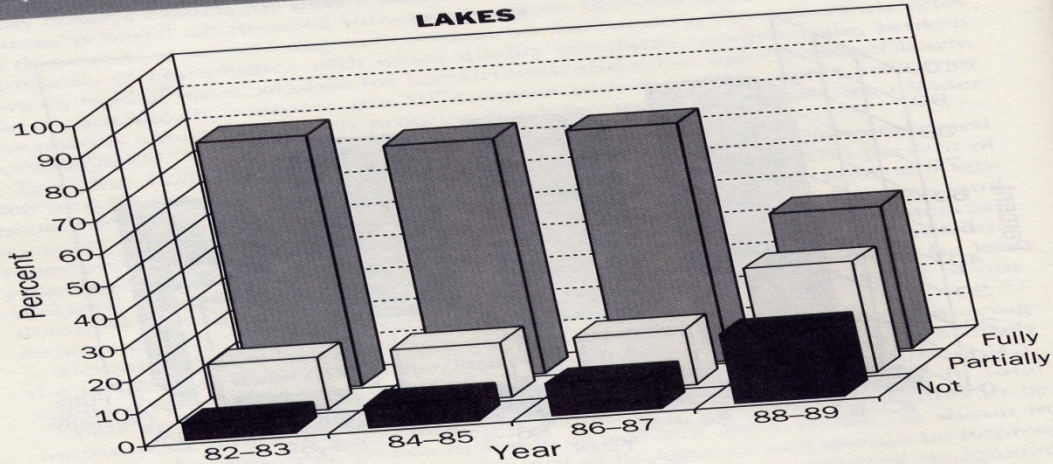
Trends in Water Quality Impairment
(% of Assessed Waters Fully, Partially, or Not Supporting Uses)



CLEAN WATER RETROSPECTIVE

FIGURE 2.1B

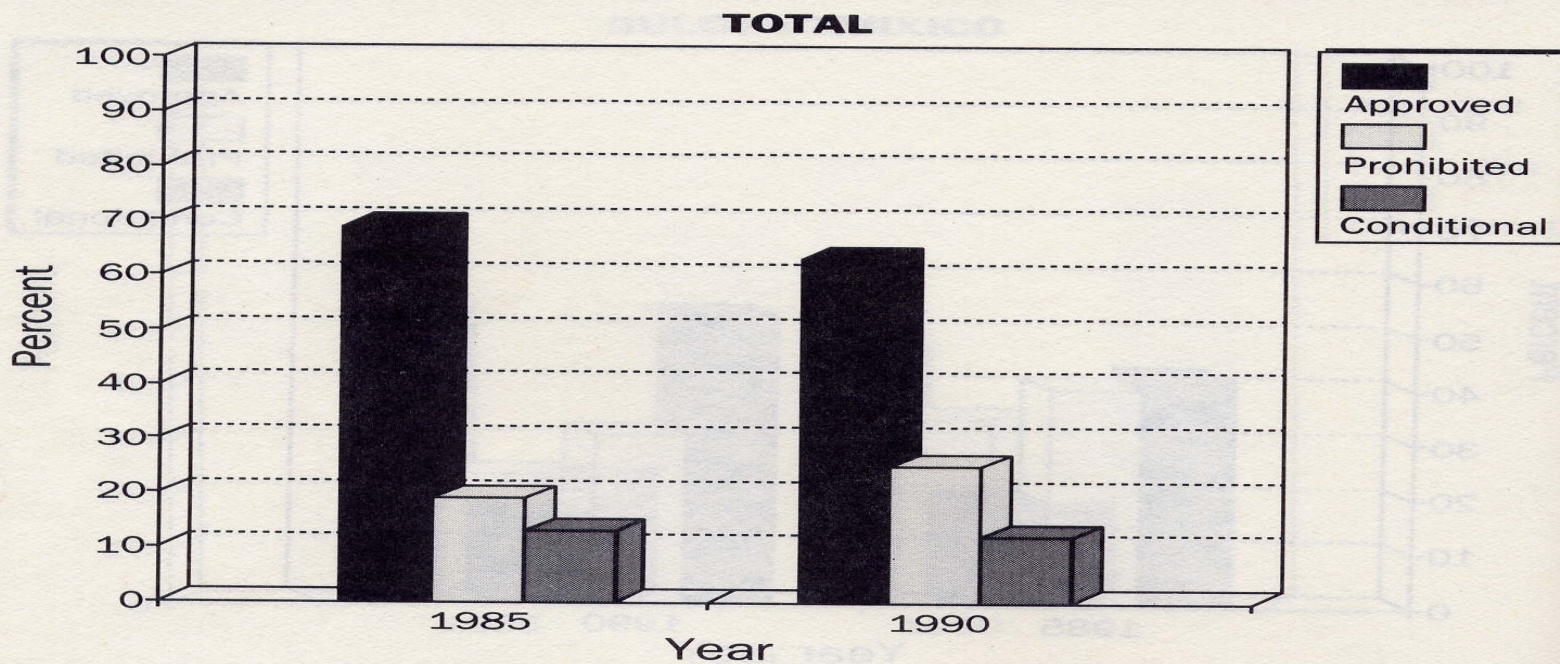
Trends in Water Quality Impairment
(% of Assessed Waters Fully, Partially, or Not Supporting Uses)



CLEAN WATER RETROSPECTIVE

FIGURE 2.2F

Trends in Shellfish Bed Closures (% of Waters)



Source: NOAA, *The 1990 National Shellfish Register of Classified Estuarine Waters* (1991), Table 3.

Conclusions

- Stability in water quality since 1950s probably, not improvement
- Point source discharges show most improvement
- Non-point sources must be controlled
- Cost-benefit analyses generally show costs outweigh benefits (but can we really know?)