SPLWG Meeting

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SFEI September 2001

Main Outcomes From the May SPLWG Meeting

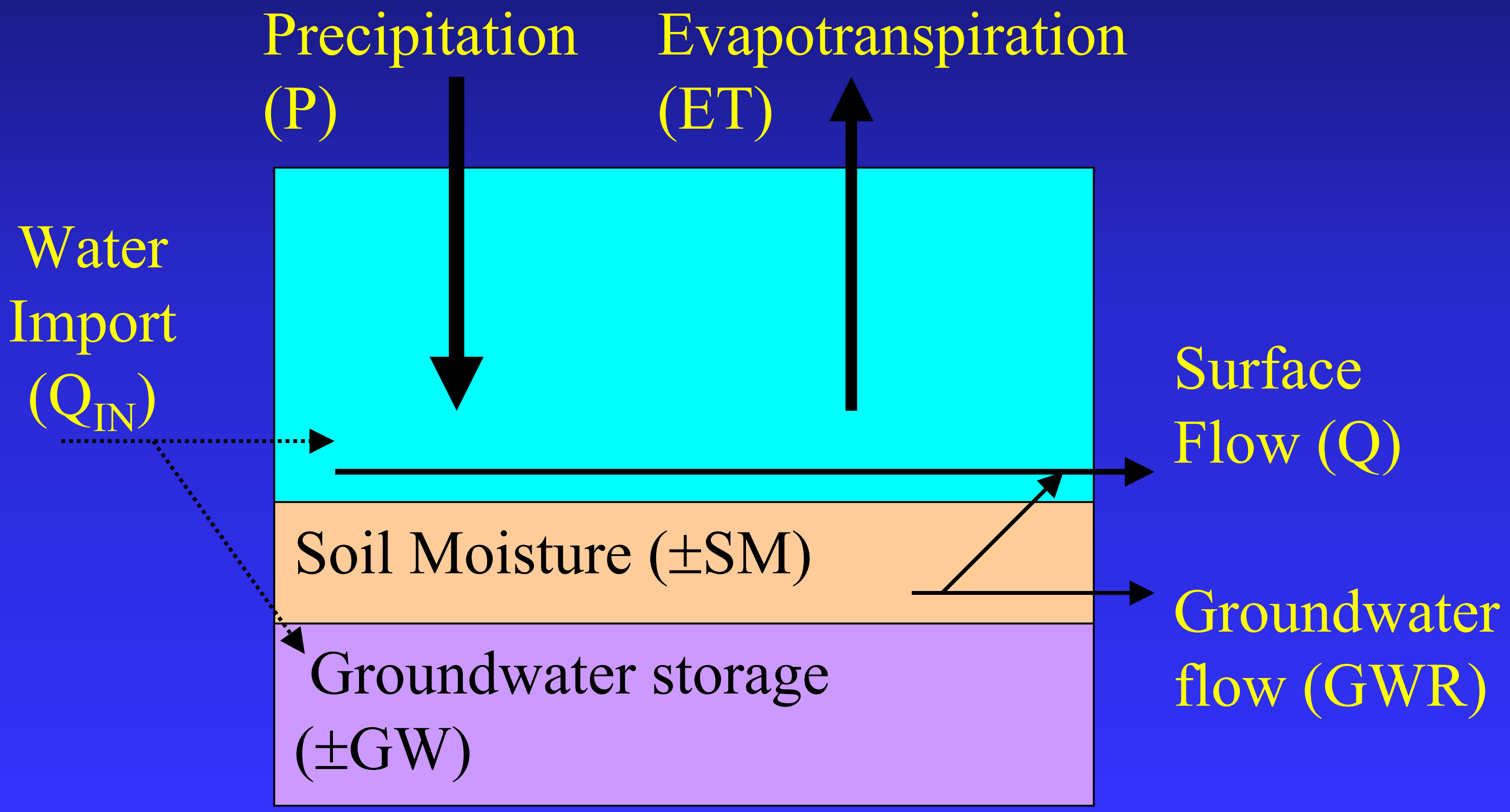
- **<u>2002 Studies:</u>** Asked to prepare scopes for 2002 pilot and special studies
- **<u>2001 Workplans:</u>** RMP Special Studies II.1 (Develop and Refine Mass Budget Models) and II.4 (Development of a Sources, Pathways, and Loadings Monitoring Component) were approved, with guidance on details of the scope of the studies provided during the meeting
- **<u>GIS Mapping:</u>** Asked to prepare an "apples and oranges" GIS map of PCBs, and other pollutant data for the Bay and its watersheds
- **<u>Simple Model:</u>** Asked to prepare a budget for doing further analysis and refinement

Main Outcomes From the May SPLWG Meeting (cont)

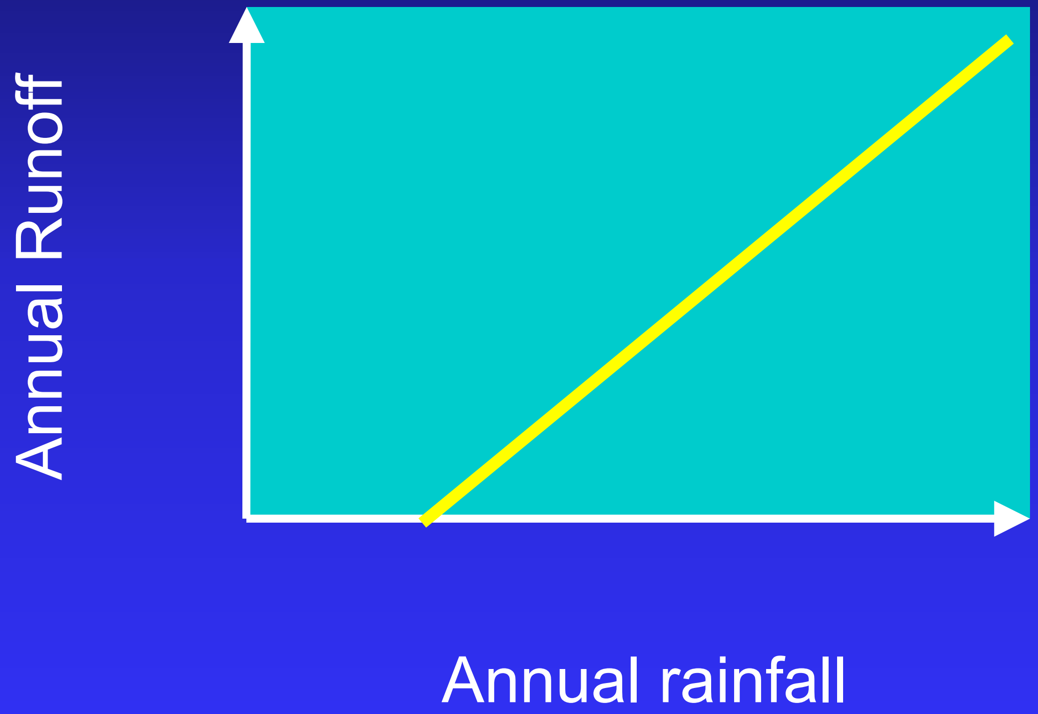
- **Drainage Boundaries:** Lester was asked to produce a work plan and budget for getting improved drainage boundaries from Contra Costa, Alameda, Santa Clara, and San Mateo
- **San Francisquito Creek:** It was suggested that Lester should talk with Geoff Brosseau about the work on San Francisquito Creek
- **Small Tributaries:** We were asked to begin the literature review
- **SPL Long-term Planning:** Asked to begin considering a long term plan for SPL in RMP

Urban Runoff Conceptual Models

Model 1: The Watershed Water Budget

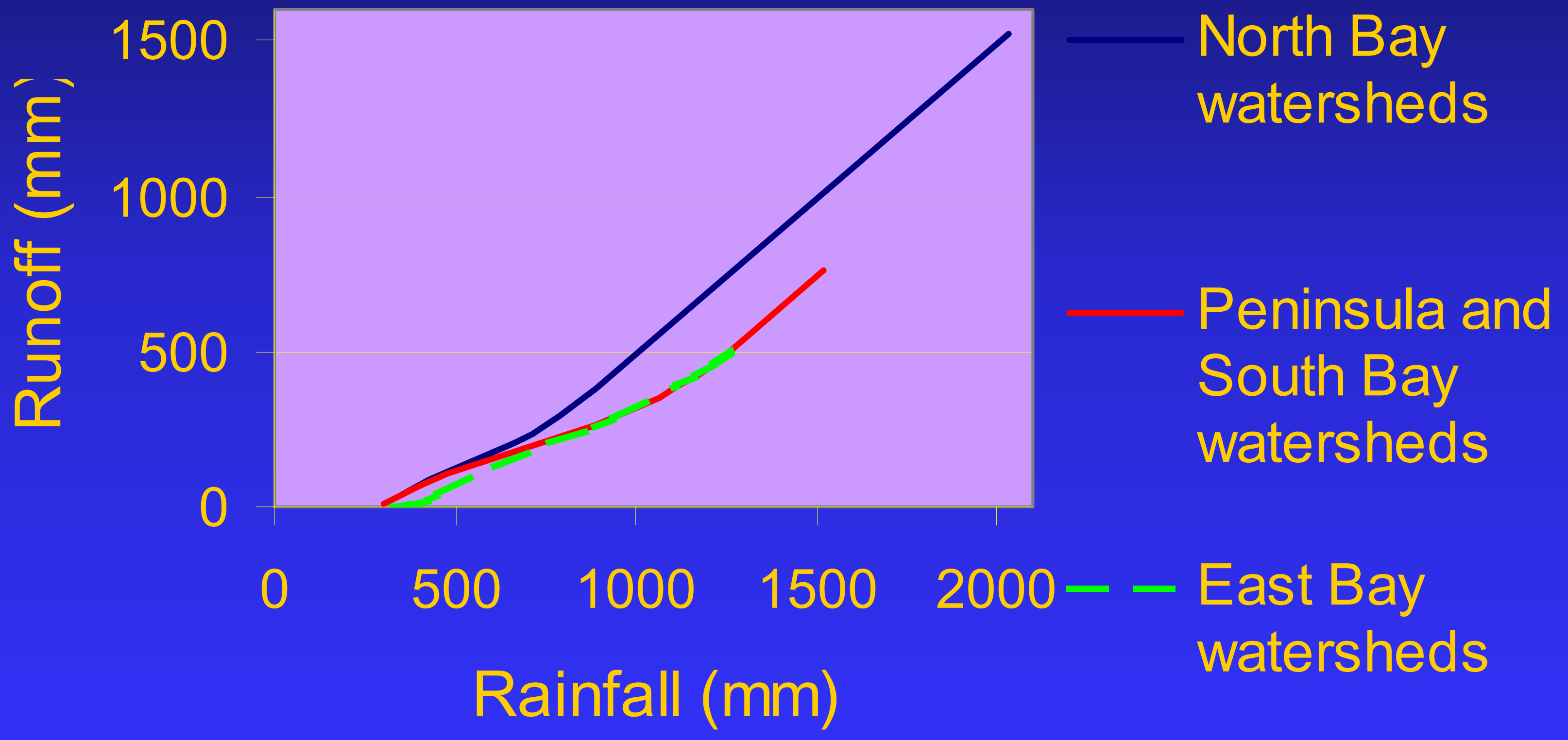


Model 2:
Rainfall vs Runoff



Rainfall vs Runoff in the Bay Area

(Modified from Rantz 1974)



Rainfall/Runoff – Bay Area Facts

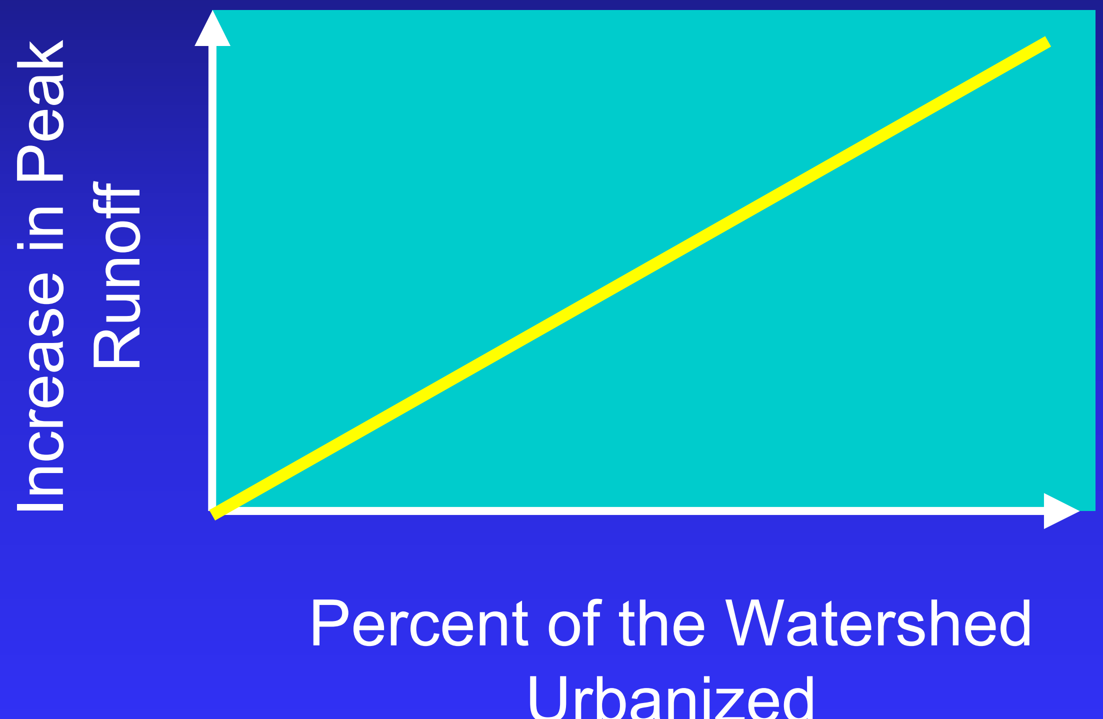
<u>Mean annual precipitation (MAP)</u>

- 90% falls Nov-Apr
- Varies spatially 305mm (12in) to 1.5m (60in)
- Single location varies from MAP–60% to MAP+100%

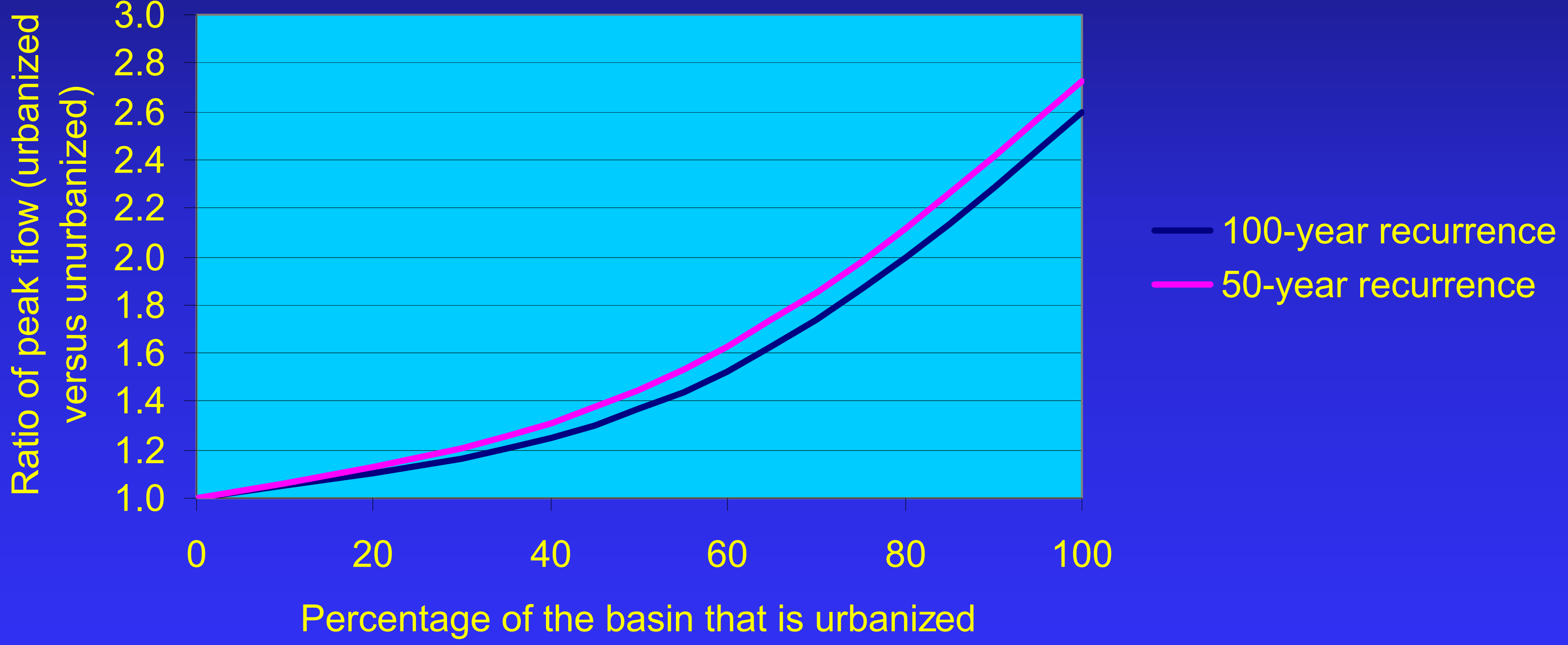
<u>Mean annual runoff (MAR)</u> (historic (Rantz 1974) or current)

- 97% runs off Nov-Apr
- Varies spatially 46mm (1.8in) to 483mm (19in)
- Single location varies from <2%MAP to 70%MAP

Model 3b:
Impacts of Humans on Runoff Generation

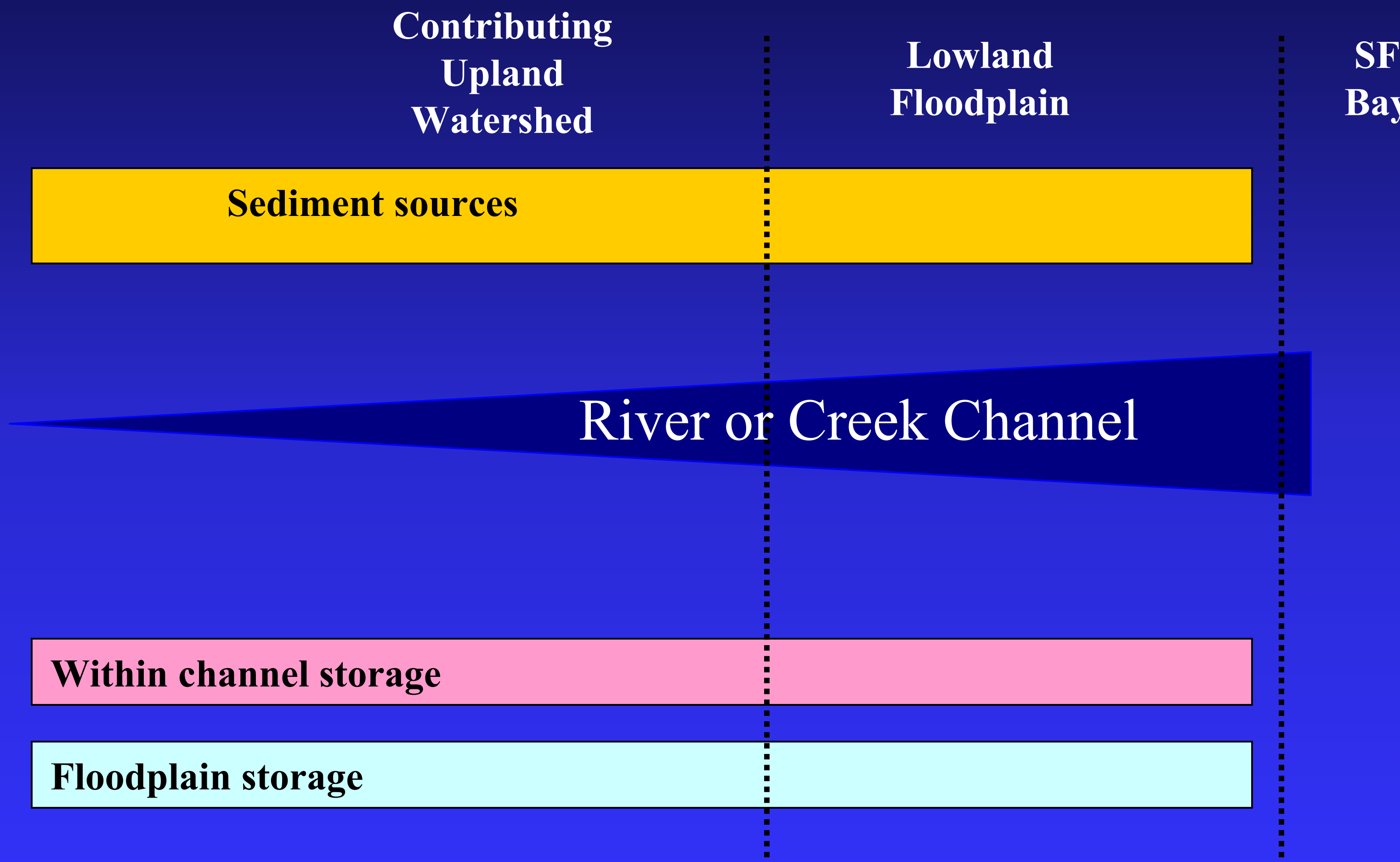


The Effect of Urbanization on Runoff in the San Francisco Region (After Waananen et al. 1977)

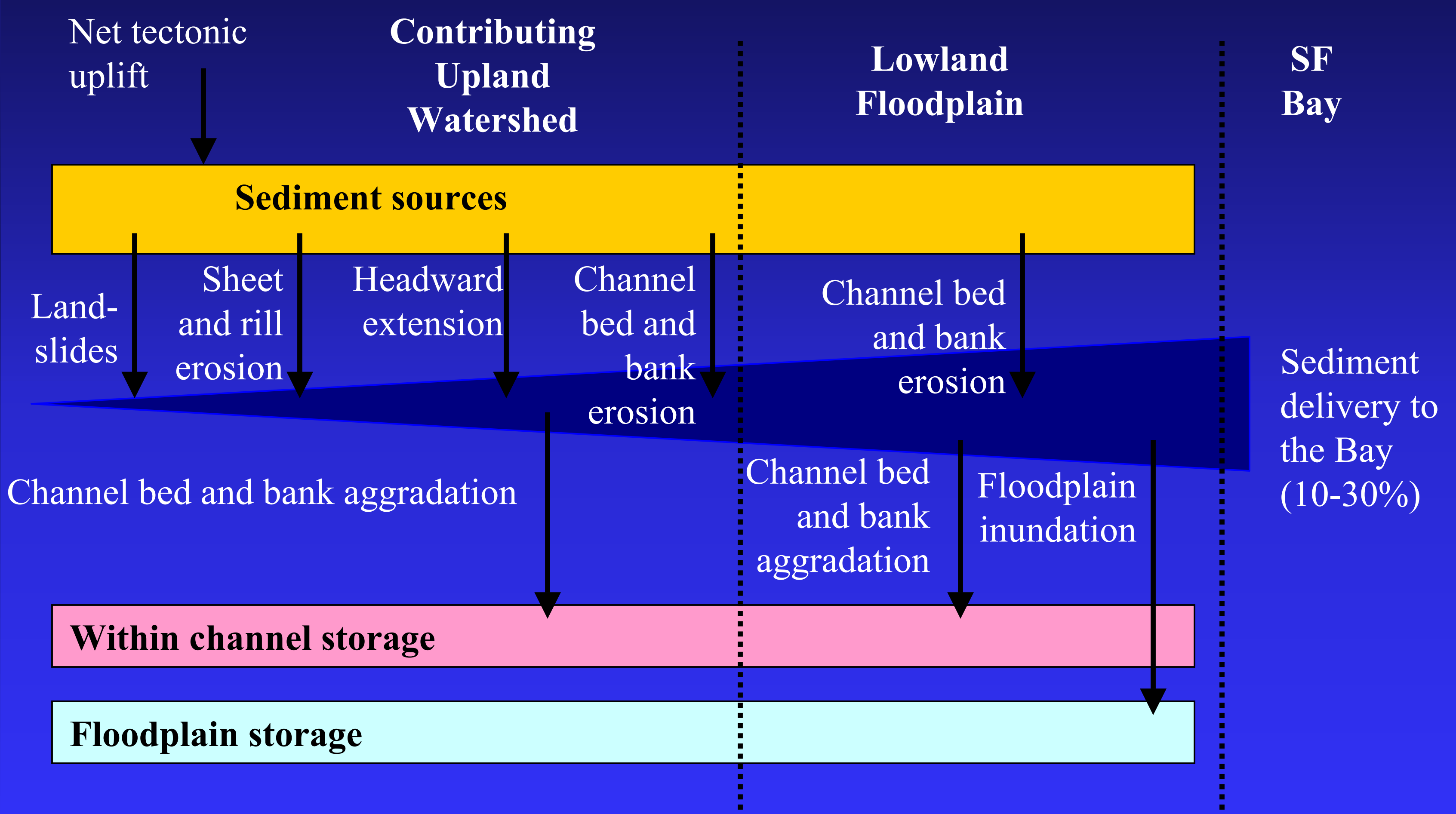


Sediment Runoff Conceptual Models

Model 1: Sediment Budget



Model 1: Sediment Budget



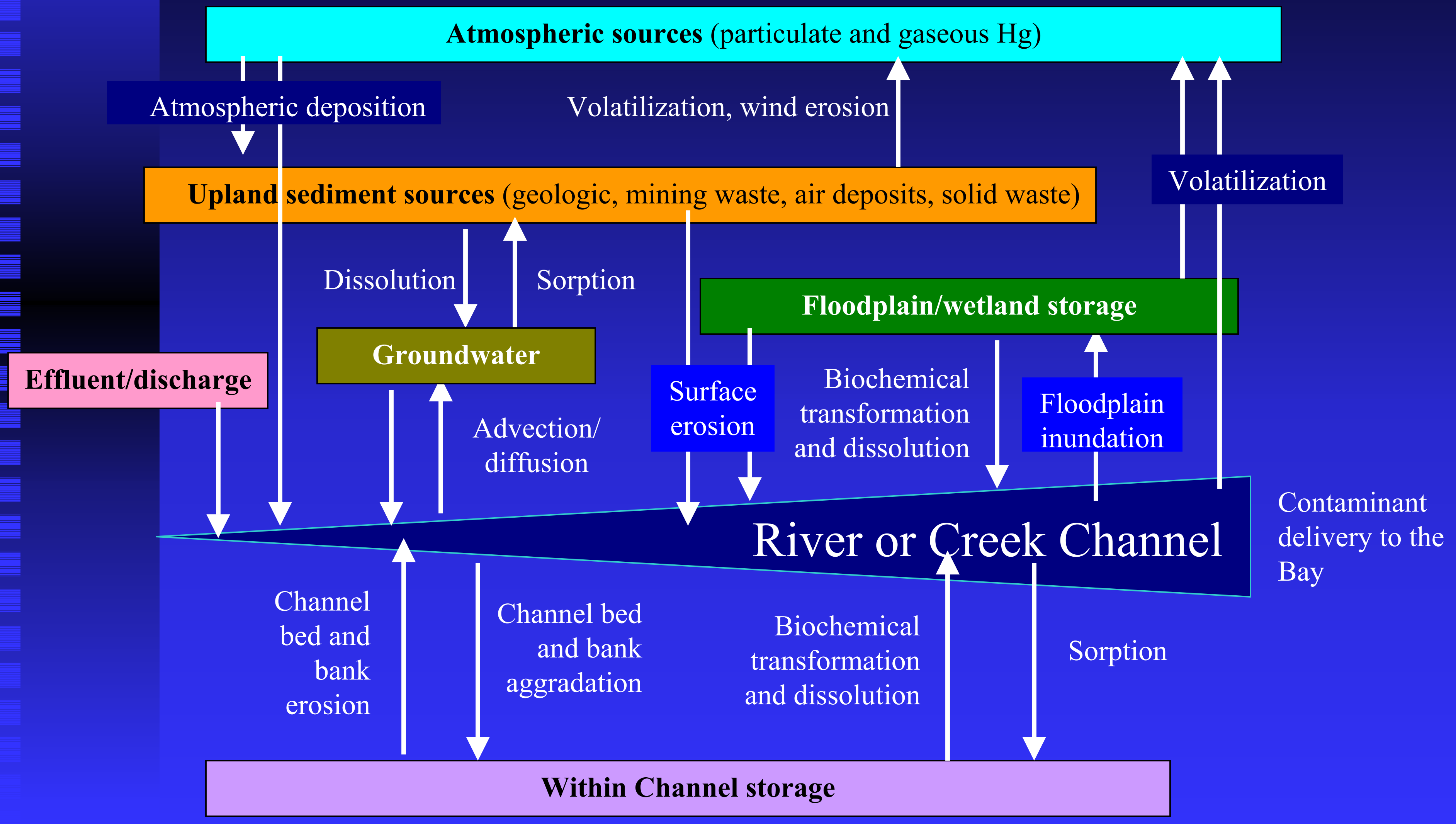
Variability of Suspended Sediment Loads in the Bay Area

SAN LORENZO CREEK ABOVE DON CASTRO RESERVOIR (1981-2000)	
Basin Area 18 sq mi	
Water Year	Suspended sediment load (Oct-Apr) (tons)
Number of complete data years	14
Minimun	499
Maximum	167013
Mean	32980
Variation	335
ALAMEDA C NR NILES, CA (1960-1973)	
Basin area = 633 sq mi	
Water Year	Suspended sediment load (Oct-Sep) (tons)
Number of complete data years	12
Minimun	3049
Maximum	287456
Mean	93928
Variation	94

Mercury Conceptual Models

Don Yee

Contaminant (Hg) budget conceptual model



Study Design Framework
Conceptual Models

Model 1:
The Watershed – Estuary System

- Budget models developed for the estuary can be used to determine:
  - magnitude of watersheds loads of concern
  - the accuracy needed for loads studies

- Spatial distribution of contamination in the estuary can help determine:
  - priorities for watershed loads determination
  - trends over time

Model 2: Loads Measurement in Watersheds

- Step 1: Map hydrography and boundaries

  (natural streams, storm drains, flood zones, tidal areas/wetland sloughs)
- Step 2: Map resources

  (land use, imperviousness, impairment indicators, BUs, geology, soils)
- Step 3: Estimate discharge
- Step 4: Measure chemical concentrations
- Step 5: Determine loads with appropriate accuracy
- Step 6: Test for trends and BMP effectiveness

Model 3: Management Initiatives

- Regionally coordinated and implemented
  (e.g. BASMAA / BACWA MOU)
- Management must make a decision on the spatial extent of the loads estimates
  - Option 1: All watershed areas
  - Option 2: Ten largest watersheds or priority watersheds?
- Study design should use methods that satisfy many of the environmental management questions
  (e.g. Environmental quality objectives, loads, trends, BMP effectiveness)
- Regional collection protocols, QA/QC, data management, data communication
- Regional and local data interpretation
- Regional peer review (design and interpretation/ report products)

2002
Special and Pilot Study Proposals

Delta Loads of Sediments and Contaminants

Background

- Suspended sediment data collected at Mallard Island is suitable for sediment loads analysis
- If coupled with contaminant data, contaminant loads could be determined for the central valley watershed

Methods

- Continue 15 minute optical back scatter (OBS)
- Collaborate with others and collect water samples and analyze for chemistry, SSC, and grainsize
- Relate SSC and contaminant concentration to OBS using regression
- Combine estimated SSC/contaminant concs with Dayflow

Budget

- $97k

Bay Margins Sediment Characterization

Background

- In spite of many efforts, there are still areas on the Bay margin that are downstream of urbanized, industrialized or agricultural watersheds whose degree of contamination has not yet been characterized
- Sediment is a natural integrator of conditions at the Bay margins and useful as an indicator of the degree of anthropogenic contamination from local watershed sources
- Methods
- Collect samples at 10 locations, once or twice during 2002
- Sediments will be analyzed for sediment chemistry and grain size

Budget

- Sampling once $40k; sampling twice $55k

Loads from Small Tributaries and Trend Analysis

Two methods for consideration

Method 1:

OBS-Regressions and Trend Analysis

Background

- There is a renewed need to estimate loads and determine trends of key pollutants entering SF Bay from local small tributaries
- A loads estimates require methods that take account of hydrogeochemical processes
- The ideal trend indicator is unaffected by climatic variability

Methods

- Install and maintain optical back scatter (OBS) at a GSGS gauging station
- Collaborate with others and collect water samples and analyze for chemistry, SSC, and grainsize

Method 1 continued:

OBS-Regressions and Trend Analysis

Methods continued…

- Relate SSC and contaminant concentration to OBS using regression
- Combine estimated SSC/contaminant concs with USGS discharge
- Collect sediment samples just above the tidal zone in depositional areas and analyze for chemistry and grainsize
- Use normalization techniques to interpret the data now and in the future (time period to be determined using power analysis)

Budget

- Existing location $101k; new location $151k

Method 2:

USGS Total Loads Stations:

Inclusion of Contaminants and Trends Indicator

Background

- There is a renewed need to estimate loads and determine trends of key pollutants entering SF Bay from local small tributaries
- A loads estimates require methods that take account of hydrogeochemical processes
- The ideal trend indicator is unaffected by climatic variability

Methods

- Begin a USGS Seasonal Total Daily Loads collection
- Collect water samples and analyze for chemistry, SSC, and grainsize

Method 2 continued:

USGS Total Loads Stations:

Inclusion of Contaminants and Trends Indicator

Methods continued…

- Relate contaminant concentration to SSC using regression taking into account grainsize effects
- Combine estimated contaminant concentrations with USGS discharge
- Collect sediment samples just above the tidal zone in depositional areas and analyze for chemistry and grainsize
- Use normalization techniques to interpret the data now and in the future (time period to be determined using power analysis)

Budget

- First year $128k; Subsequent years $42k

Simple Model

Background

Good planning level tool for:

- Inventory
- Prioritization for new data collection
- Education
- Hypothesis for loads and relative changes over time
- May give accurate loads estimation under certain circumstances in spite of assumptions

Issue

- Previous regional application was not conducted using the watershed and the base unit of area limiting past and future comparisons to loads estimates

Simple Model (continued)

Method

- Task 1. Develop load estimates for County areas, watershed areas, and areas for which there area previous load estimates and existing records of discharge
- Task 2. Make direct comparisons of new load and discharge estimates with other available load estimates
- Task 3. Present the results in figures, graphs and tables
- Task 4. Analyze the results to determine the circumstances under which the model performs well and poorly
- Task 5. Write a short report

Budget

- $30k