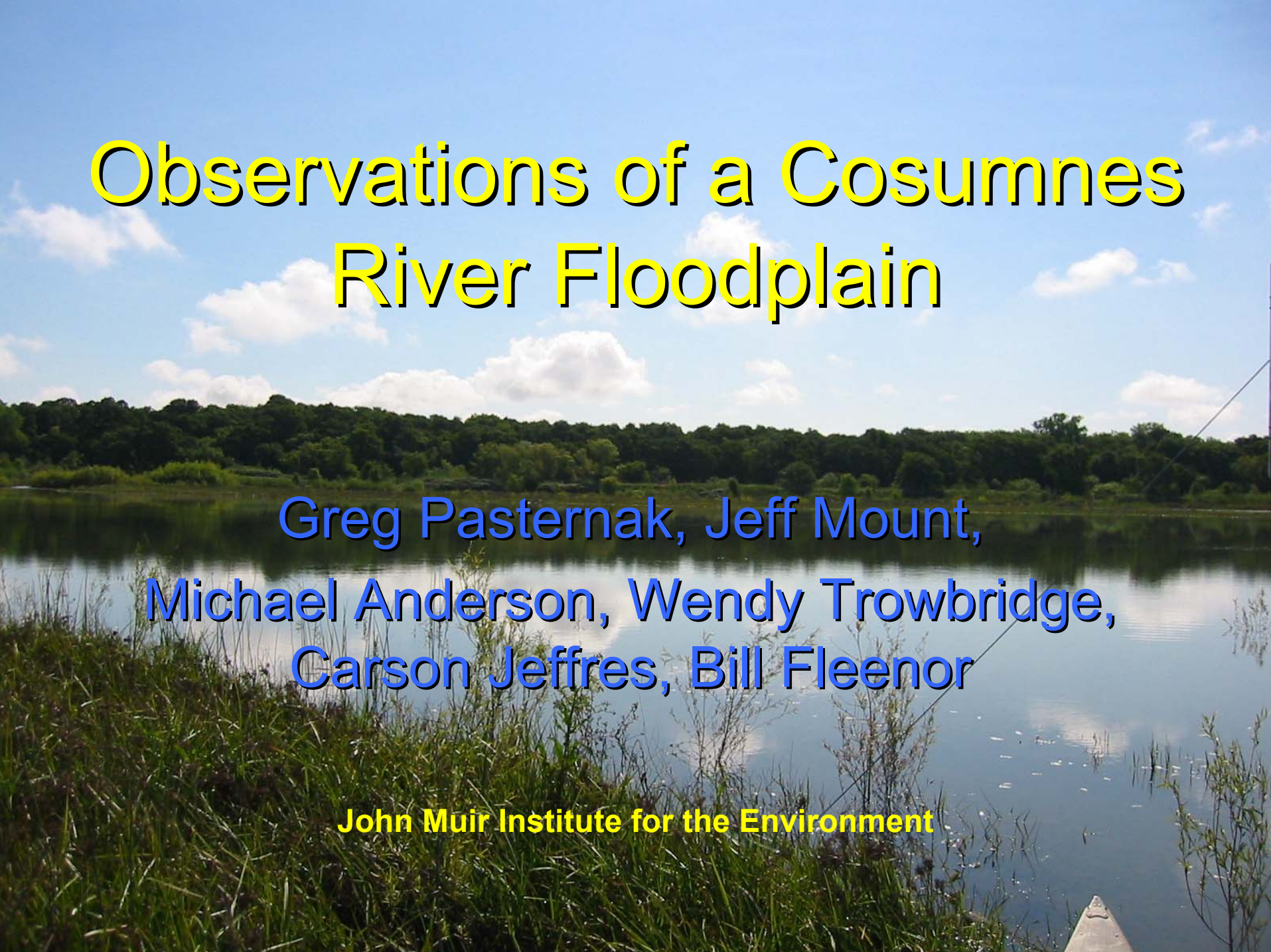

Observations of a Cosumnes River Floodplain

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John Muir Institute for the Environment

Presentation Outline

- Introduction
- Basin Overview
- Floodplain Overview
- Equipment
- Observations
- Future Plans

Introduction

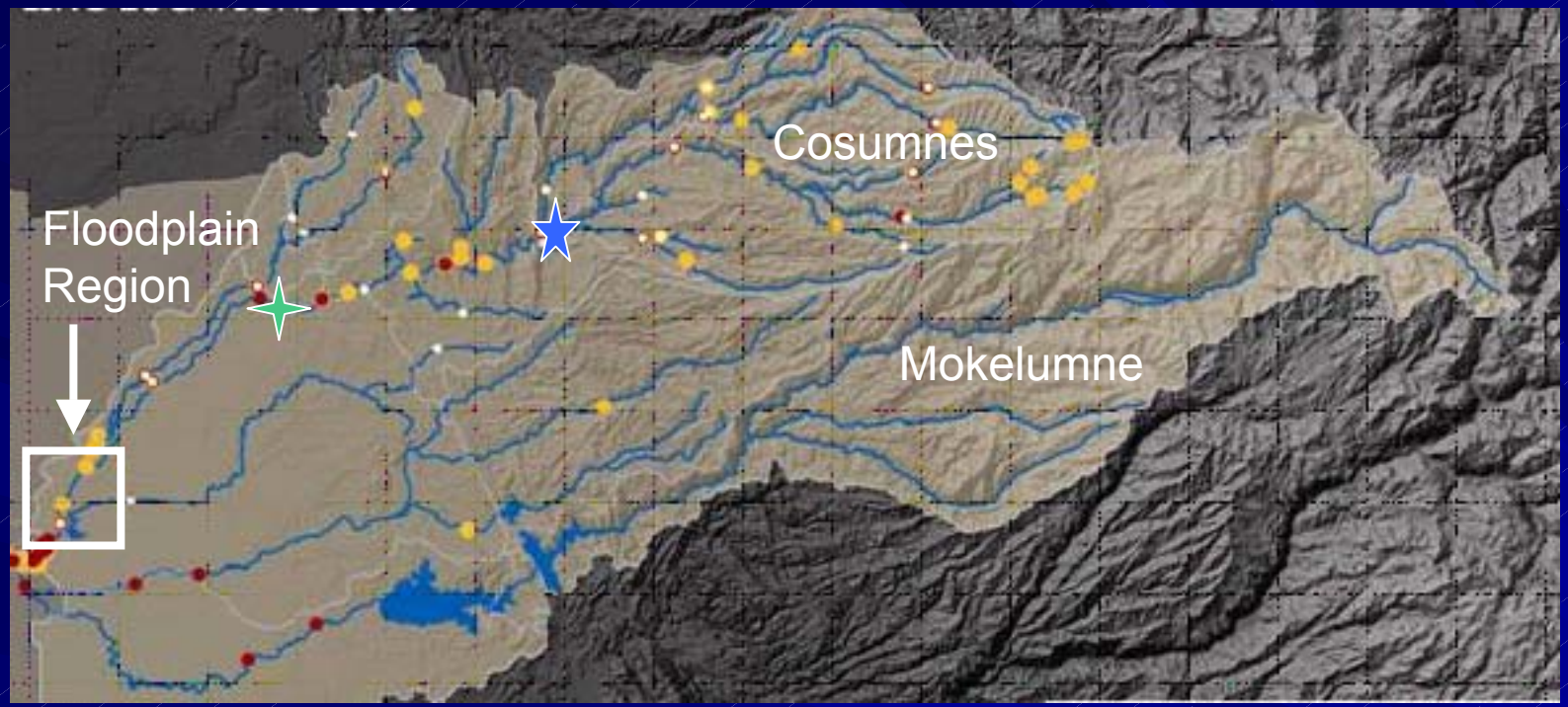
- Cosumnes floodplain hydrologic observation part of larger integrated effort of the Cosumnes Research Group studying both the Cosumnes and Mokelumne Rivers

- Work carried out by participating faculty and researchers of the John Muir Institute of the Environment at UC Davis

Hydrologic Observation

- Floodplain hydrologic observation started in 2000
- Further instruments added in 2001 and 2002
- Meteorological stations added in 2003
- Observations continuing including some equipment replacement

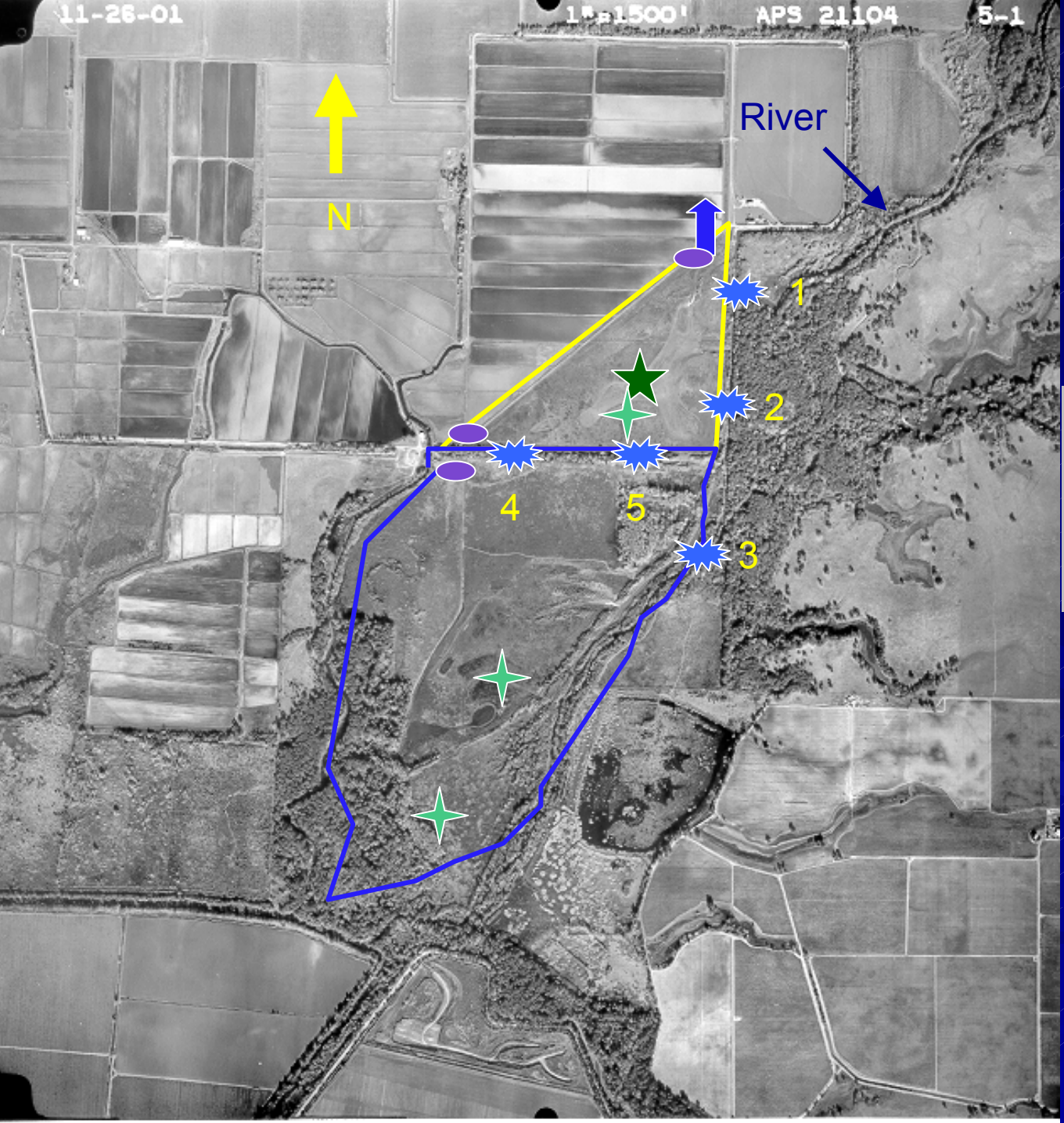
Cosumnes Basin Overview



- 1600 sq. km Area
- Elevation up to around 7000 ft
- USGS flow gage at Michigan Bar
- USGS stage gage at McConnell

Floodplain Overview

- Floodplain formed by intentional levee breaches approximately 11 miles downstream of the USGS McConnell stage gage.
- Upper floodplain triangular in shape with adjacent farm fields
- Lower floodplain connected to upper floodplain via levee breaches



Floodplain Map

Legend

- Upper Floodplain
- Lower Floodplain
- Breach Location
- Met Station
- Overflow point 4/03
- Photo spot
- FP pond sites

Upper Floodplain Cross Levee

Upper Floodplain Cross Levee

Upper Floodplain

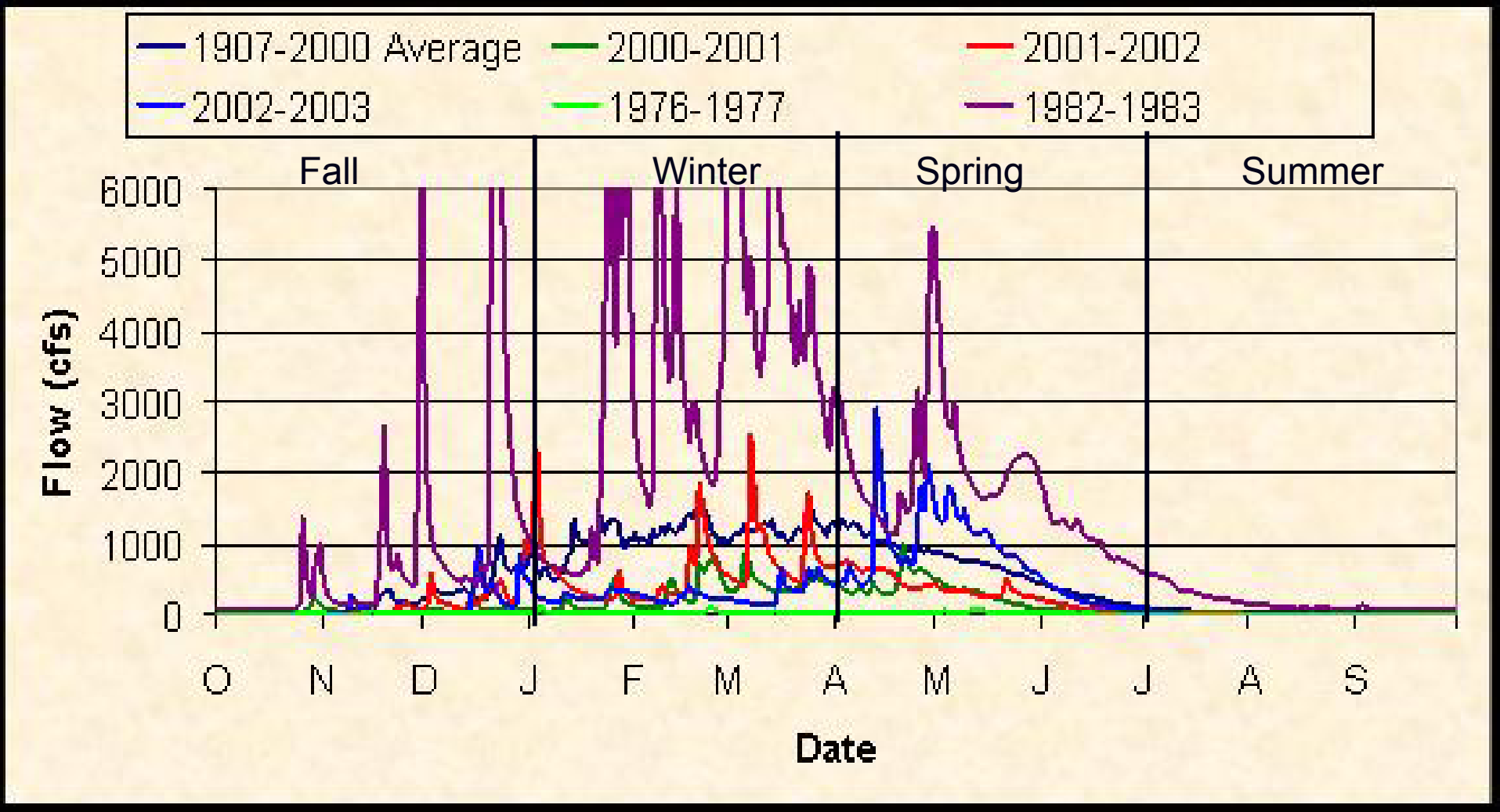
Levee between Upper and Lower Floodplain

Lower Floodplain

Equipment

- Depth and velocity measured in 5 breaches and 3 floodplain pond sites using pressure transducers
- Floodplain water temperatures measured using thermisters
- Met station measures rainfall, wind speed, radiation (solar and net), temperature and relative humidity

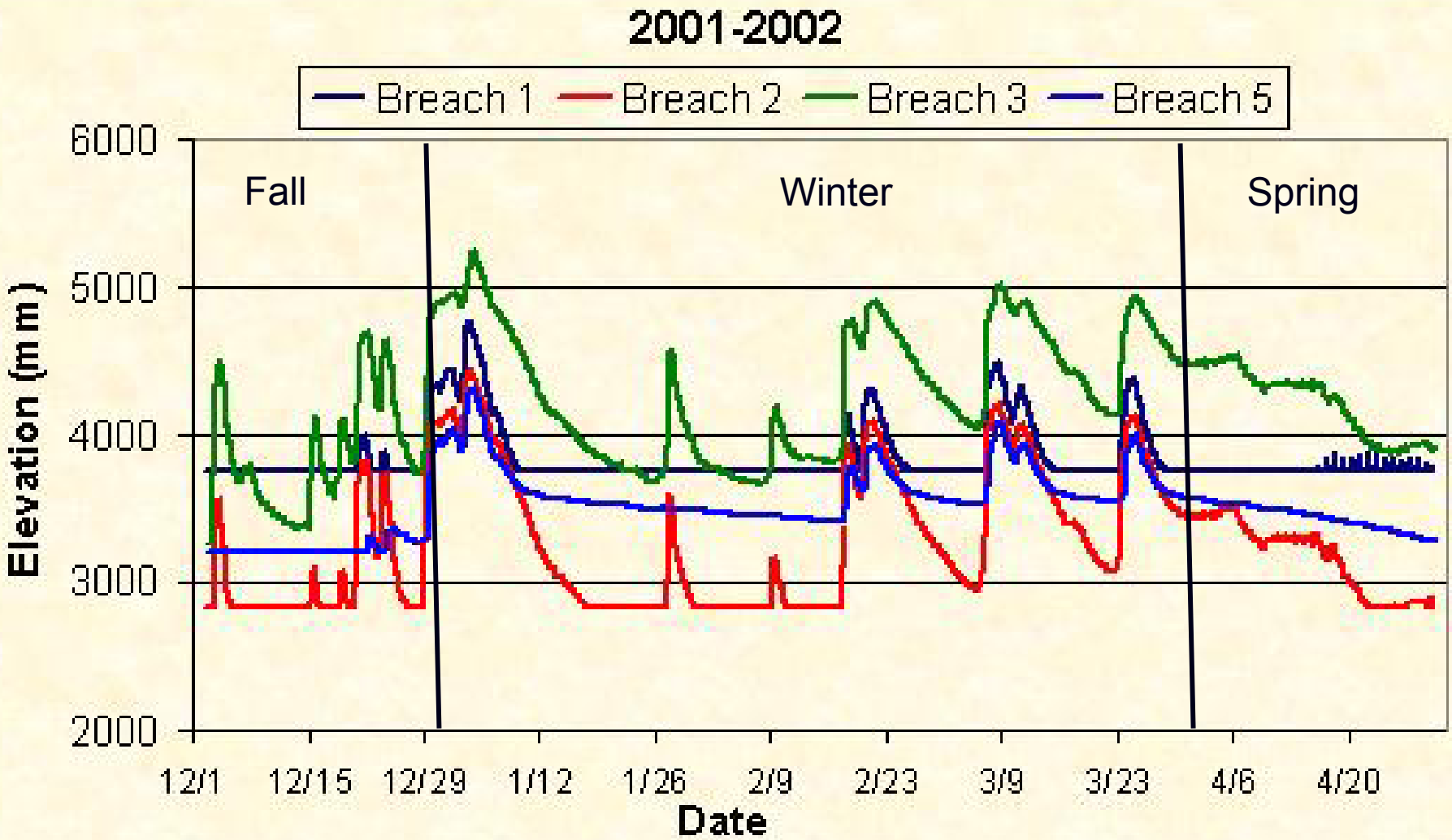
Annual Hydrographs at Michigan Bar



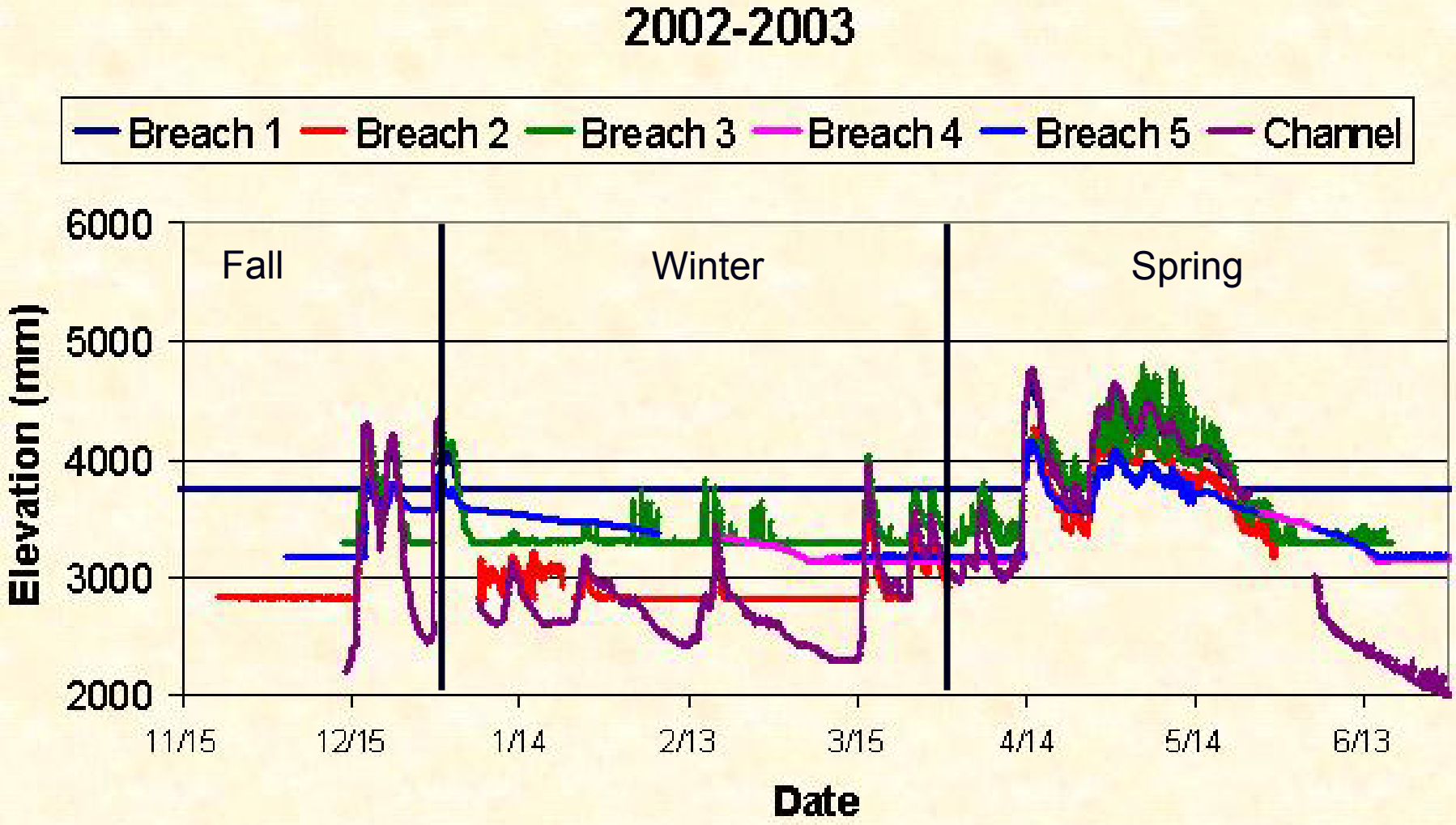
Annual Volumes at Michigan Bar

Year	1907-2000 Avg.	2000-2001	2001-2002	2002-2003	1976-1977	1982-1983
Vol. (taf)	365	116	201	212	16	1221
% Avg.	100	32	55	58	4	577

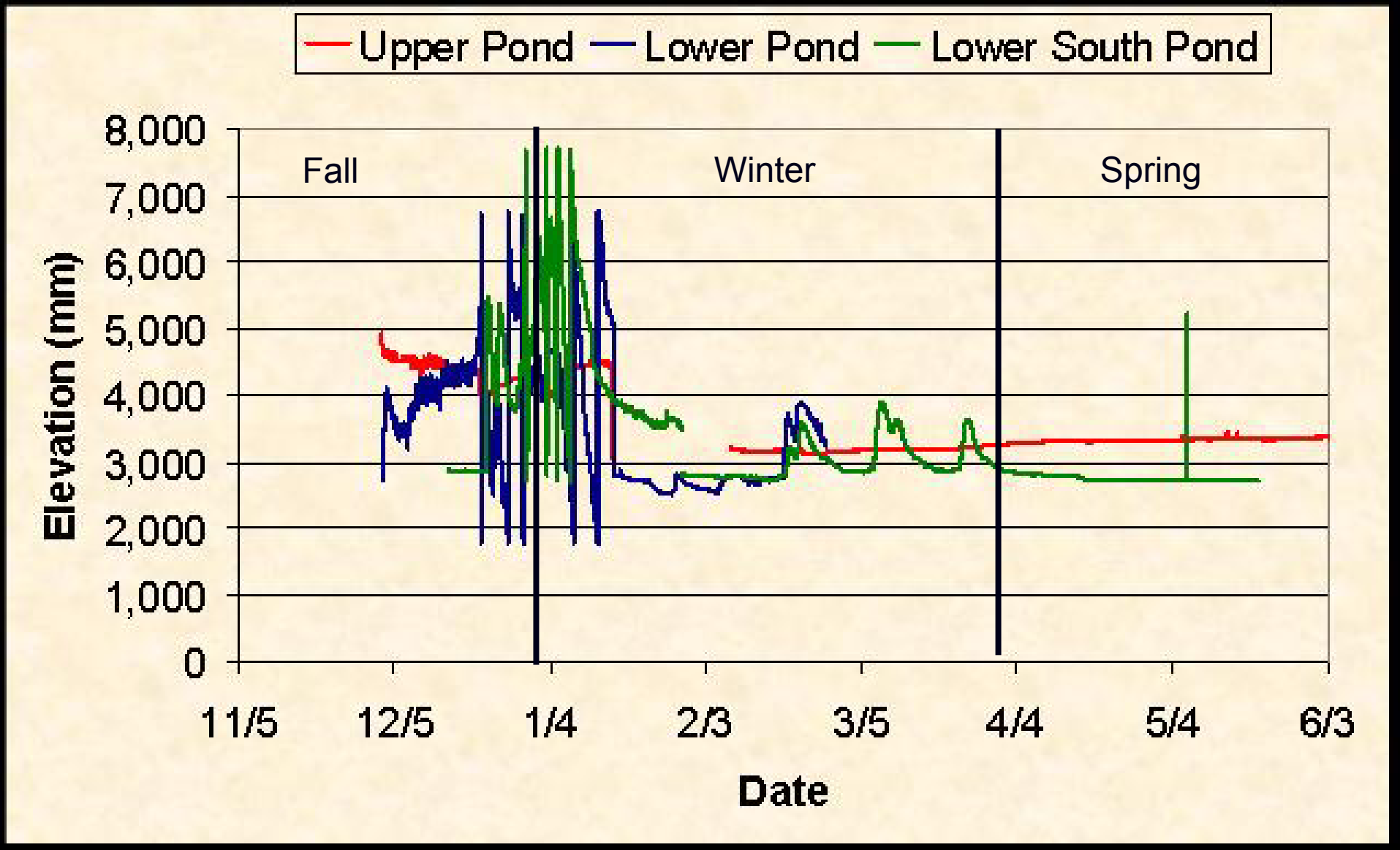
Breach Water Elevations



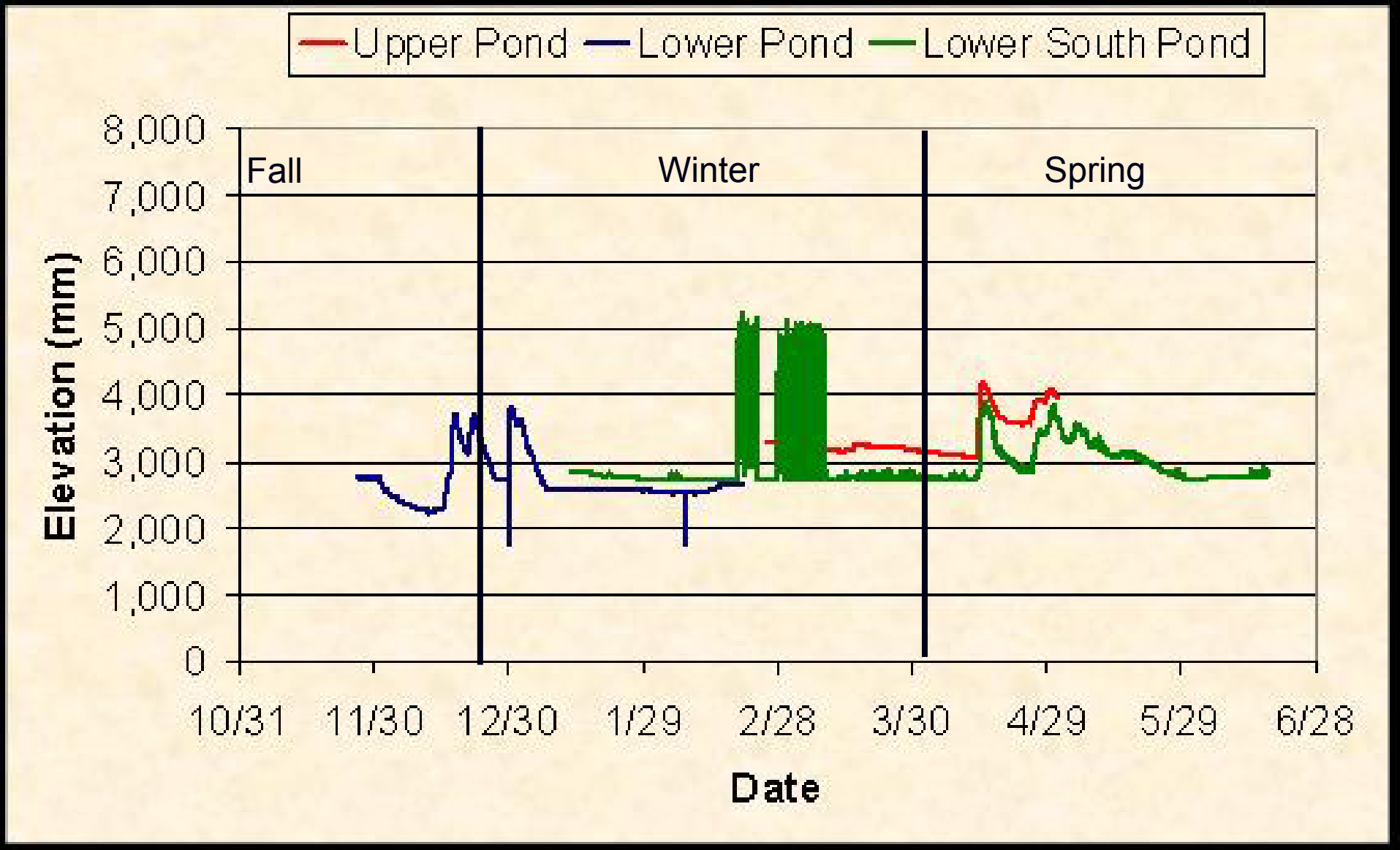
Breach Water Elevations



Pond Elevations 2001-2002



Pond Elevations 2002-2003



Event Comparison

Event Comparison

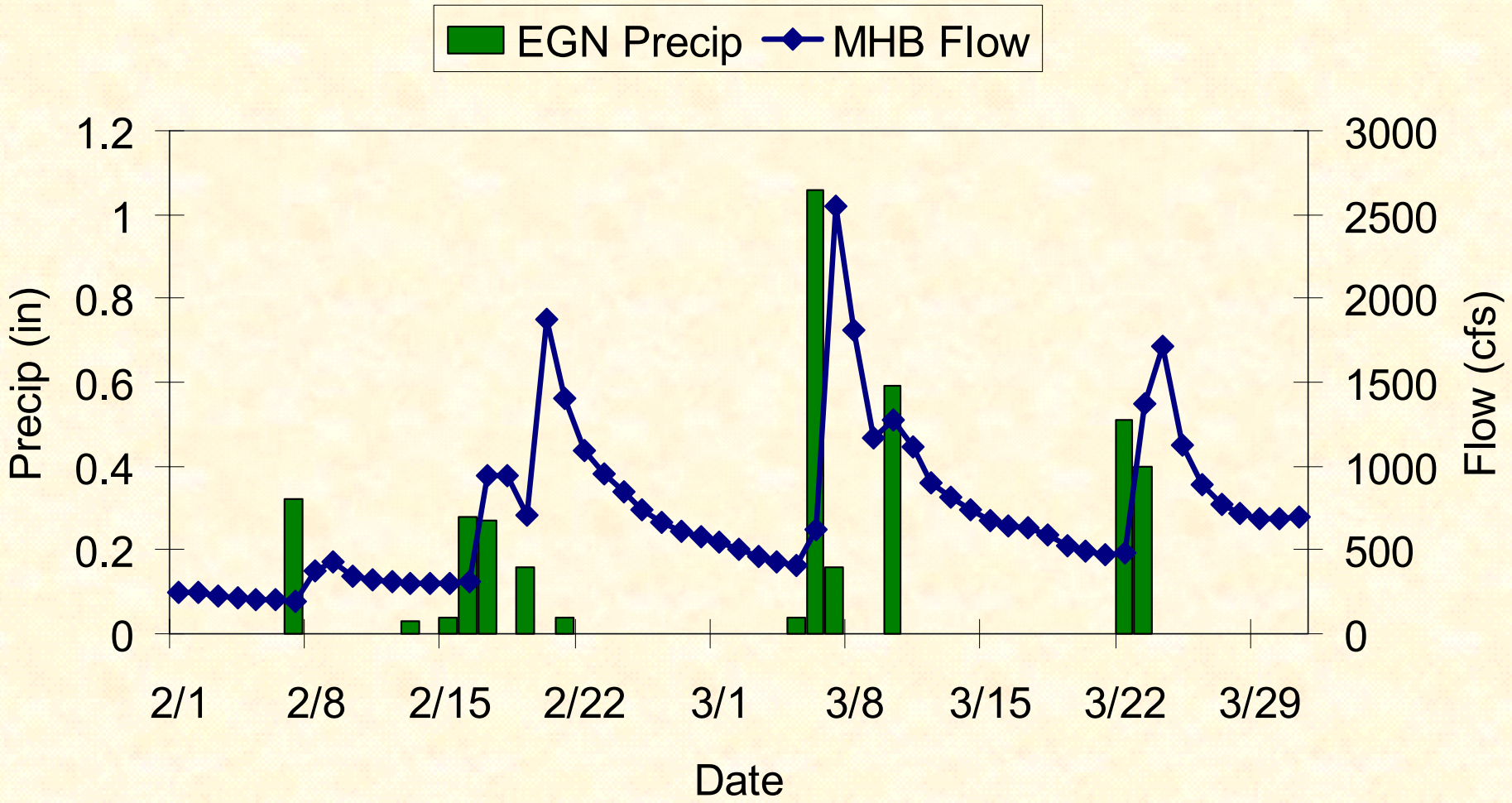
- 2/1 to 3/31 2002 compared to 3/15-5/15 2003
- Rainfall near Michigan Bar
  - 2002: 3.9 inches
  - 2003: 9.49 inches (Floodplain precip 4.93 in.)
- Peak Average Daily Flow at Michigan Bar
  - 2002: 2550 cfs
  - 2003: 2920 cfs

Floodplain Comparison

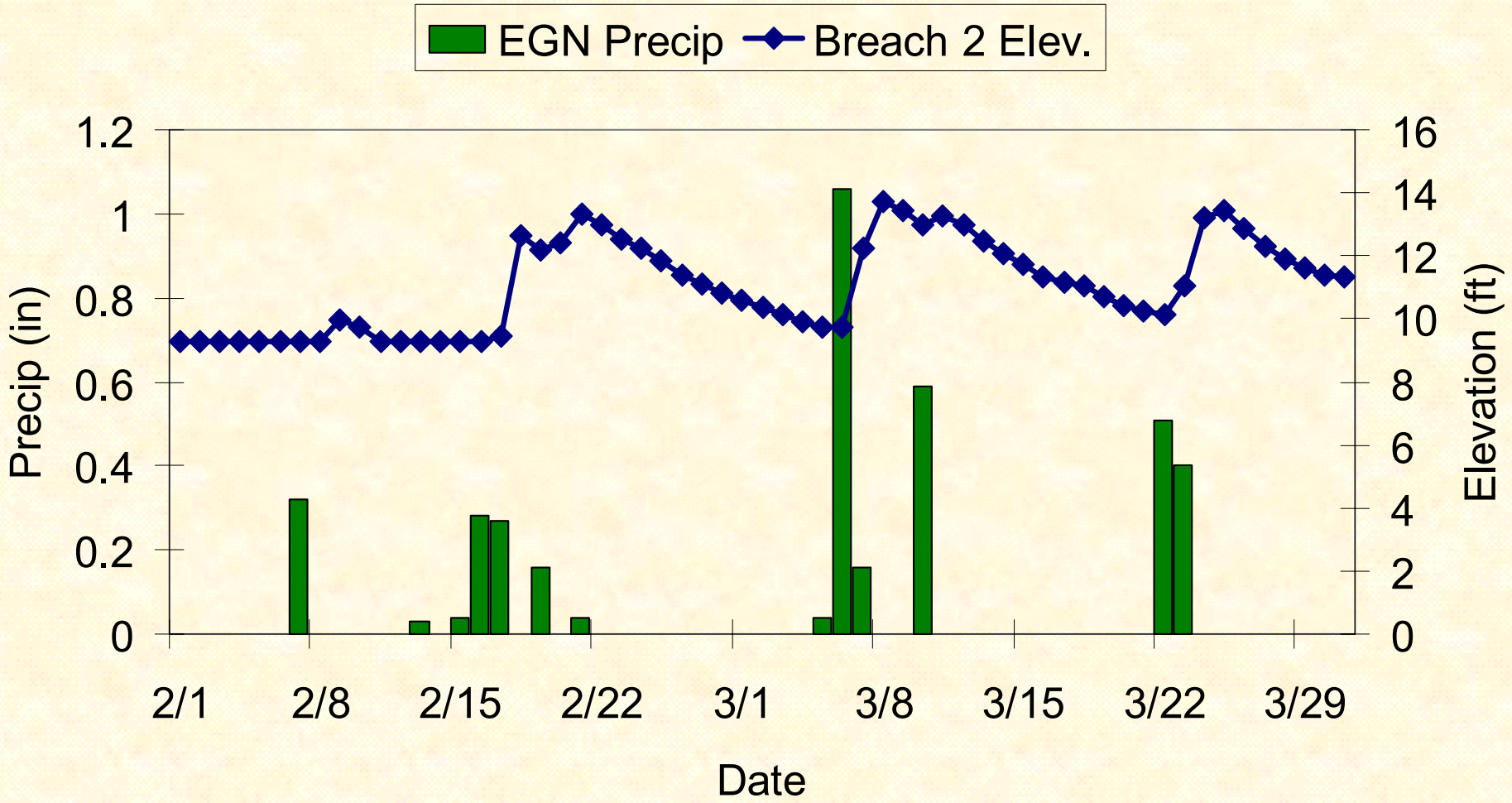
Maximum Elevations in feet

Year	Breach 1	Breach 2	Breach 3	Breach 4	Breach 5
2002	14.75	13.82	16.4	-	13.42
2003	15.18	14.02	15.7	10.80	12.64

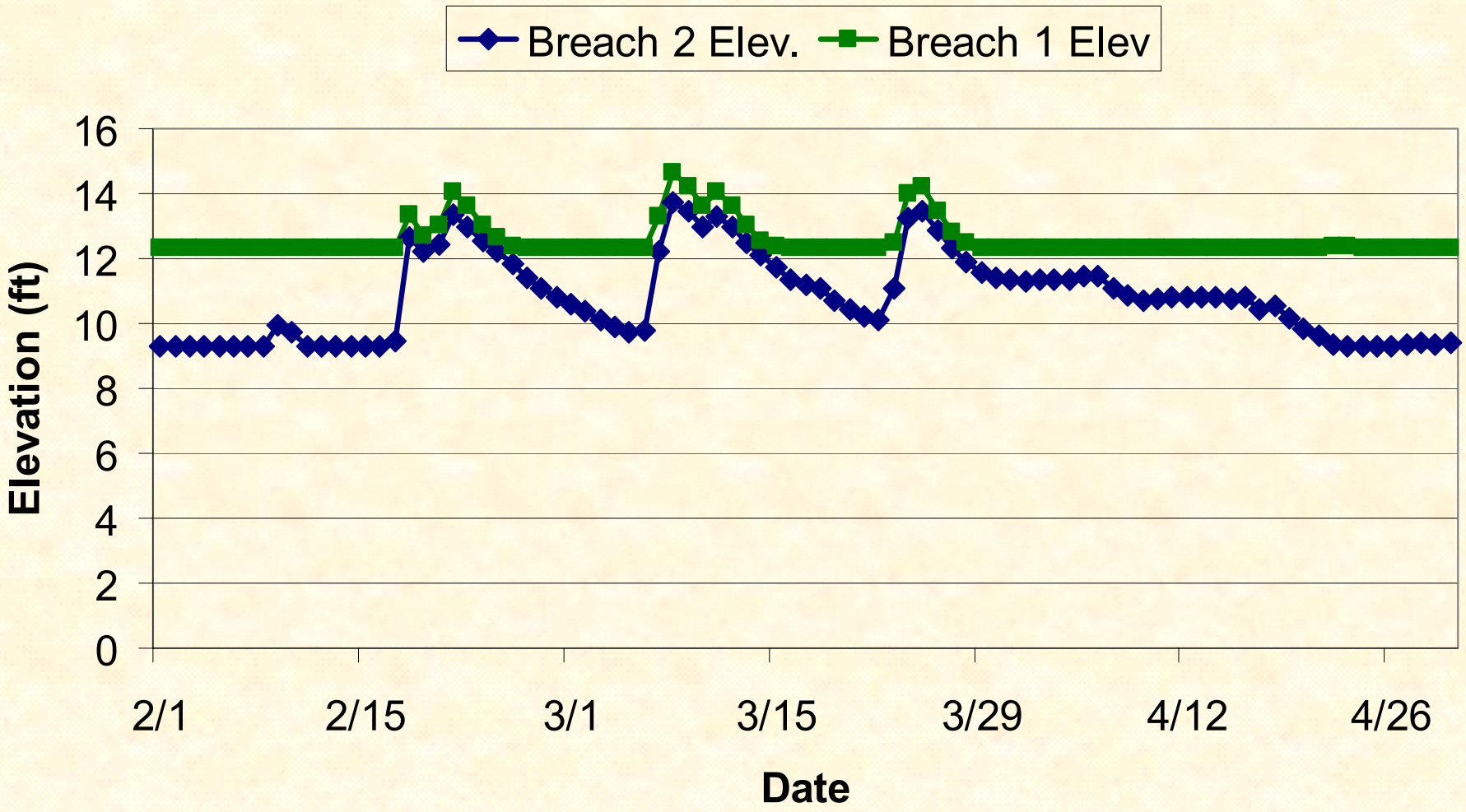
February and March 2002



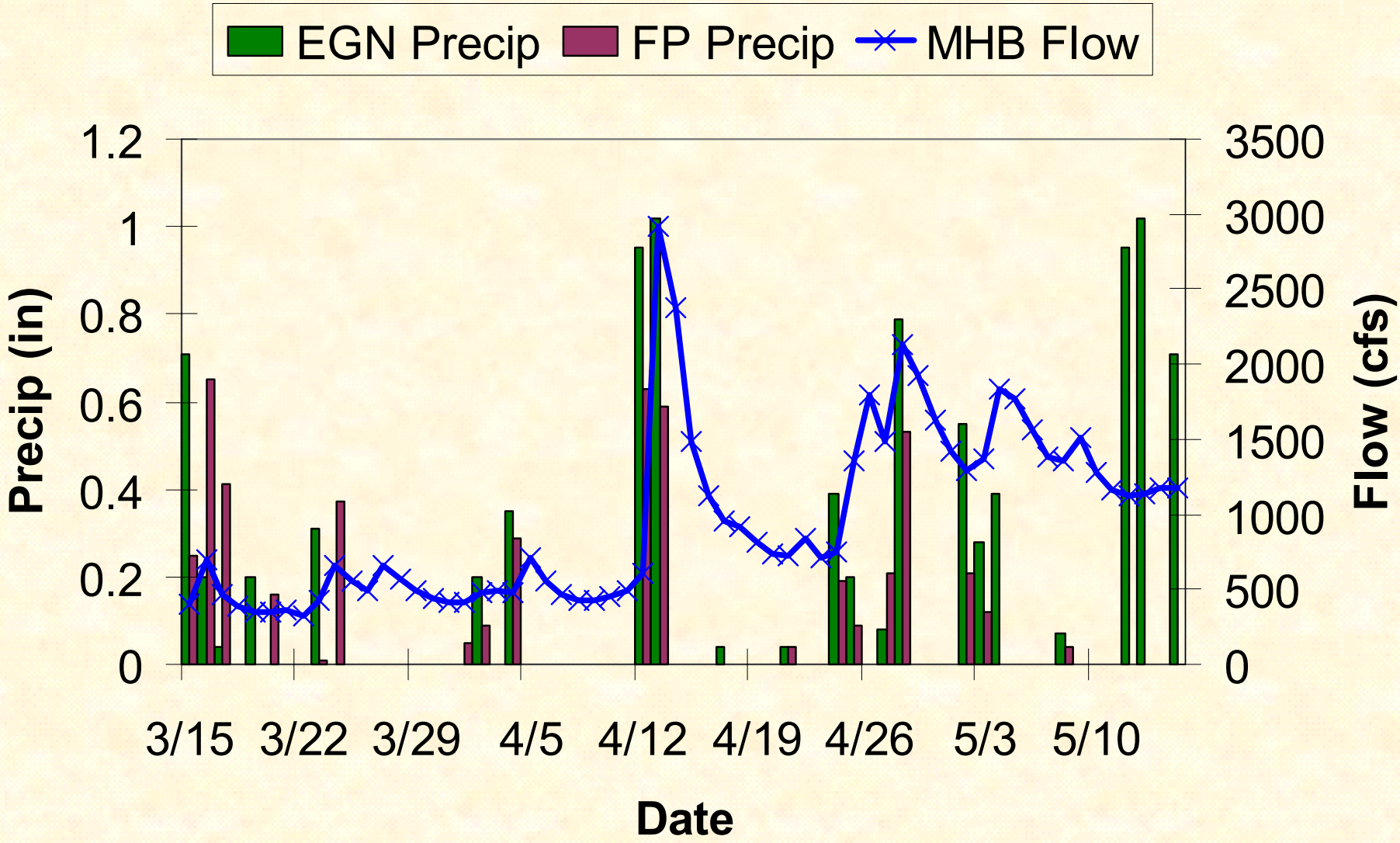
February and March 2002



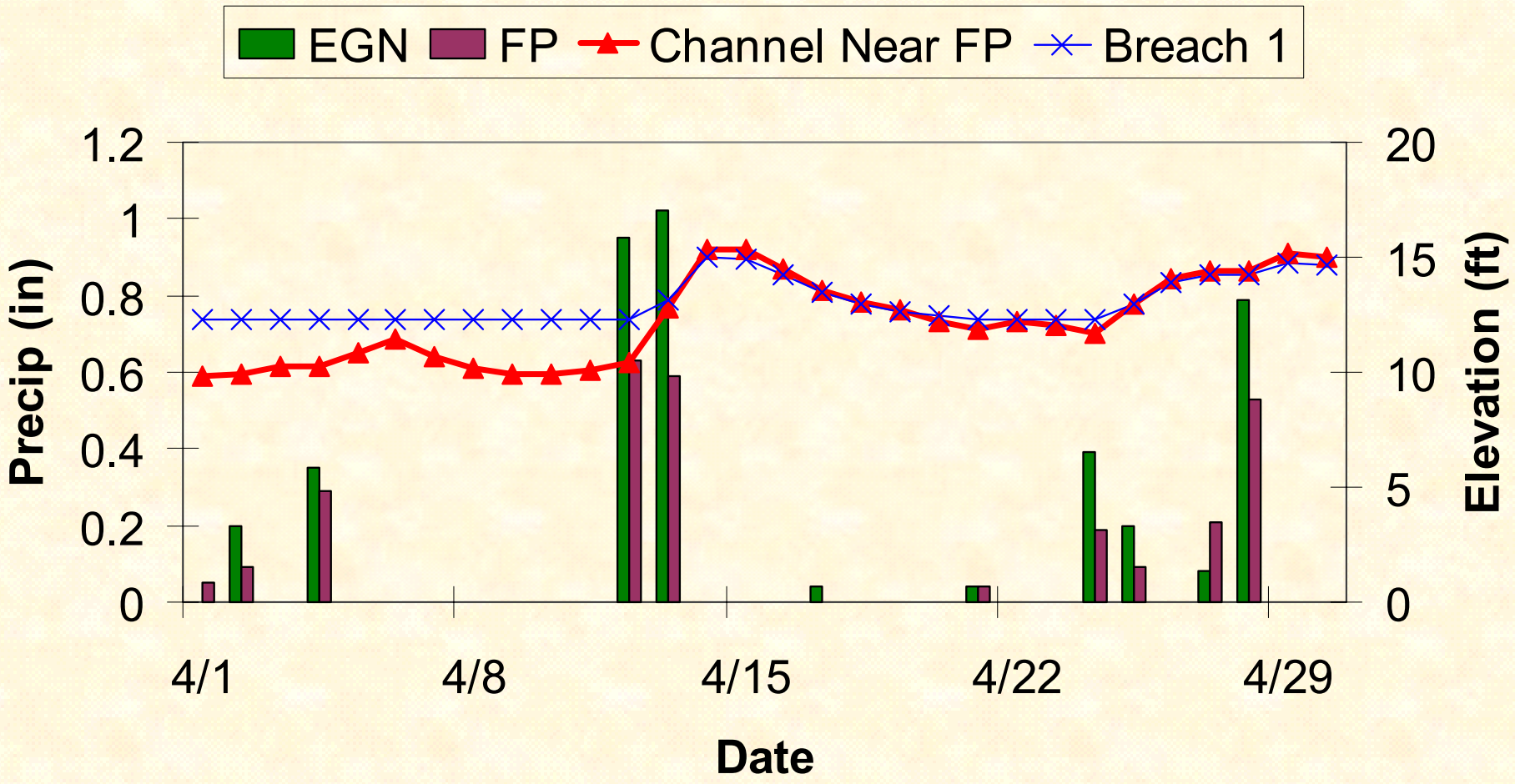
Breach Elevation Comparison 2002



March through May 2003



April 2003


EGN
FP
Channel Near FP
Breach 1
1.2
1
0.8
0.6
0.4
0.2
0
Precip (in)
20
15
10
5
0
Elevation (ft)
4/1
4/8
4/15
4/22
4/29
Date

What's Happening Hydrologically

- Floodplain activity tied to wet season (Oct-May) synoptic scale rainfall events in the watershed
- High variability in magnitude and timing of events
- Floodplain activity can occur even in water years classified as dry
- Upper basin snowpack can play a role in flows reaching floodplain

Modeling the Floodplain

- What to model
  - Flow/Stage
  - Inundation Time
  - Sediment/Nutrient Transport
- Type of model
  - Statistical
  - Hydrodynamic/Hydrologic
- BCs/Mass Conservation
  - Overflow
  - Seepage/ET

What's Next on the Cosumnes

- Quantify role of groundwater
- Quantify evapotranspiration
- Evaluate role of snowpack
- Evaluate modeling needs of other group members
- Evaluate available models
- Continue observation record

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