Maine Department of Marine Resources
Public Health Division

Sample Collection, Tides and Salinity


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Salinity and Low Tide Sampling Issues

- Looked at subset of stations:
  - within 300 feet of a stream
  - 2000 – 2007 period of time
  - 188 stations, 7500 data points
  - Looking for data trends for salinity and tide stages
  - Number of sample collections
  - Average of fecal coliform scores

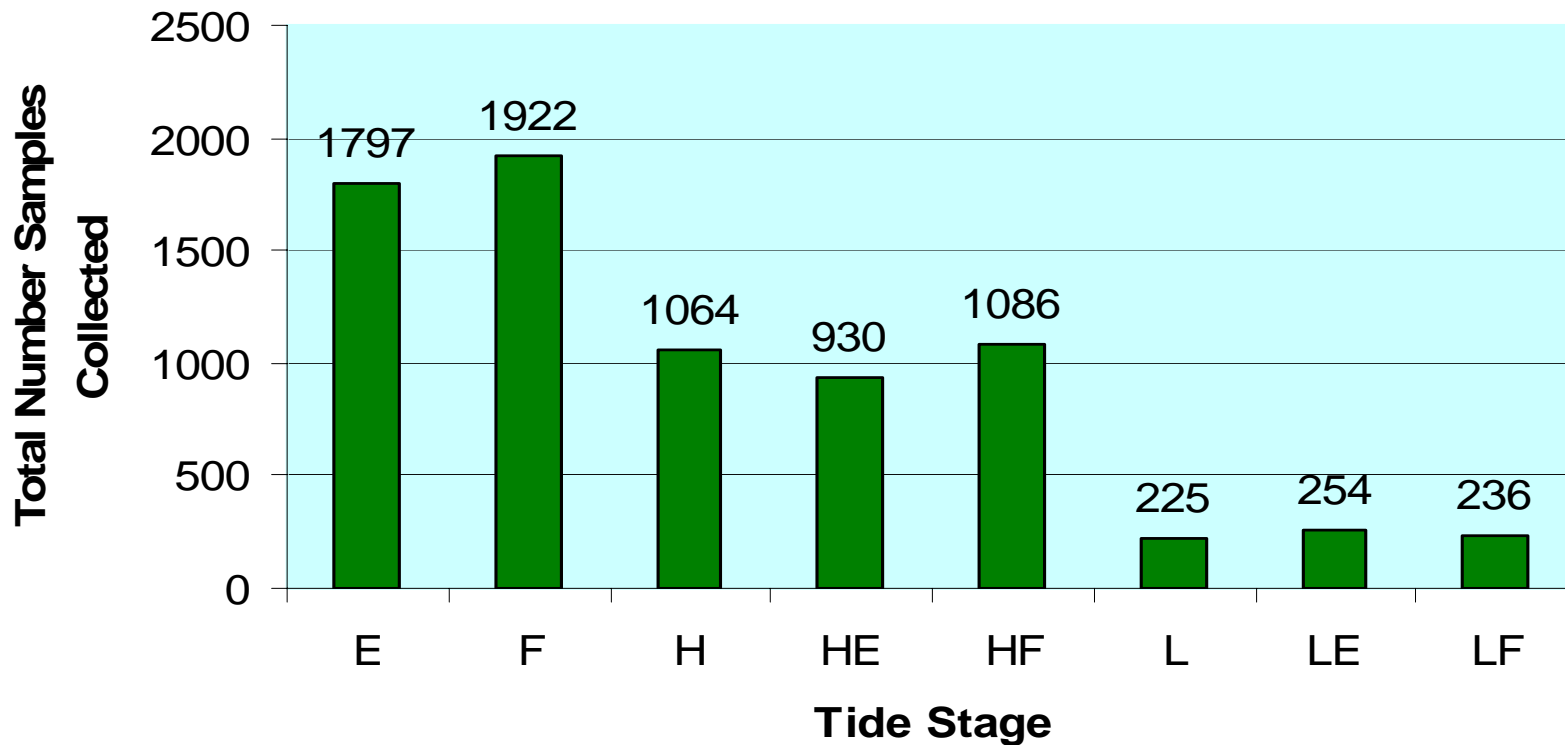The stations span the length of the Maine Coast

Tide Circle

- H / 1 hr
- HE / 1 hr.
- E / ±3 hrs.
- LE / 1 hr
- L / 1 hr.
- LF / 1 hr
- F / ±3 hrs.
- HF / 1 hr.
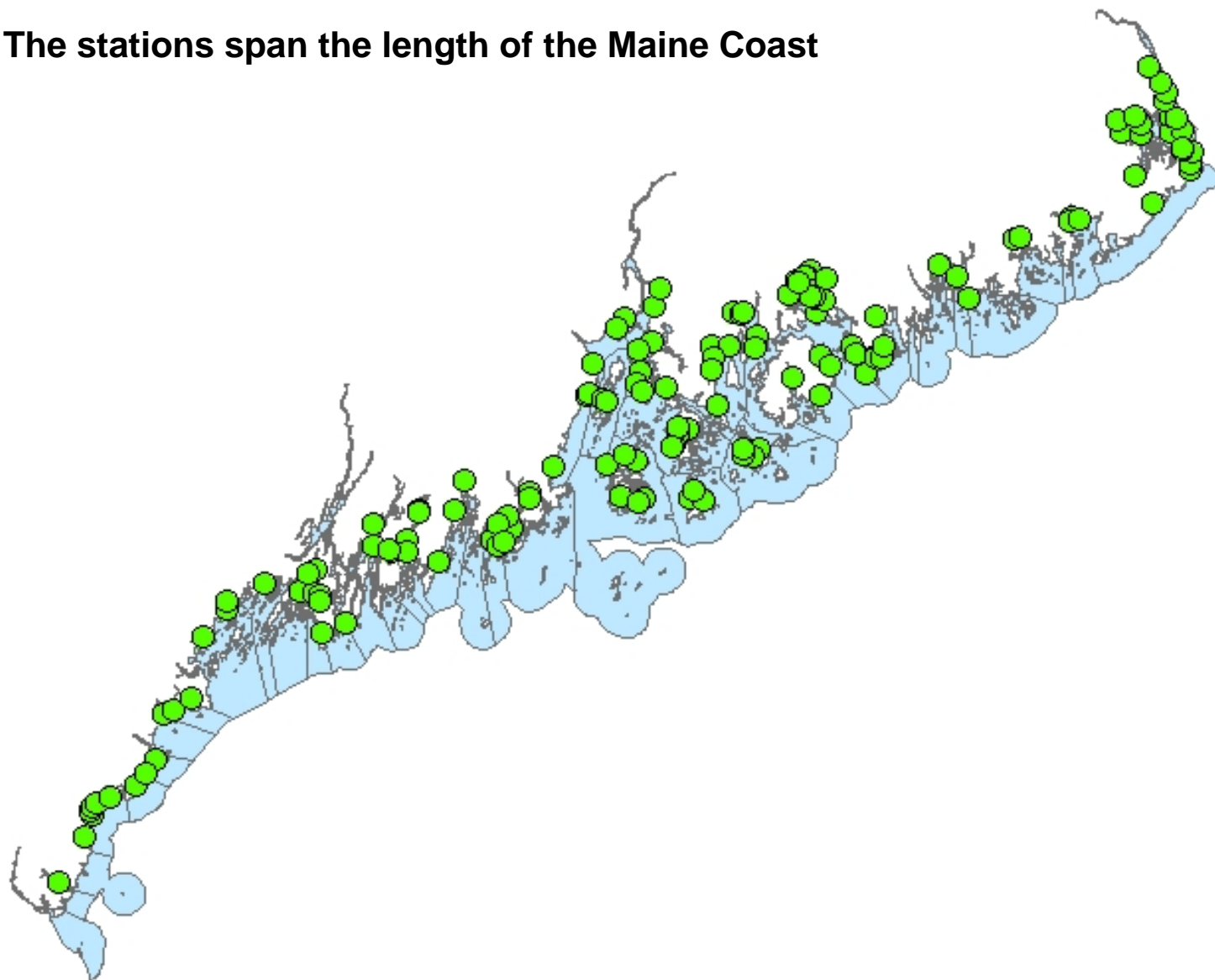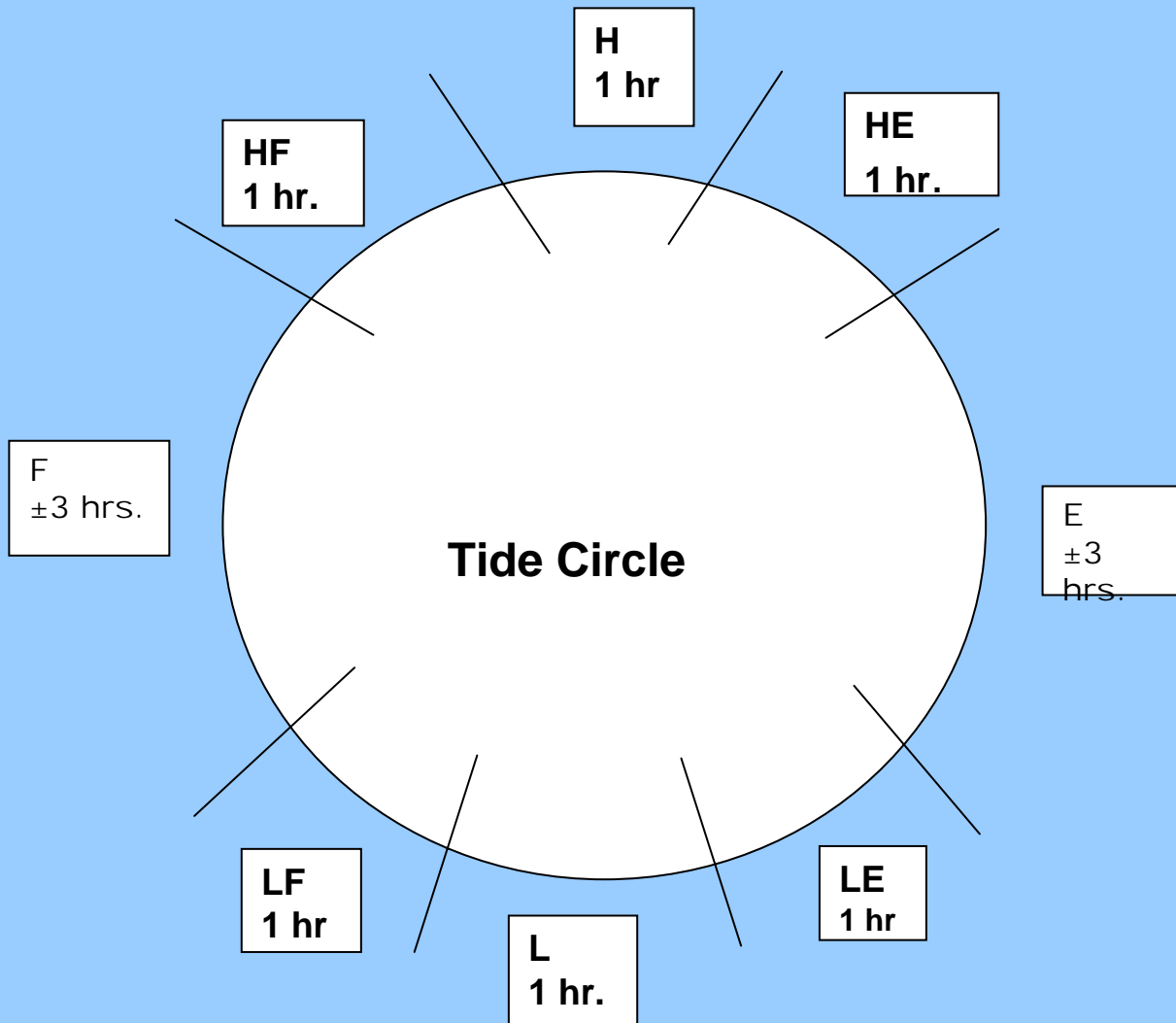
Key: describes the Tide Stages and length of time of tidal stages:

H – High, HE – High Ebb, E – Ebbing, LE – Low Ebb, L – Low, LF – Low Flood, F – Flooding, HF – High Flood

Number Samples Collected by Tide

Bar chart titled "Number Samples Collected by Tide" with Y-axis labeled "Total Number Samples Collected" (0 to 2500) and X-axis labeled "Tide Stage":

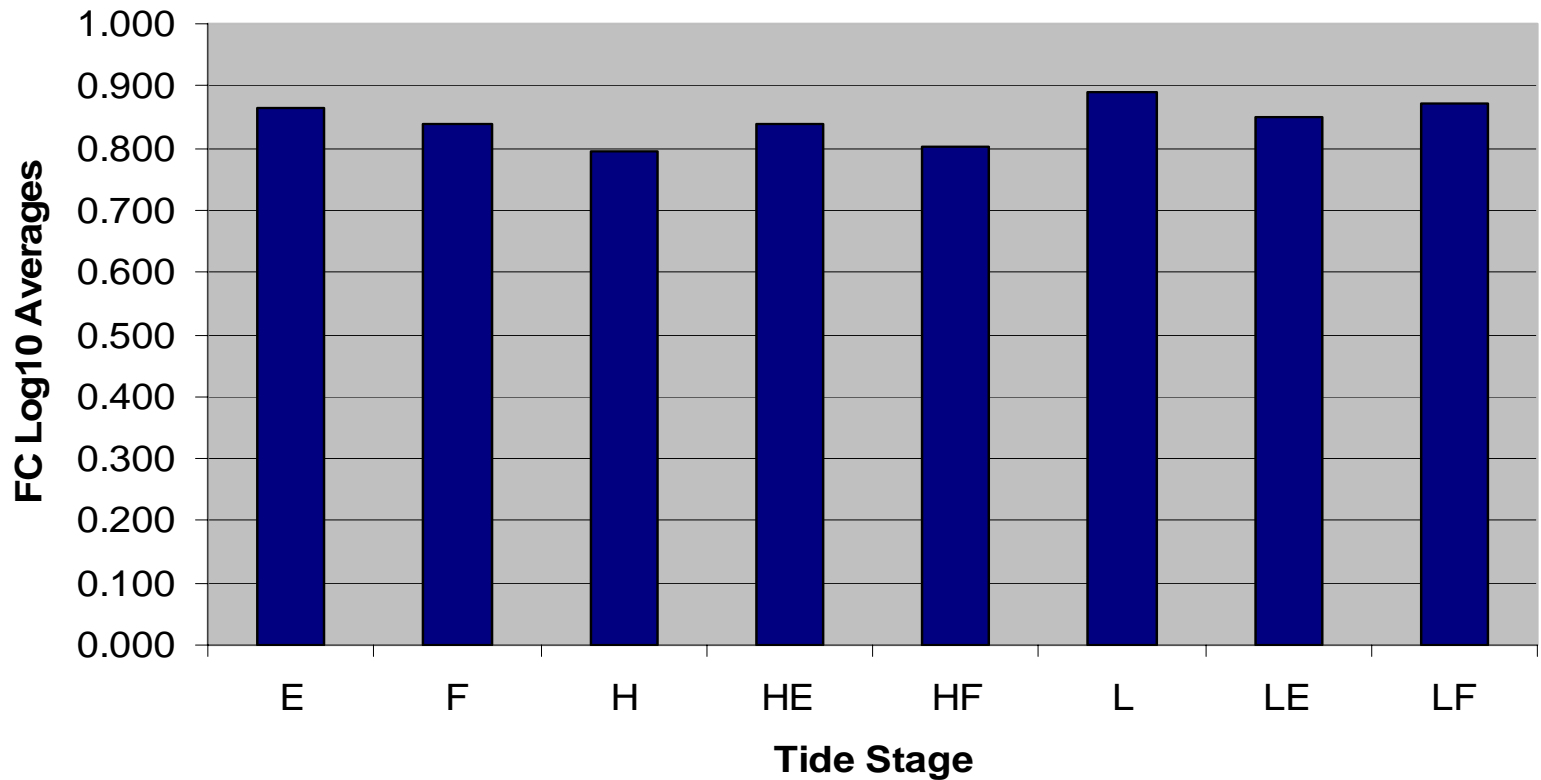| Tide Stage	E	F	H	HE	HF	L	LE	LF
Total Number Samples Collected	1797	1922	1064	930	1086	225	254	236
Percentage of the total	24	26	14	12	14	3.0	3.4	3.1

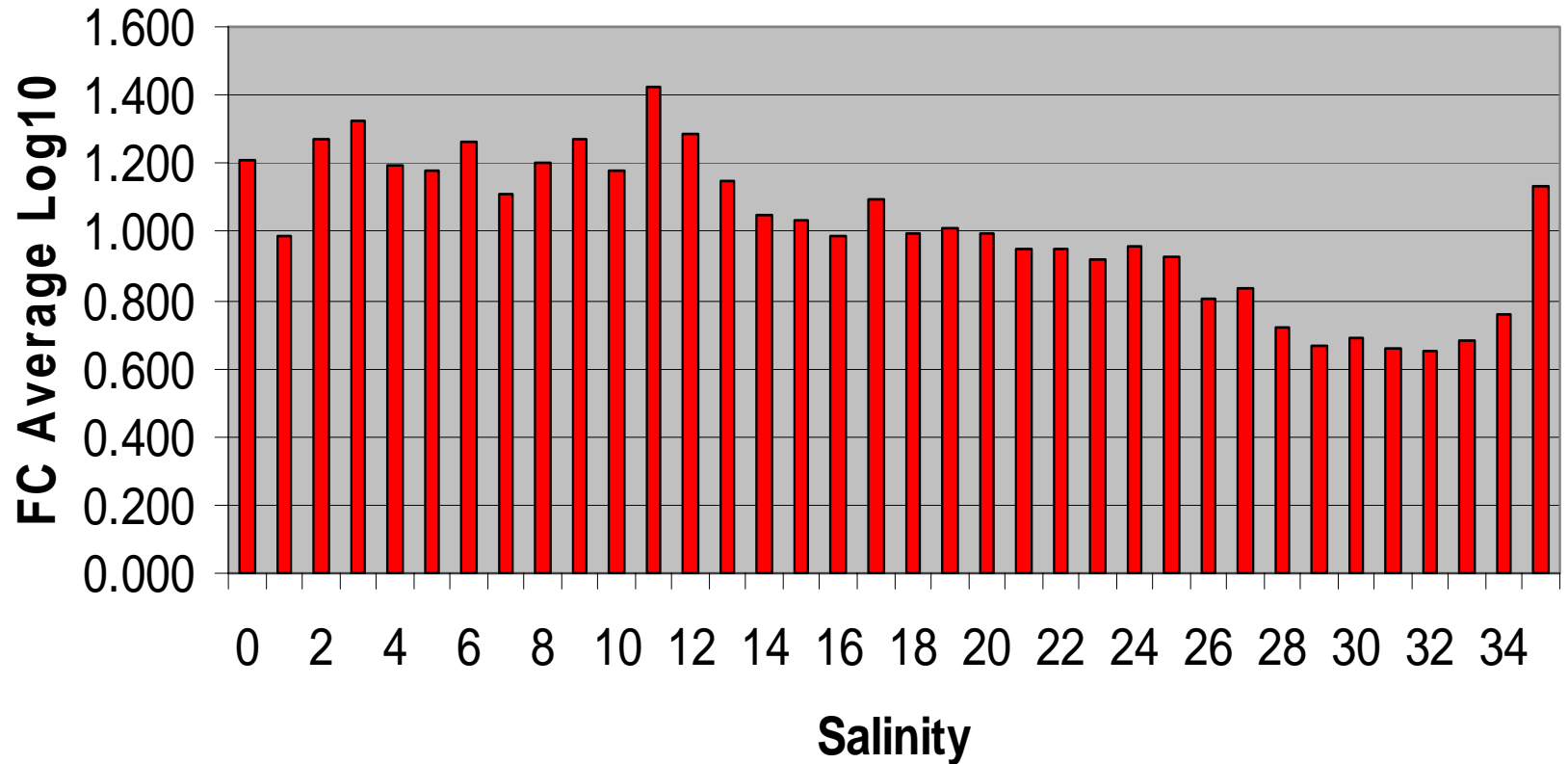**Fecal Coliform Log10 Averages verses Tide**
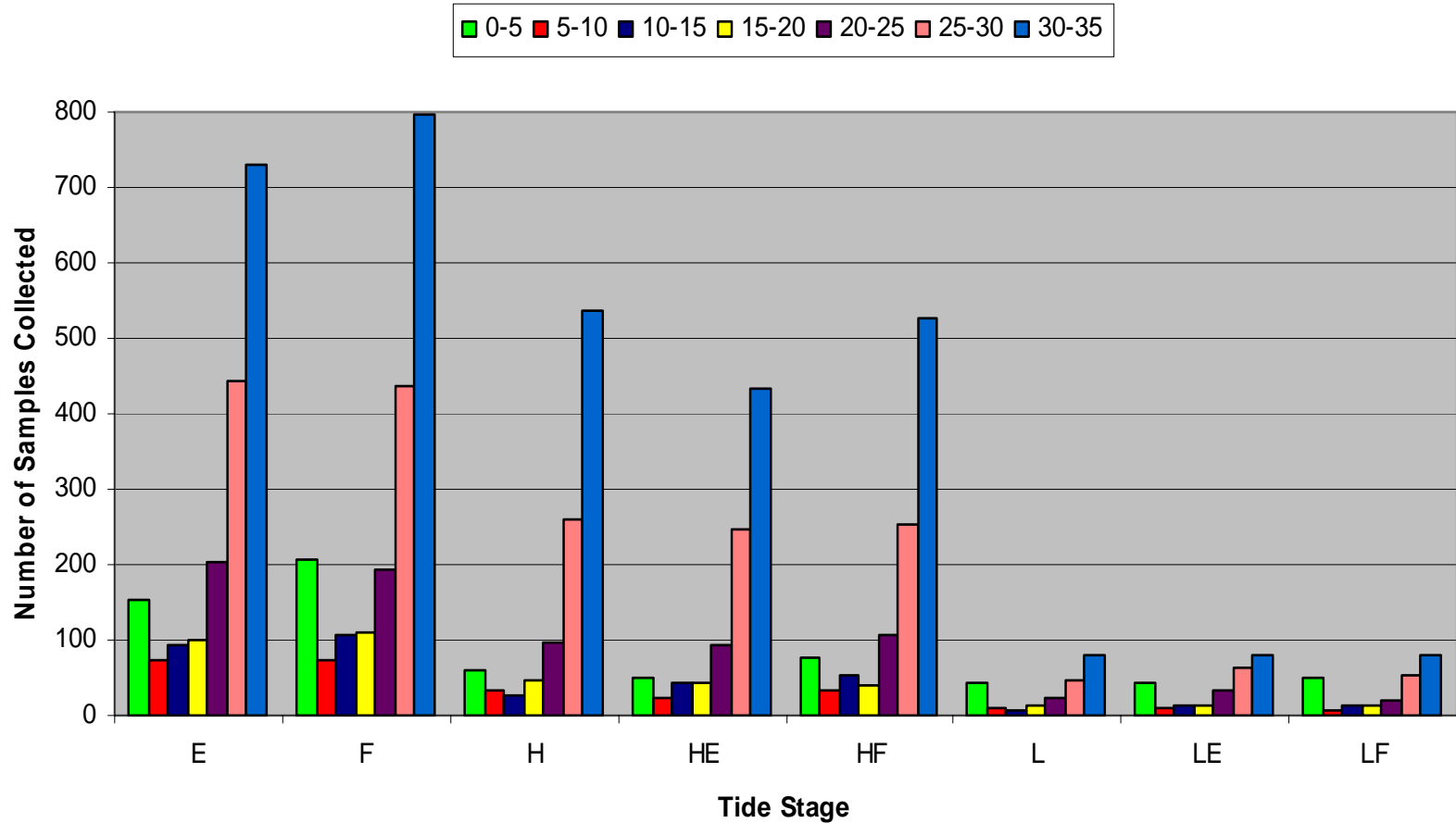
There was not a significant difference in Average Fecal Coliforms Across Tides

There was a significant difference in Fecal Coliforms Across Salinity – the lower the salinity the higher the fecal coliform average for the data set.
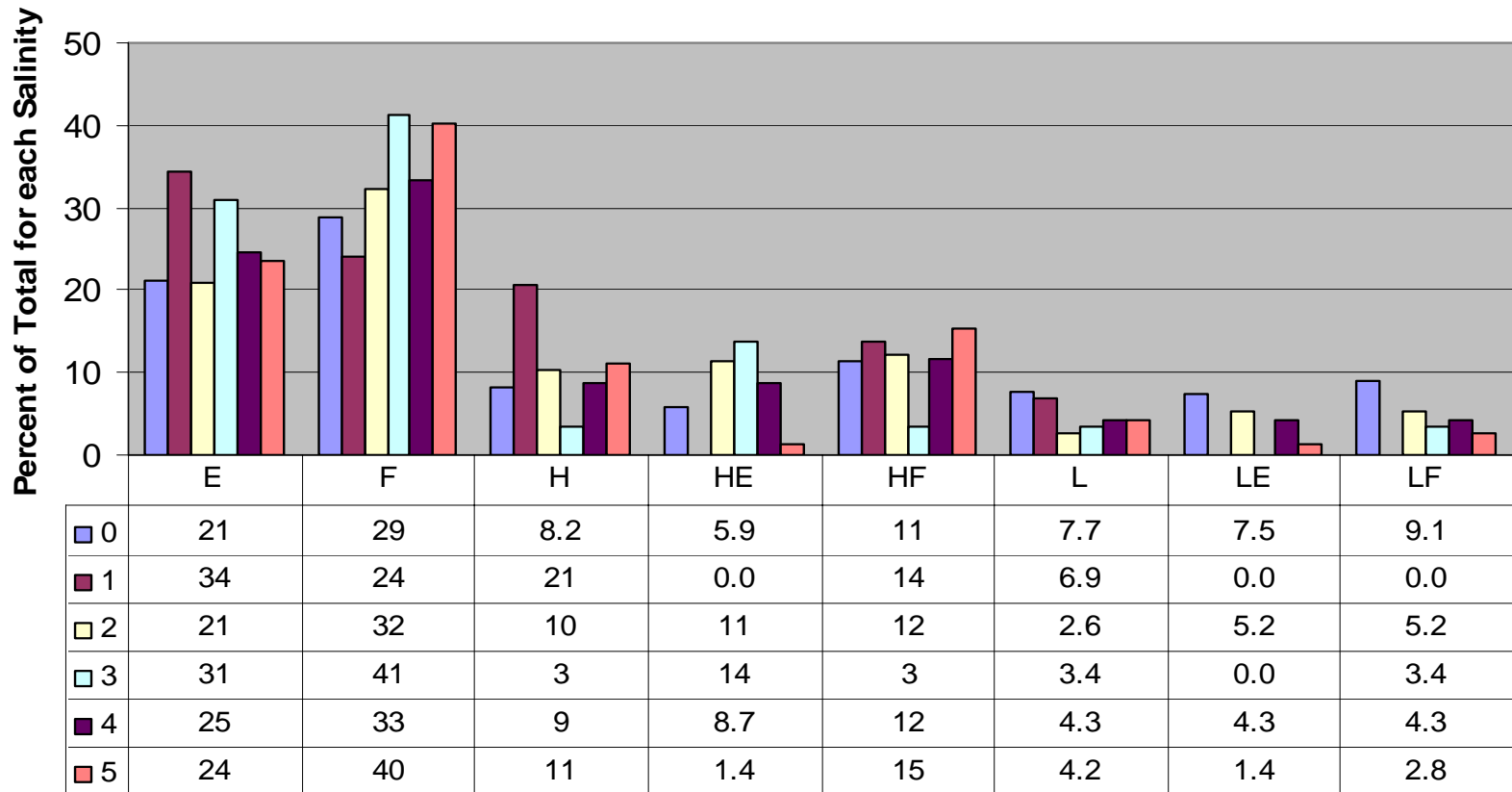
Number of Samples Collected Salinity verses Tide Stage

Legend: ■ 0-5 ■ 5-10 ■ 10-15 ■ 15-20 ■ 20-25 ■ 25-30 ■ 30-35

Y-axis: Number of Samples Collected

X-axis: Tide Stage (E, F, H, HE, HF, L, LE, LF)

All ranges of salinities were present at all tide stages

Percentage of Each Salinity (0 - 5) Collected at a Specific Tide Stage

	E	F	H	HE	HF	L	LE	LF
0	21	29	8.2	5.9	11	7.7	7.5	9.1
1	34	24	21	0.0	14	6.9	0.0	0.0
2	21	32	10	11	12	2.6	5.2	5.2
3	31	41	3	14	3	3.4	0.0	3.4
4	25	33	9	8.7	12	4.3	4.3	4.3
5	24	40	11	1.4	15	4.2	1.4	2.8

This chart again displays the spread of salinities across tidal stages – for samples where salinity was 0 ‰, 21% were collected at Ebbing tides, 29 % were collected at flooding tides to 9.1% collected at LF
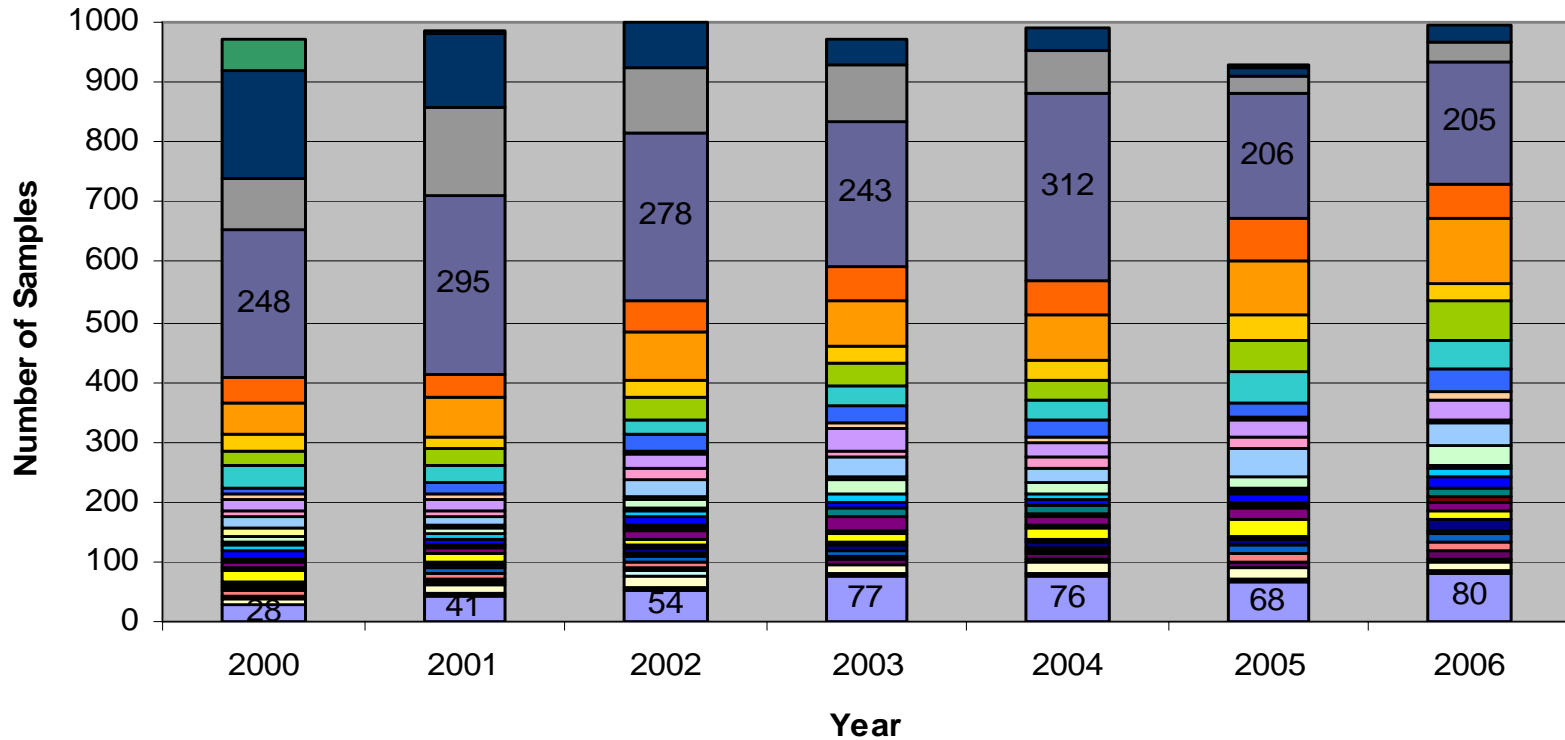
Number of Samples Collected Across Tidal Stage by Year
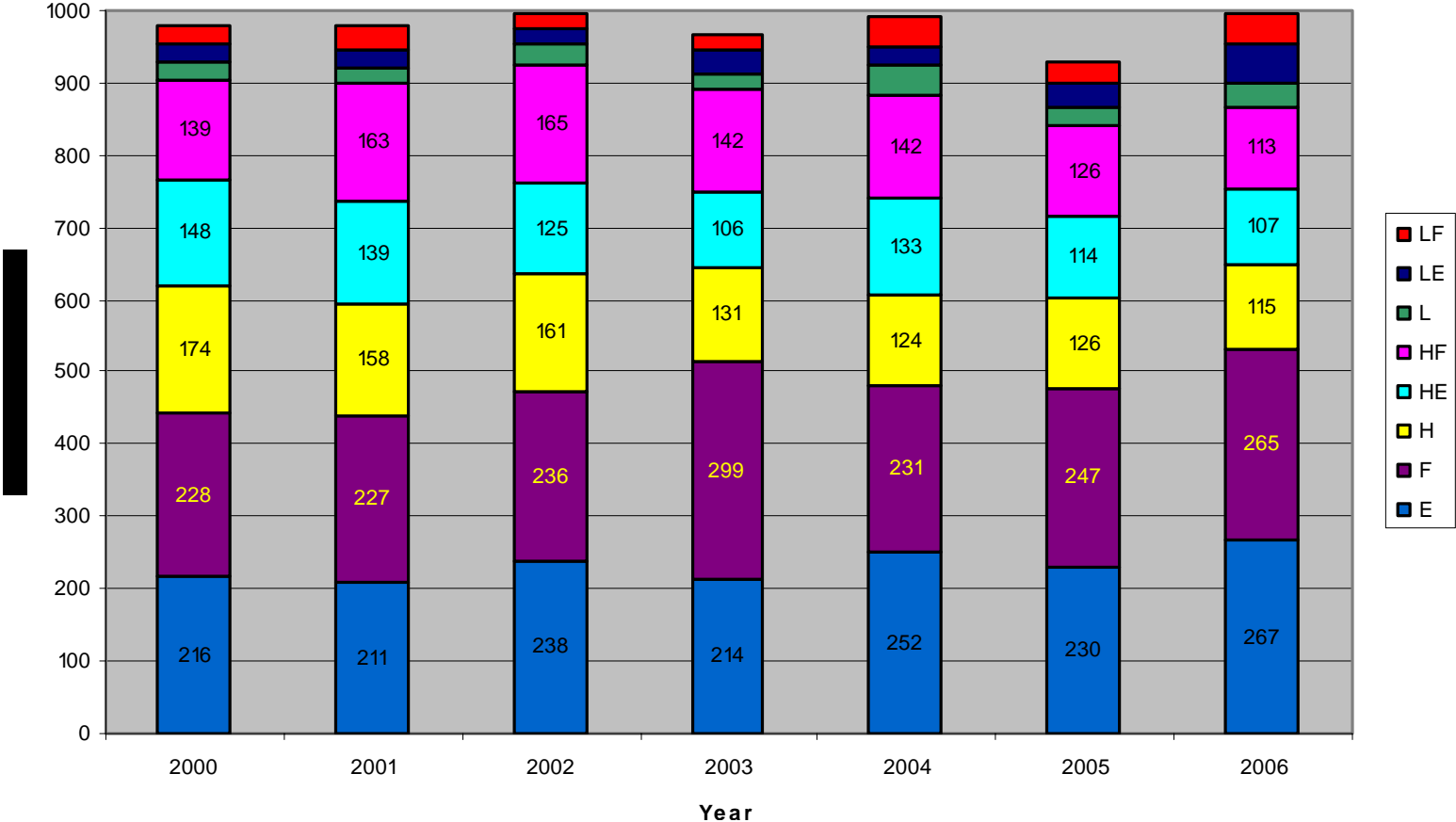
This slide illustrates the gradual change since 2000 of sample collection at different tidal stages – less samples collected at H, HF & HE and more at E, F, L, LF & LE
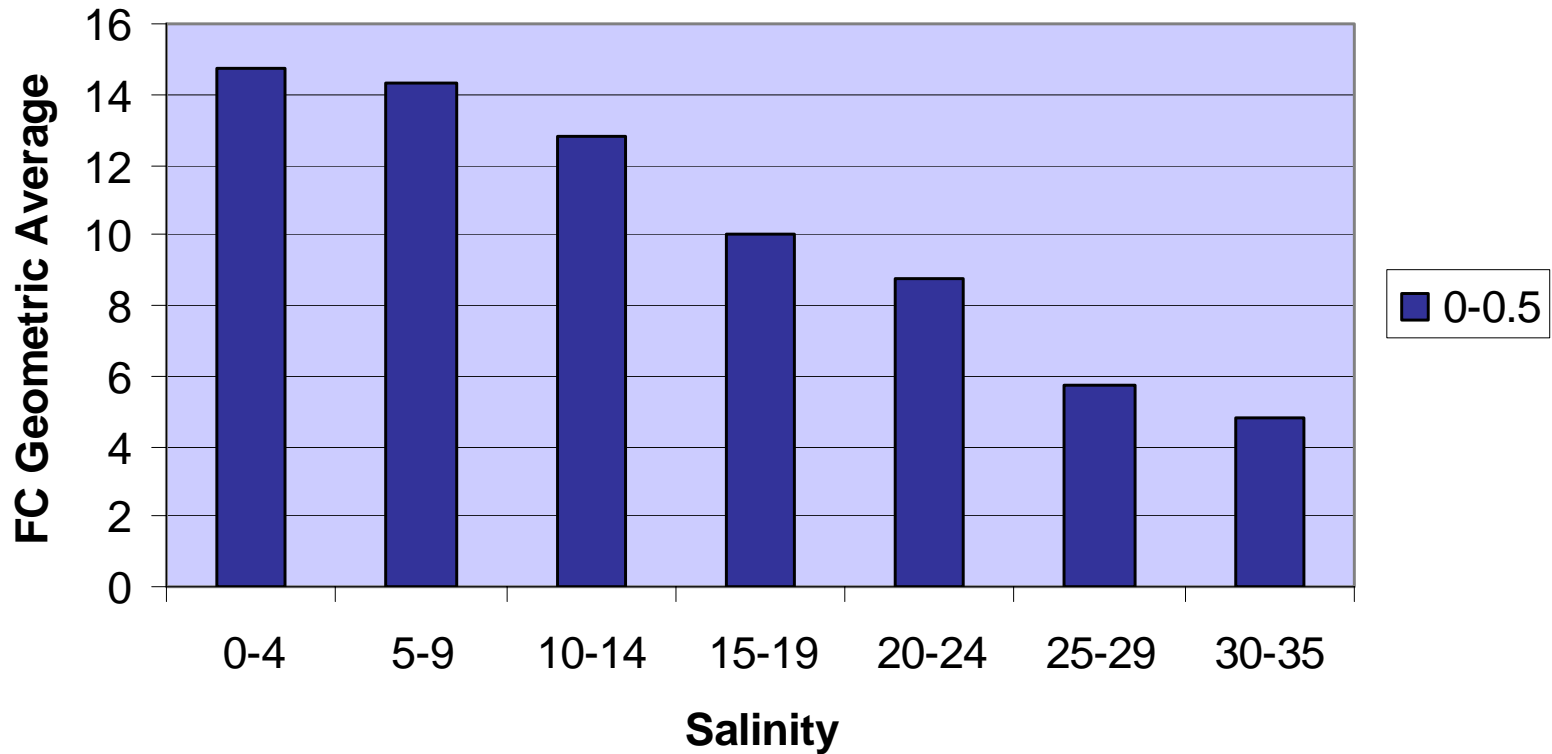
Number of Samples Collected Across Salinity

This chart illustrates the change in salinities of sample collections since 2000 – there has been a decrease in salinities 30 and greater and an increase in all other salinities
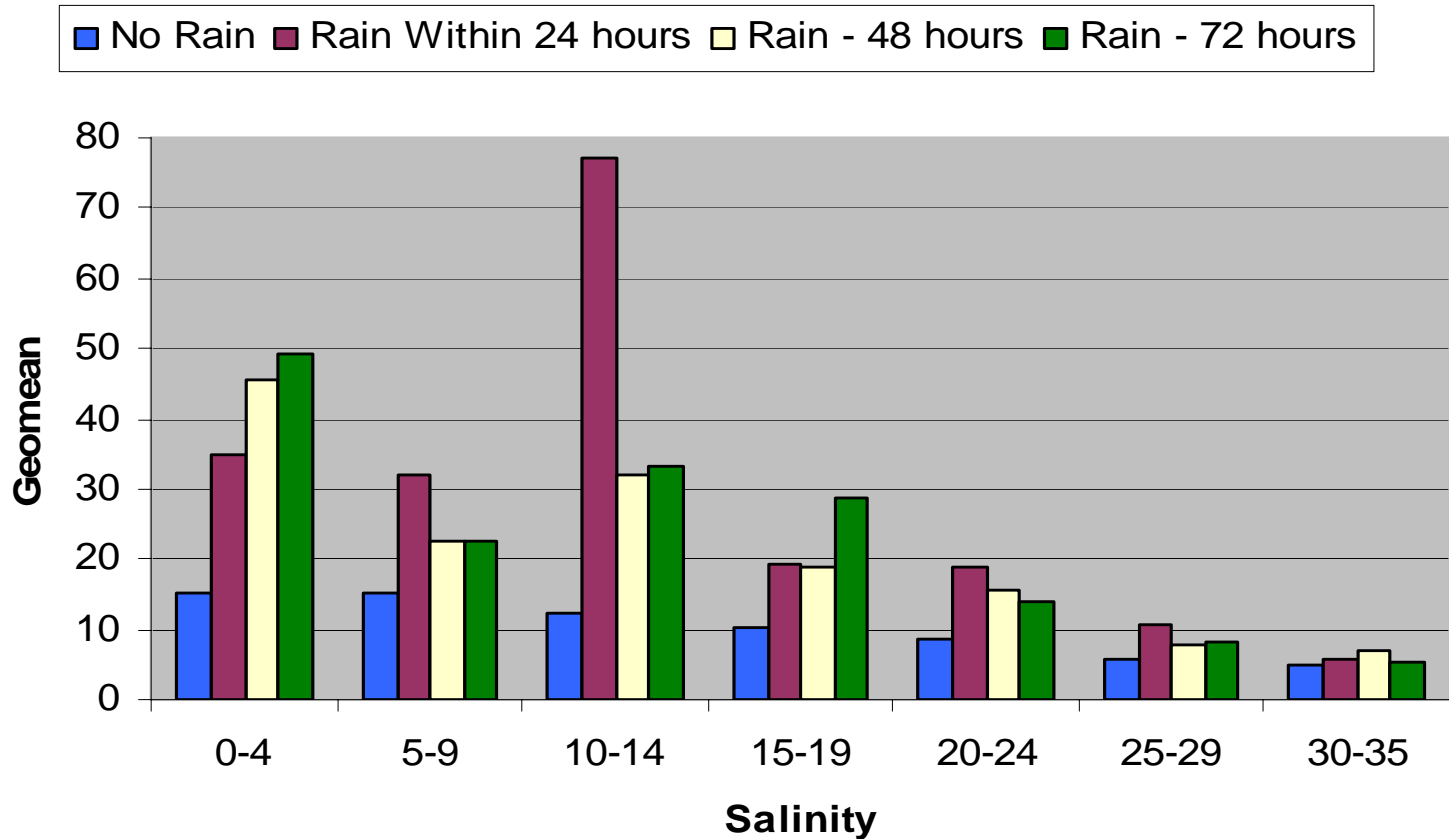
Fecal Coliform verses Salinity
< 0.5 in rain in 24 hours

During dryer weather conditions, fecal coliform averages increase with lower salinity values – this illustrates the impacts of fresh water streams on coves and estuaries
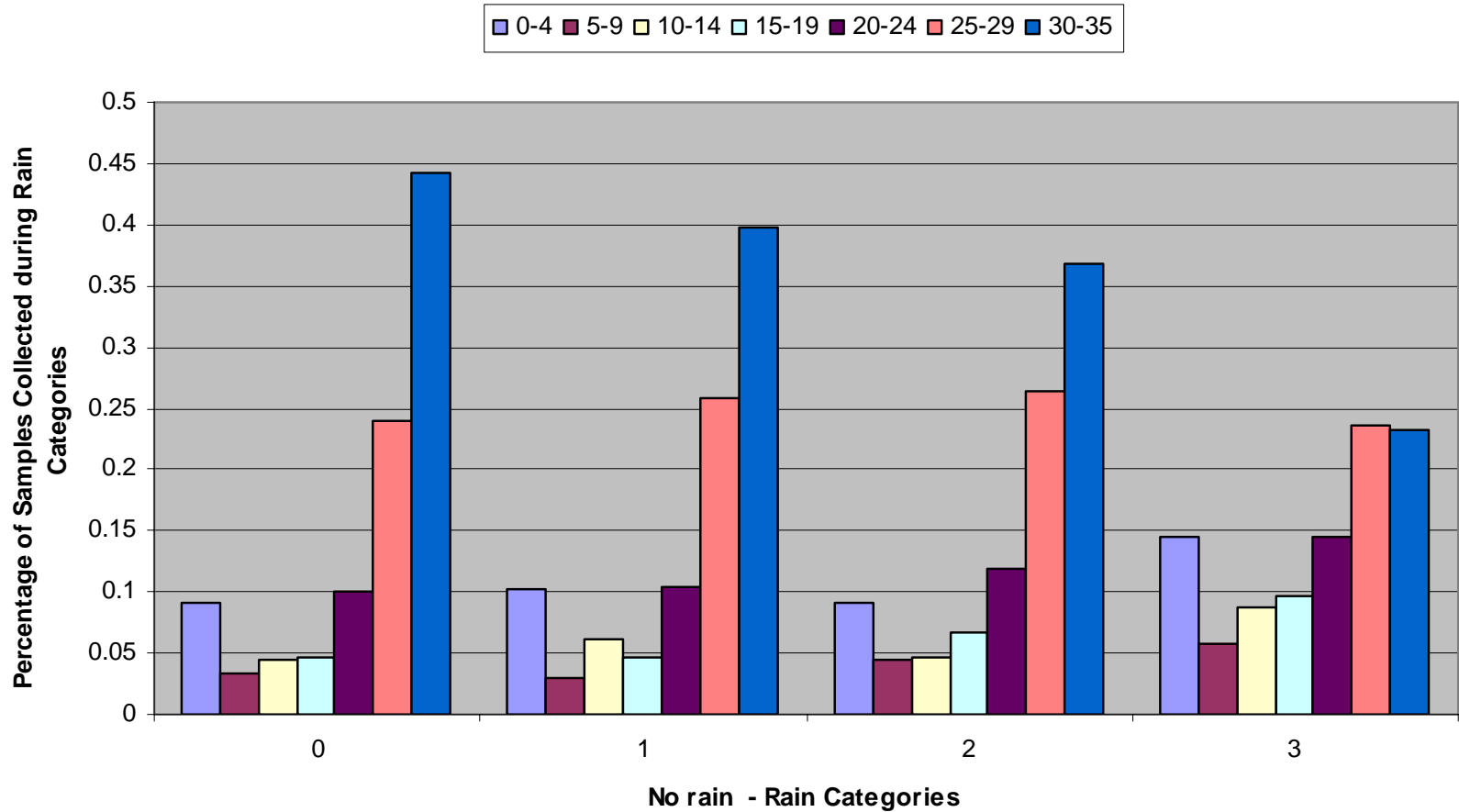
Geomeans verses Rain and Salinity

Sample results sorted and averaged for rain conditions, no rain, rain within 24 hours of sample collection, 48 and 72 hours prior. Rain has an even greater impact on fecal coliform averages.

Salinity in samples verses Rainfall

Legend: ■ 0-4 ■ 5-9 □ 10-14 □ 15-19 ■ 20-24 ■ 25-29 ■ 30-35

X-axis: **No rain - Rain Categories**

Y-axis: **Percentage of Samples Collected during Rain Categories**

Data was separated by no rain prior(0), rain within 24 hours (1), rain within 48 (2) & rain within 72 hours (3) prior to sampling – With increasing rainfall days there was an overall decrease of salinity in the samples collected – that is more of the samples collected had lower salinities

What Do These Charts Say?

- Fecal Coliform (FC) Averages
  - Not much difference between Tides
  - Is a difference between Salinity values
  - Higher FC associated with Lower Salinity
  - Rainfall impacts - Higher FC & Lower Salinity
- All Tides exhibited the full range of Salinity
  - Low Salinity values at High Tides & vice versa
- The trend since 2000 samples collected over more tide stages & salinity ranges