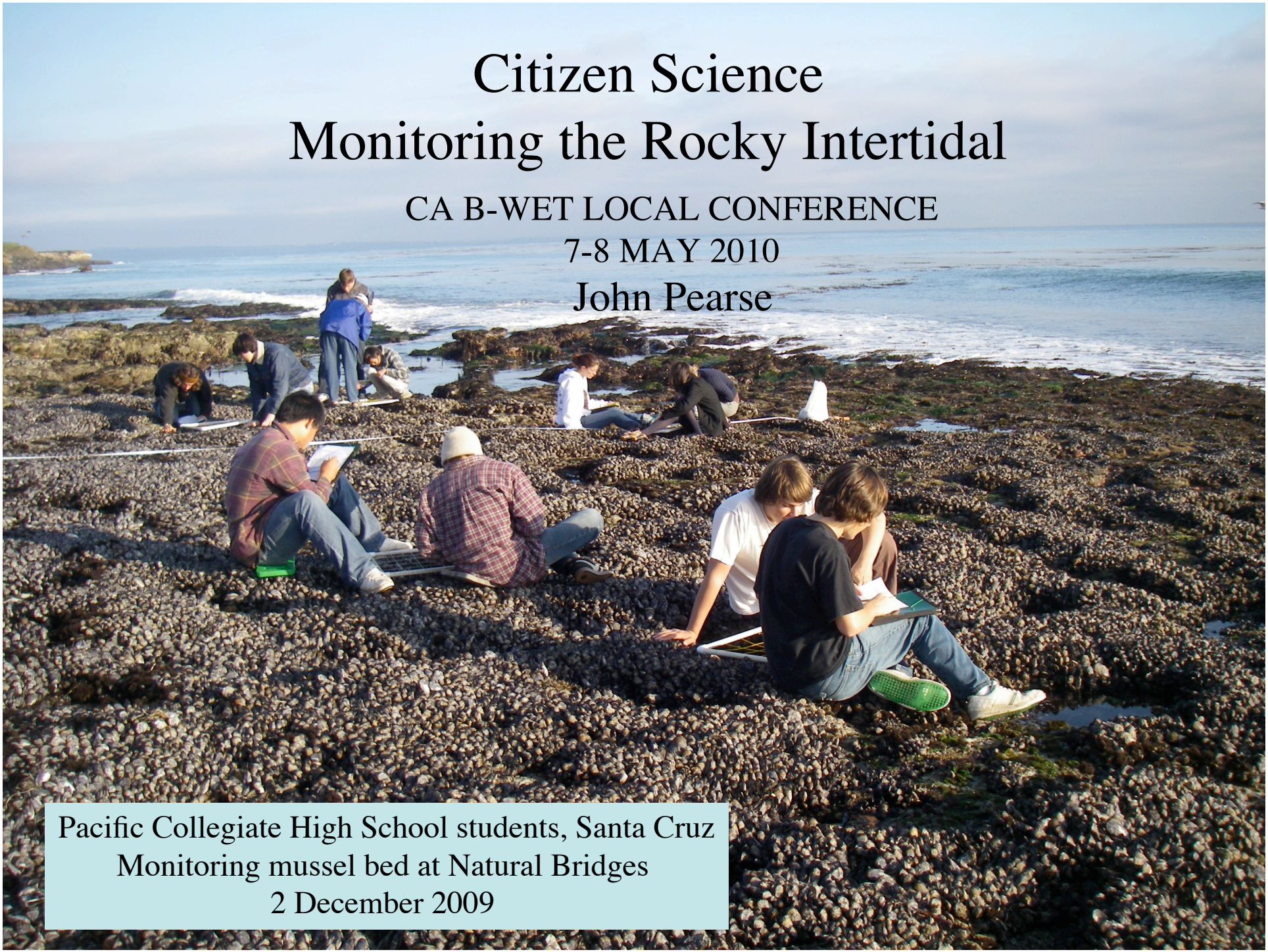
Citizen Science
Monitoring the Rocky Intertidal

CA B-WET LOCAL CONFERENCE

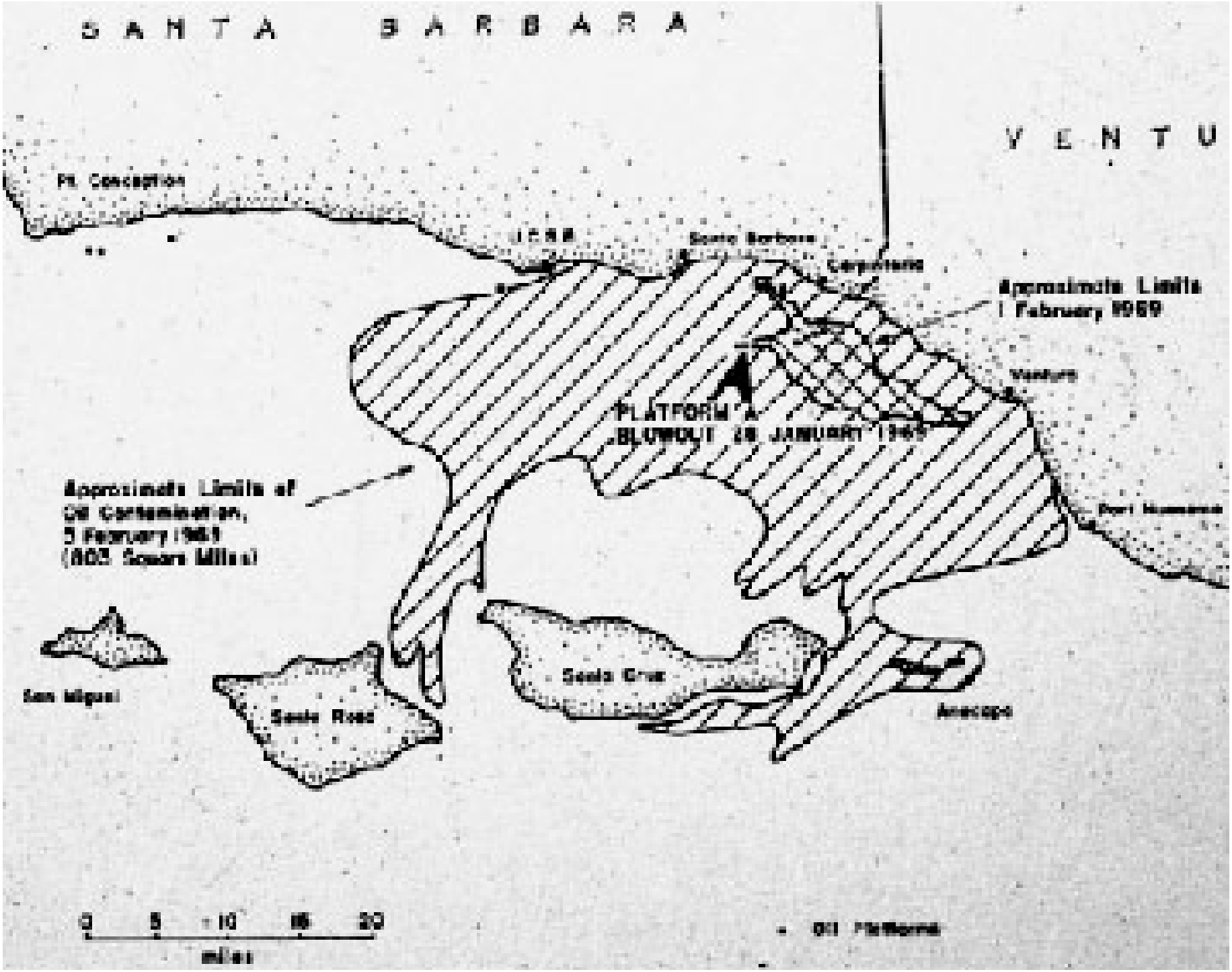
7-8 MAY 2010

John Pearse



Pacific Collegiate High School students, Santa Cruz
Monitoring mussel bed at Natural Bridges
2 December 2009

Platform A Blow-Out
Santa Barbara Channel
28 January 1969
80,000-100,000 barrels
of crude oil spilled


SANTA BARBARA
VENTU
Pt. Conception
U.C.S.B.
Santa Barbara
Carpinteria
Approximate Limits
1 February 1969
Ventura
PLATFORM
BLOWOUT 28 JANUARY 1969
Approximate Limits of
Oil Contamination,
5 February 1969
(800 Square Miles)
Port Hueneme
San Miguel
Santa Rosa
Santa Cruz
Anacapa
0 5 10 15 20
miles
Oil Platforms

"Here strange plants and bizarre, brilliantly colored animals grow in such abundance that the most casual visitor to the seashore cannot fail to notice some of them. … Everywhere there is color, life, movement." ***Between Pacific Tides*** **1939, p. v.**

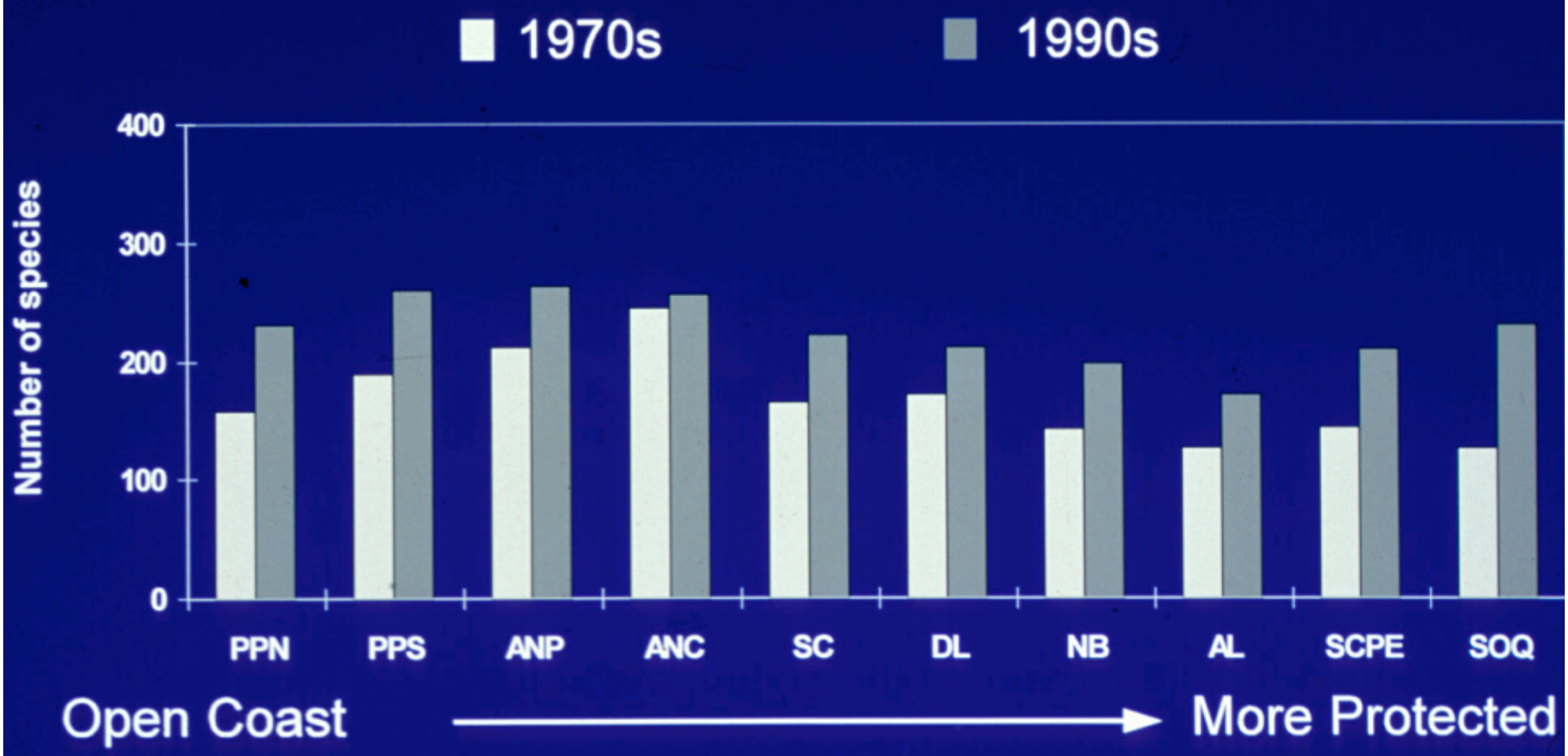
UCSC students surveying species at Año Nuevo - 1972

Locations of Intertidal Sampling Sites

UCSC students surveying species at Soquel Point - 1996

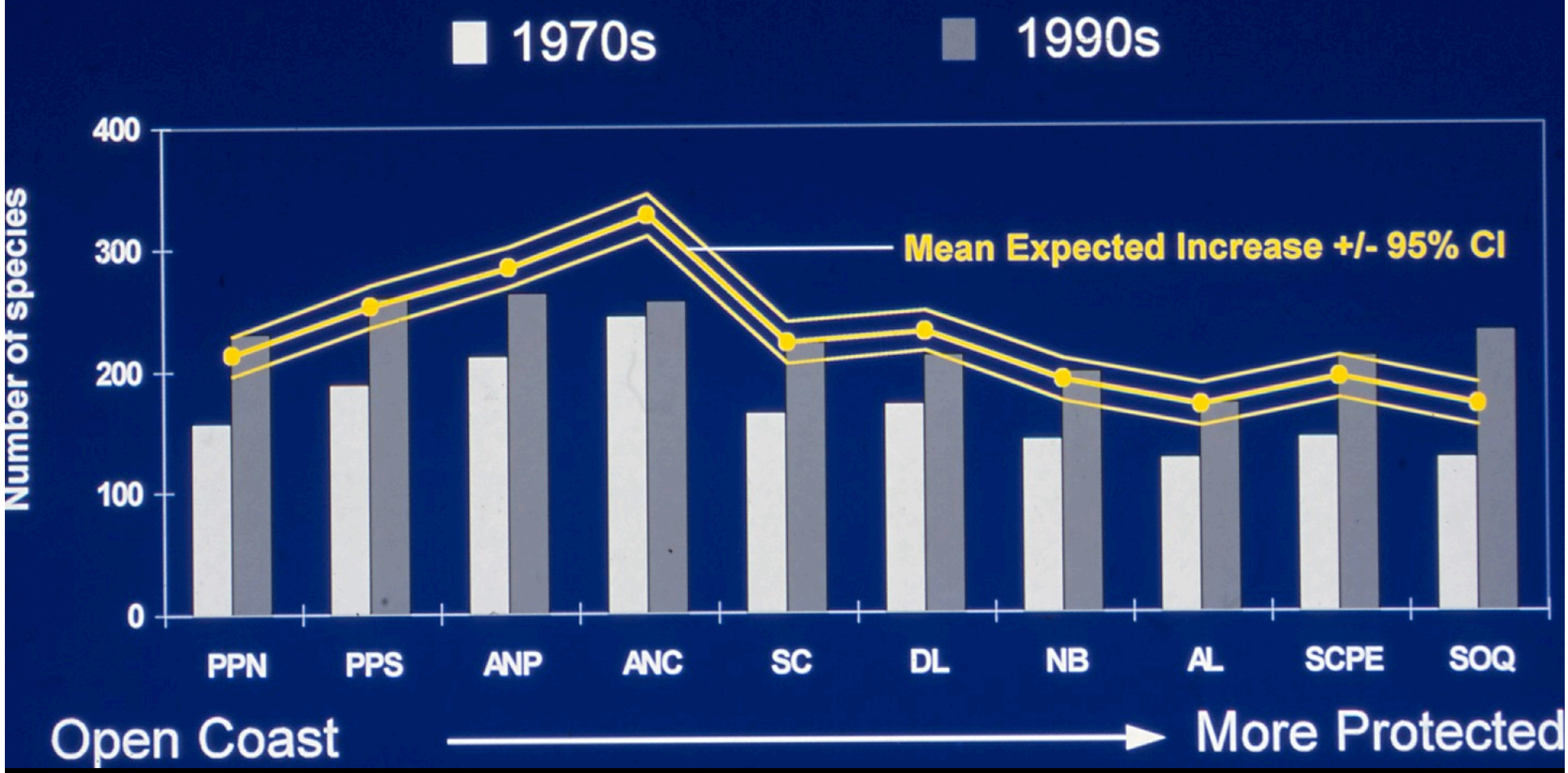
Species Richness - Invertebrates

(517 species total)



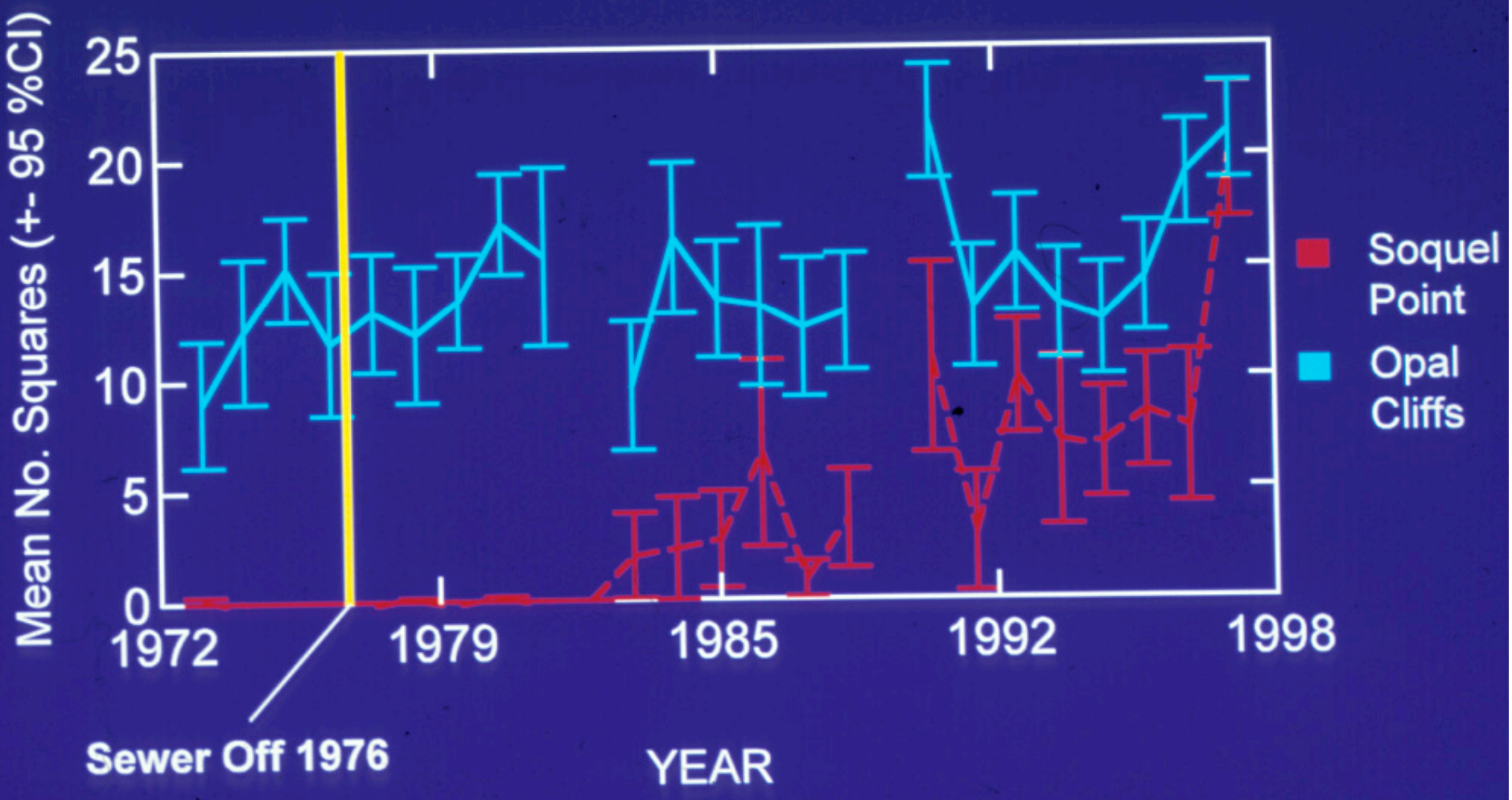
Species Richness - Invertebrates

(517 species total)



Sampling at Soquel Point
1975

Relative abundance of the seagrasses, *Phyllospadix* spp.



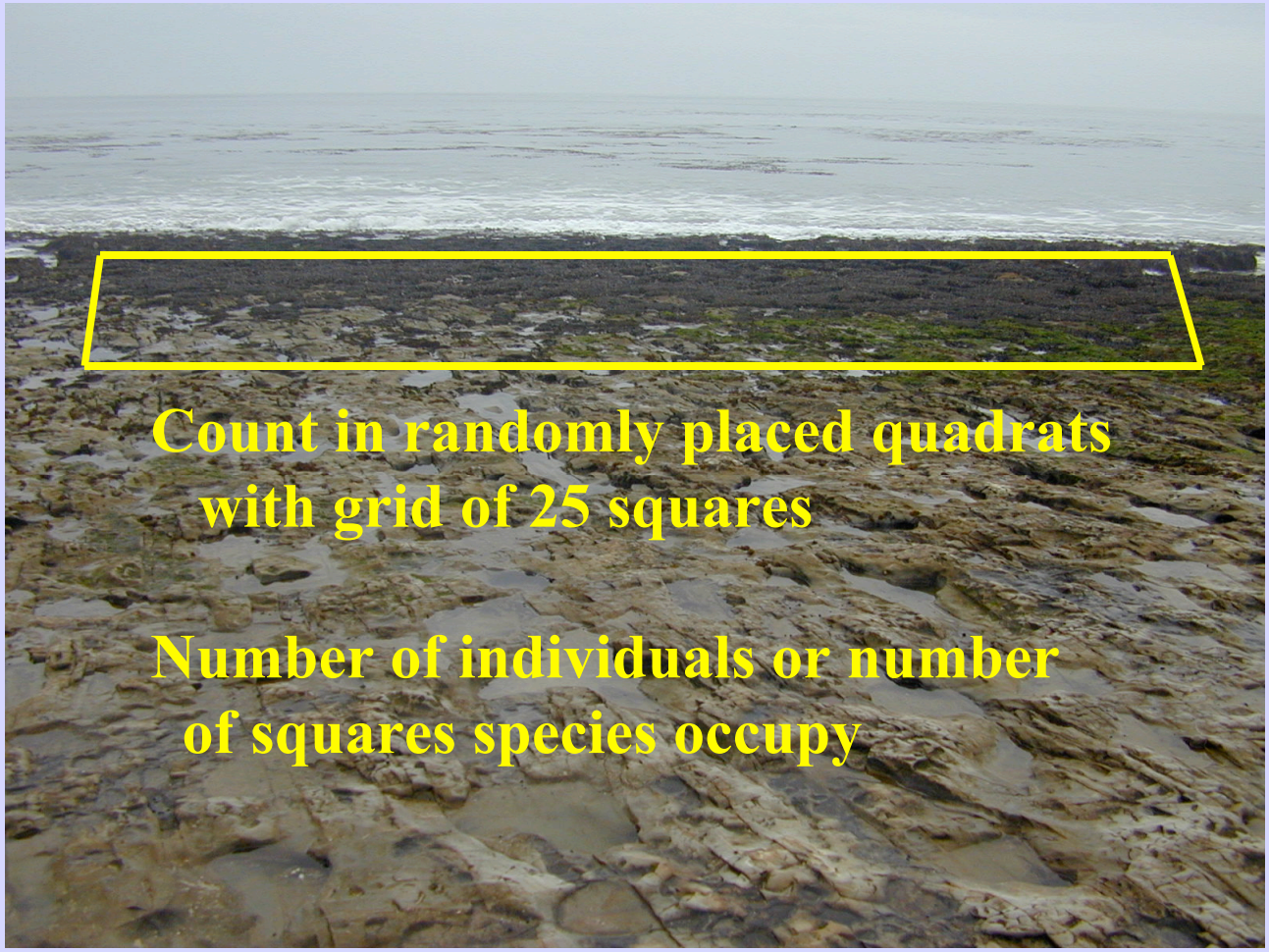
Soquel Point

1982

1997

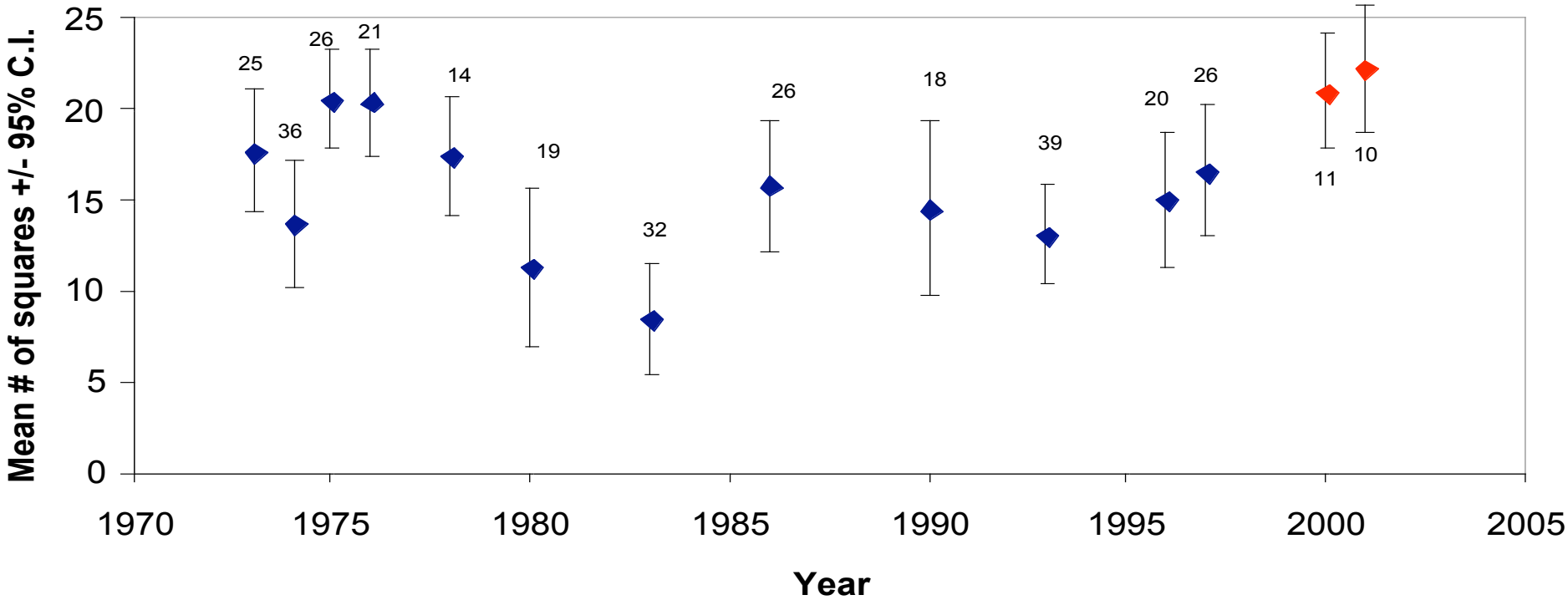
Natural Bridges quantitative counts - 21 April 1973

Count randomly placed quadrats within a permanent plot at Natural Bridges site



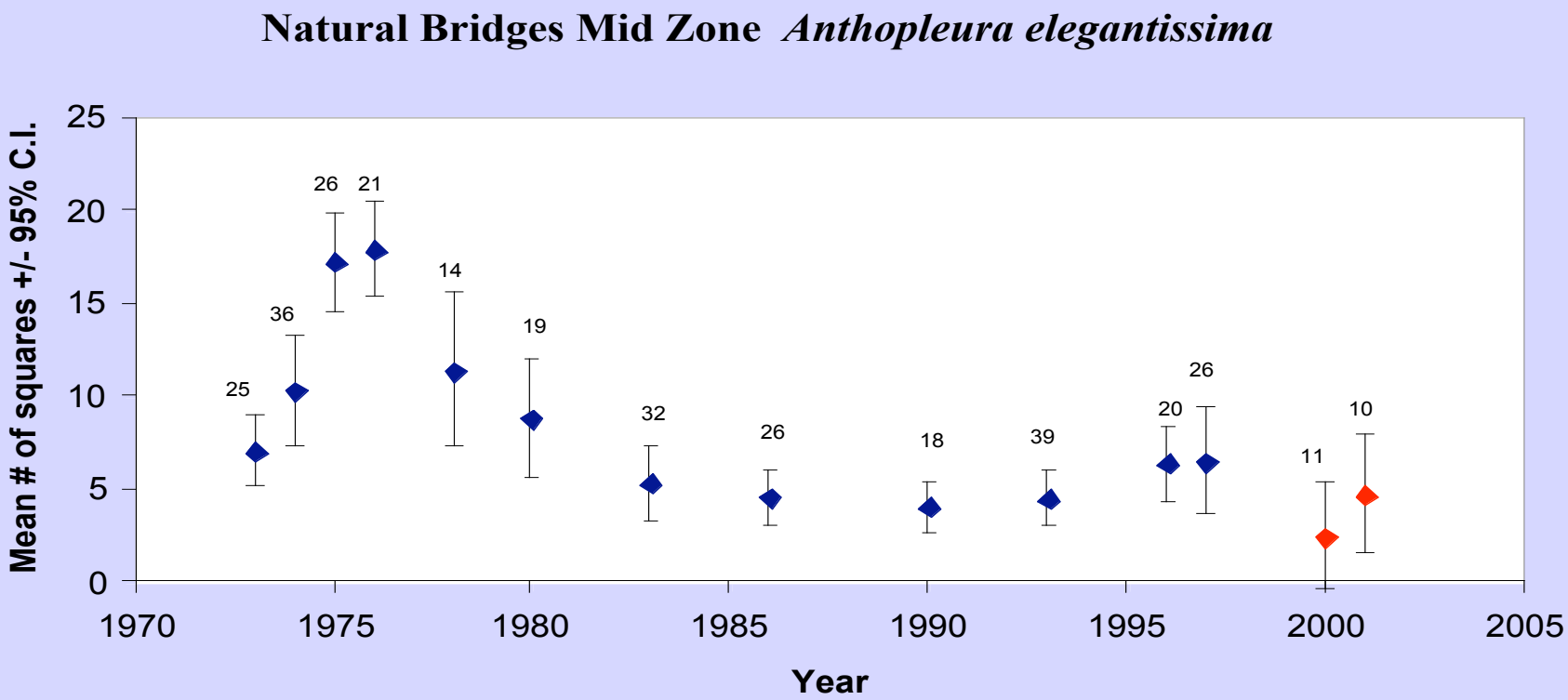
Stability in mussel abundance at Natural Bridges site

Natural Bridges Mid Zone *Mytilus californianus*

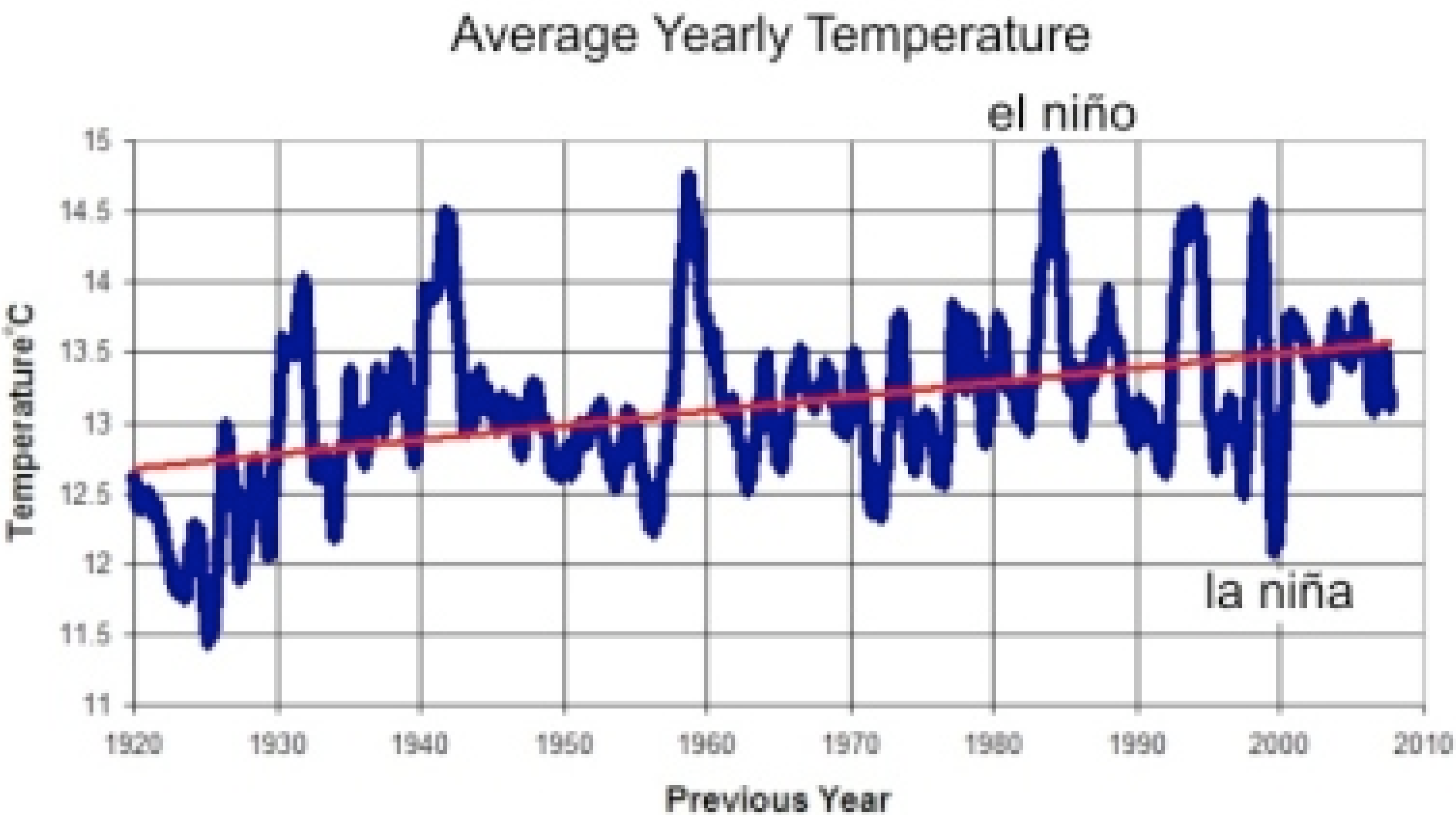


Blue = UCSC students; red = Aptos High students.
Numbers = number of 1/4m^2 quadrats counted.

Changes in aggregating sea anemone abundance at Natural Bridges site



Blue = UCSC students; red = Aptos High students.
Numbers = number of 1/4m^2 quadrats counted.

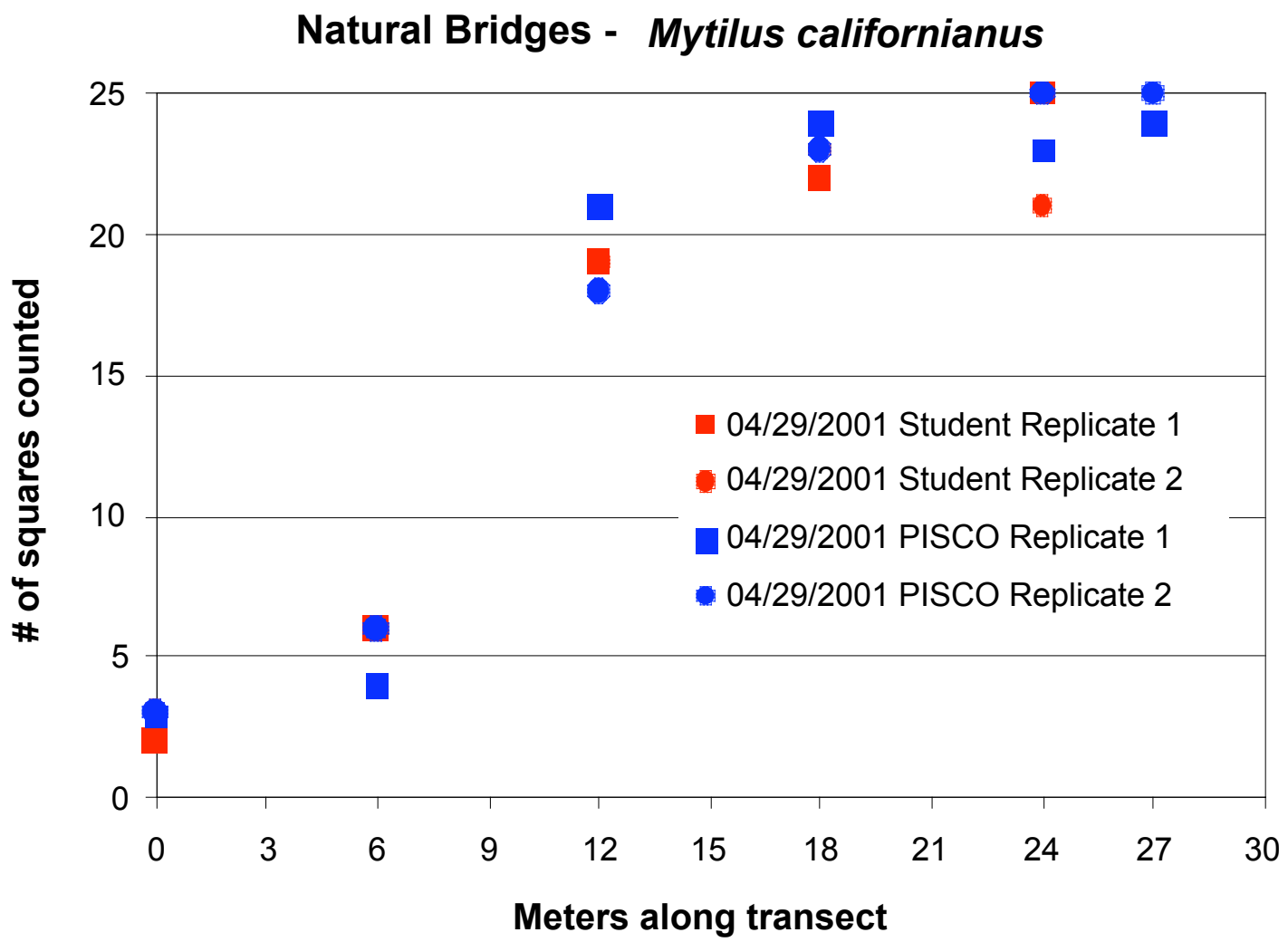


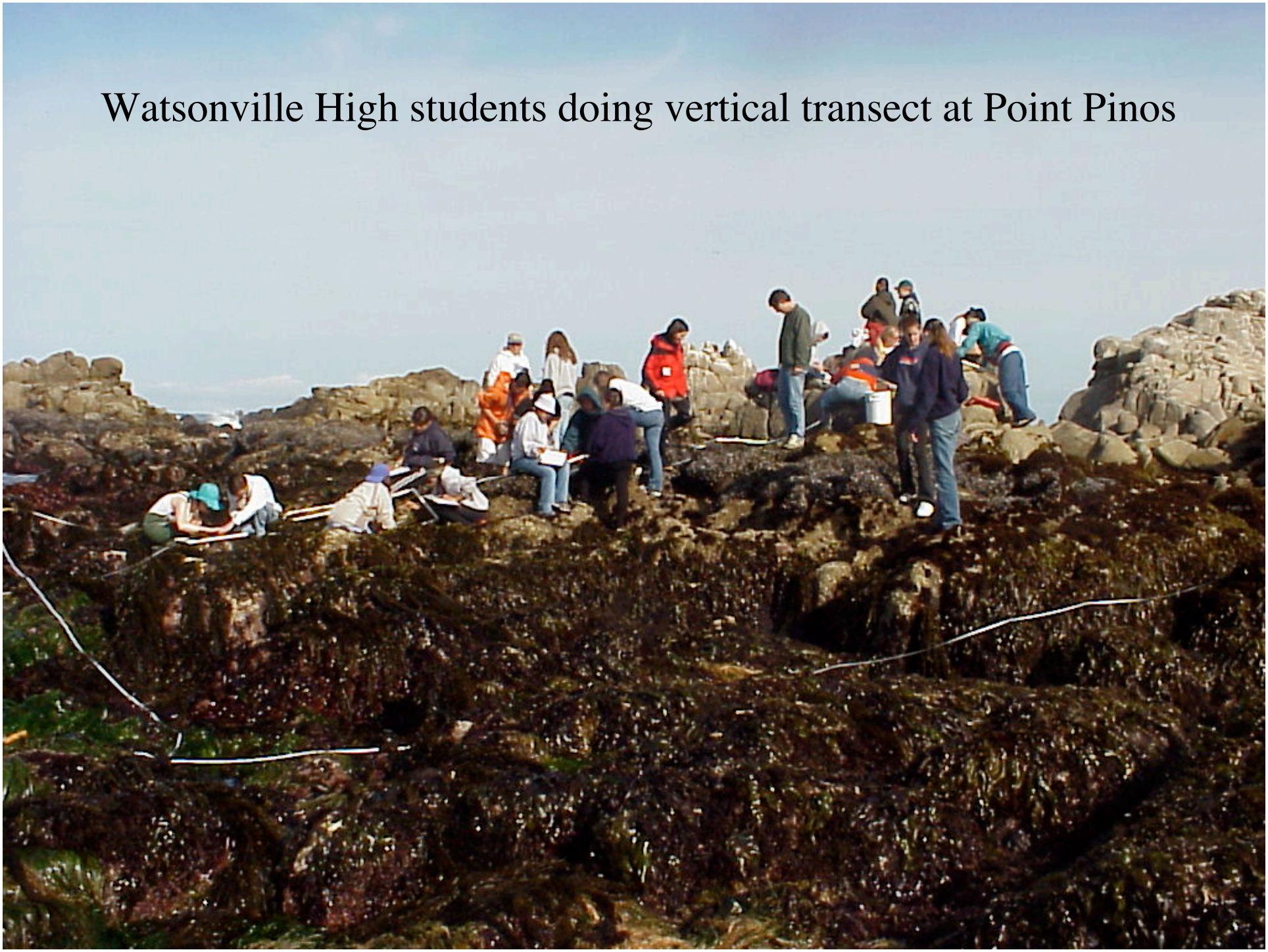
Shore sea temperature - Hopkins Marine Station
Marine Life Observatory
http://mlo.stanford.edu/

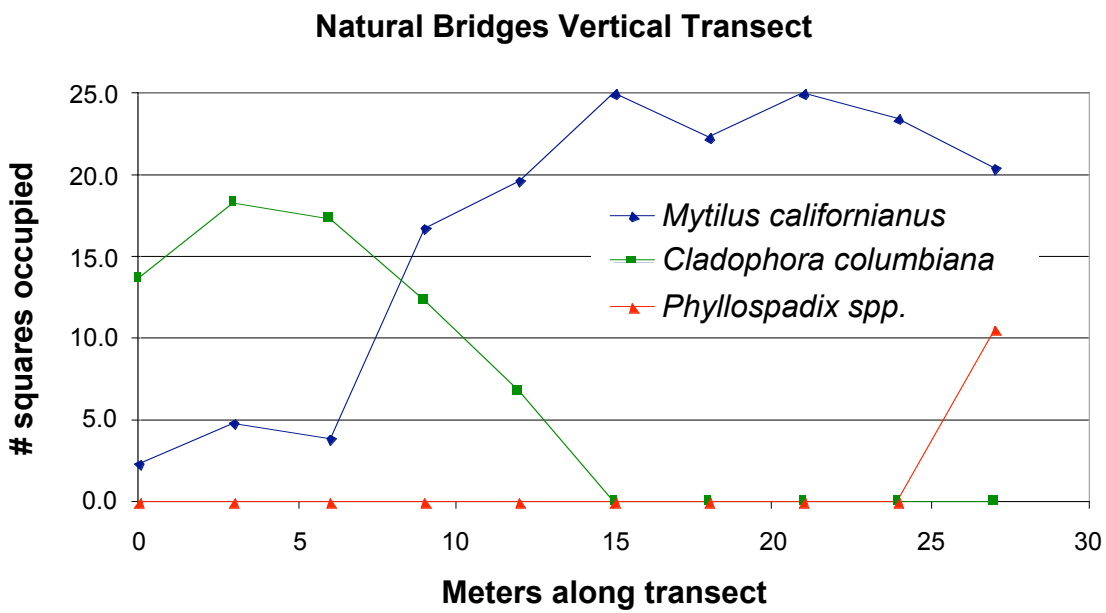
John Pearse | Dawn Osborn | Christy (Roe) Bell

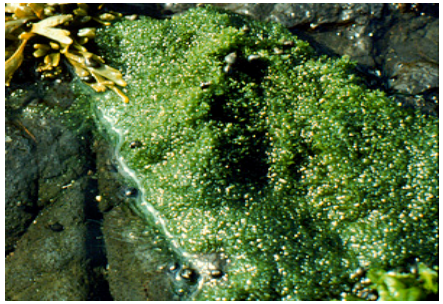
Aptos High students doing vertical transect at Natural Bridges

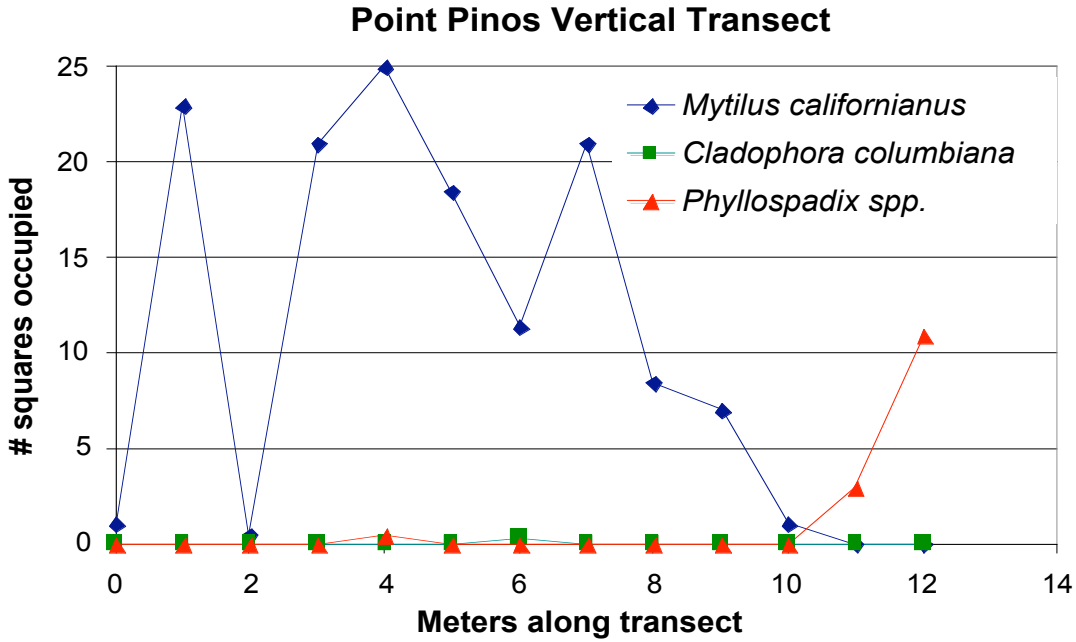
Counting a quadrat at Natural Bridges site


Natural Bridges - *Mytilus californianus*
# of squares counted
Meters along transect
0
5
10
15
20
25
0
3
6
9
12
15
18
21
24
27
30
04/29/2001 Student Replicate 1
04/29/2001 Student Replicate 2
04/29/2001 PISCO Replicate 1
04/29/2001 PISCO Replicate 2


Watsonville High students doing vertical transect at Point Pinos

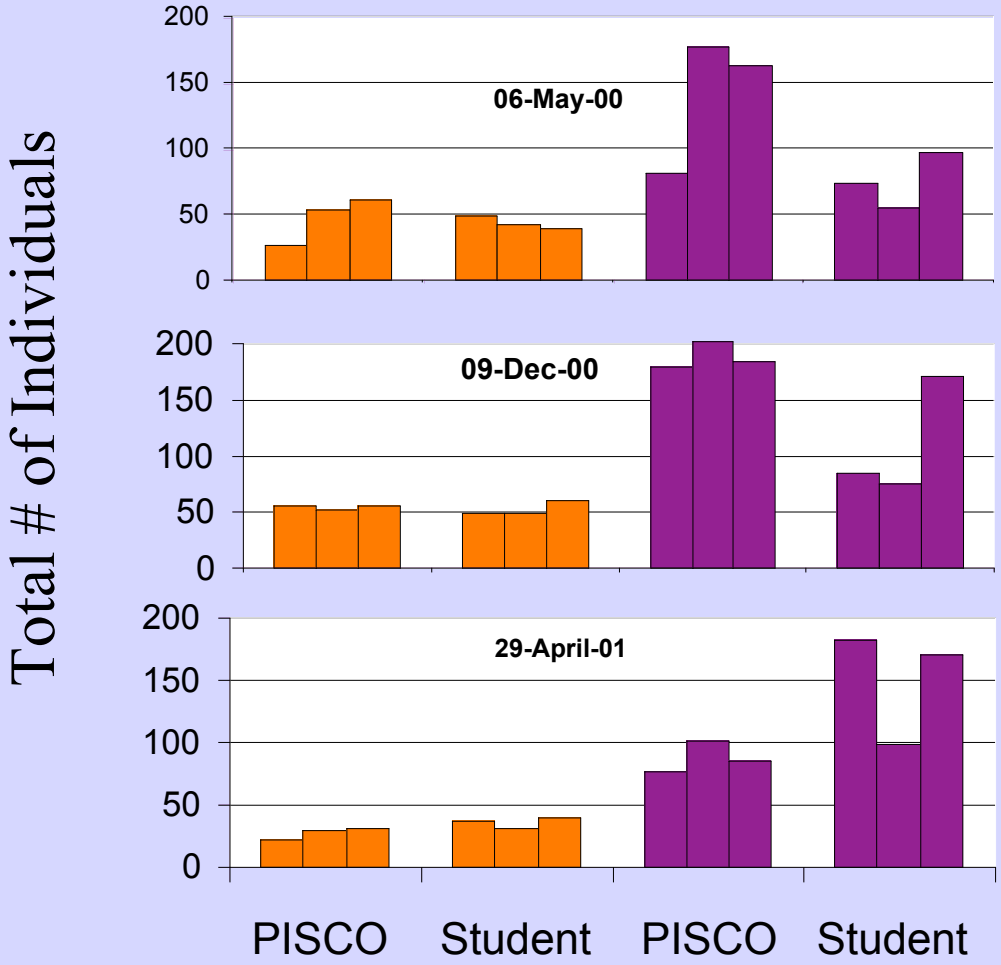

Natural Bridges Vertical Transect
squares occupied
25.0
20.0
15.0
10.0
5.0
0.0
0
5
10
15
20
25
30
Meters along transect
Mytilus californianus
Cladophora columbiana
Phyllospadix spp.




Point Pinos Vertical Transect
squares occupied
25
20
15
10
5
0
0
2
4
6
8
10
12
14
Meters along transect
Mytilus californianus
Cladophora columbiana
Phyllospadix spp.

Aptos High students counting ochre sea stars at Natural Bridges site

Counts of orange and purple/brown stars by students and professionals (PISCO)

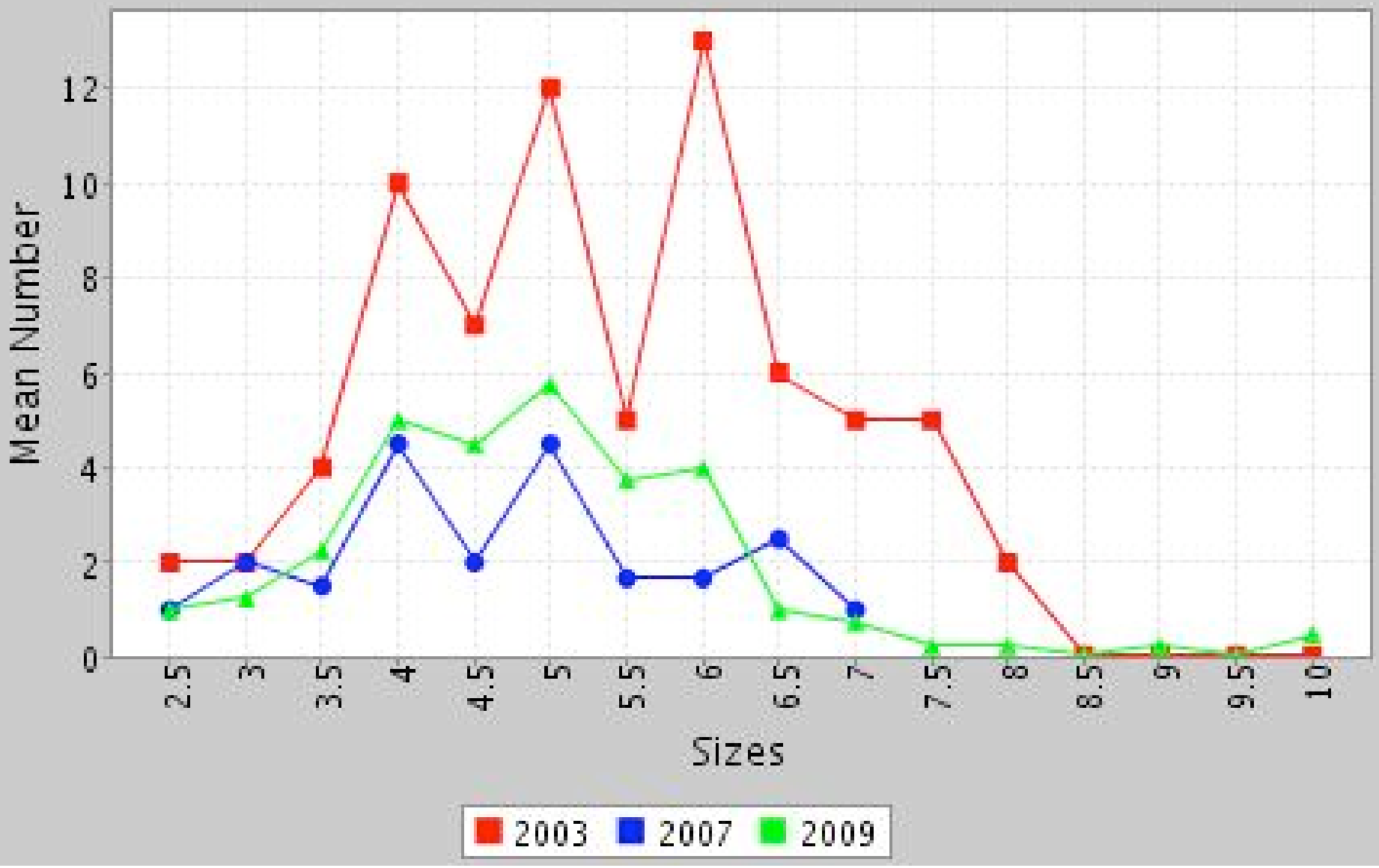


Each bar is count by one team.

Owl limpet on her “farm”

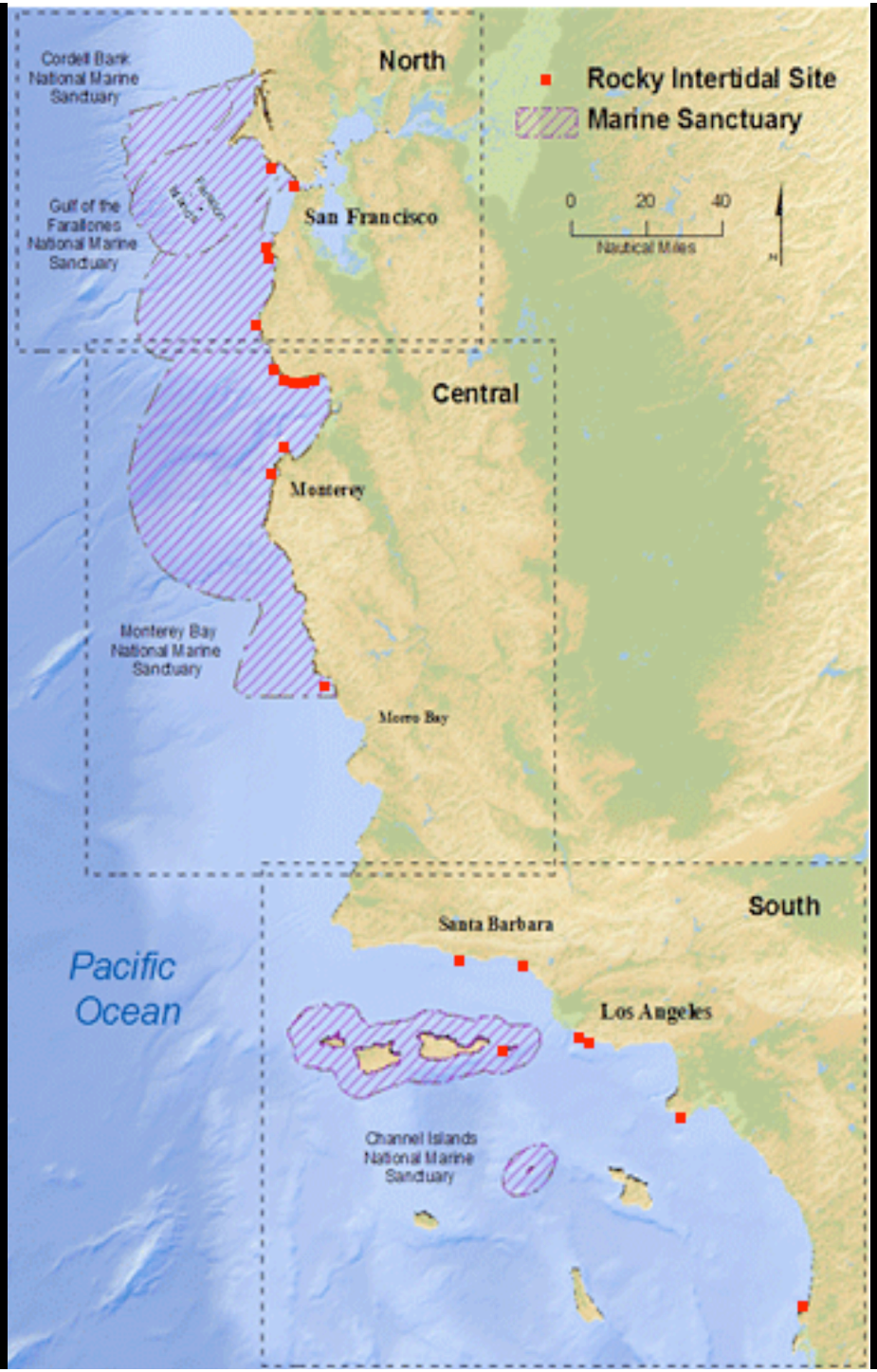
Ann Soldo Middle School students measuring an owl limpet

Owl limpet size distributions at Natural Bridges



Long-term Monitoring Program and Experiential Training for Students (LiMPETS)

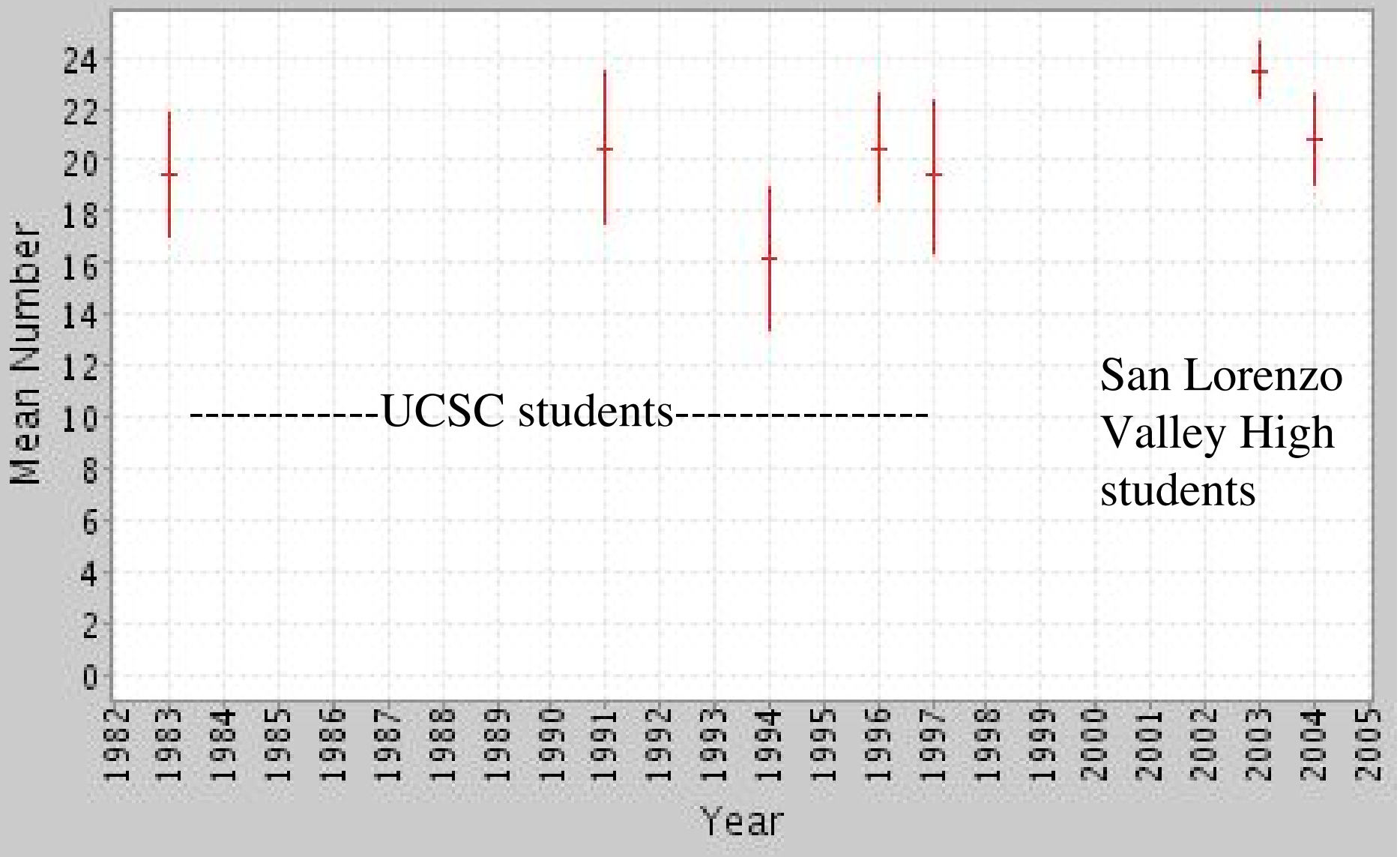
A coordinated program of three California sanctuaries for <u>rocky intertidal</u> and sandy beach monitoring


North
Rocky Intertidal Site
Marine Sanctuary
Cordell Bank National Marine Sanctuary
Gulf of the Farallones National Marine Sanctuary
San Francisco
0
20
40
Nautical Miles
Central
Monterey
Monterey Bay National Marine Sanctuary
Morro Bay
South
Santa Barbara
Pacific Ocean
Los Angeles
Channel Islands National Marine Sanctuary

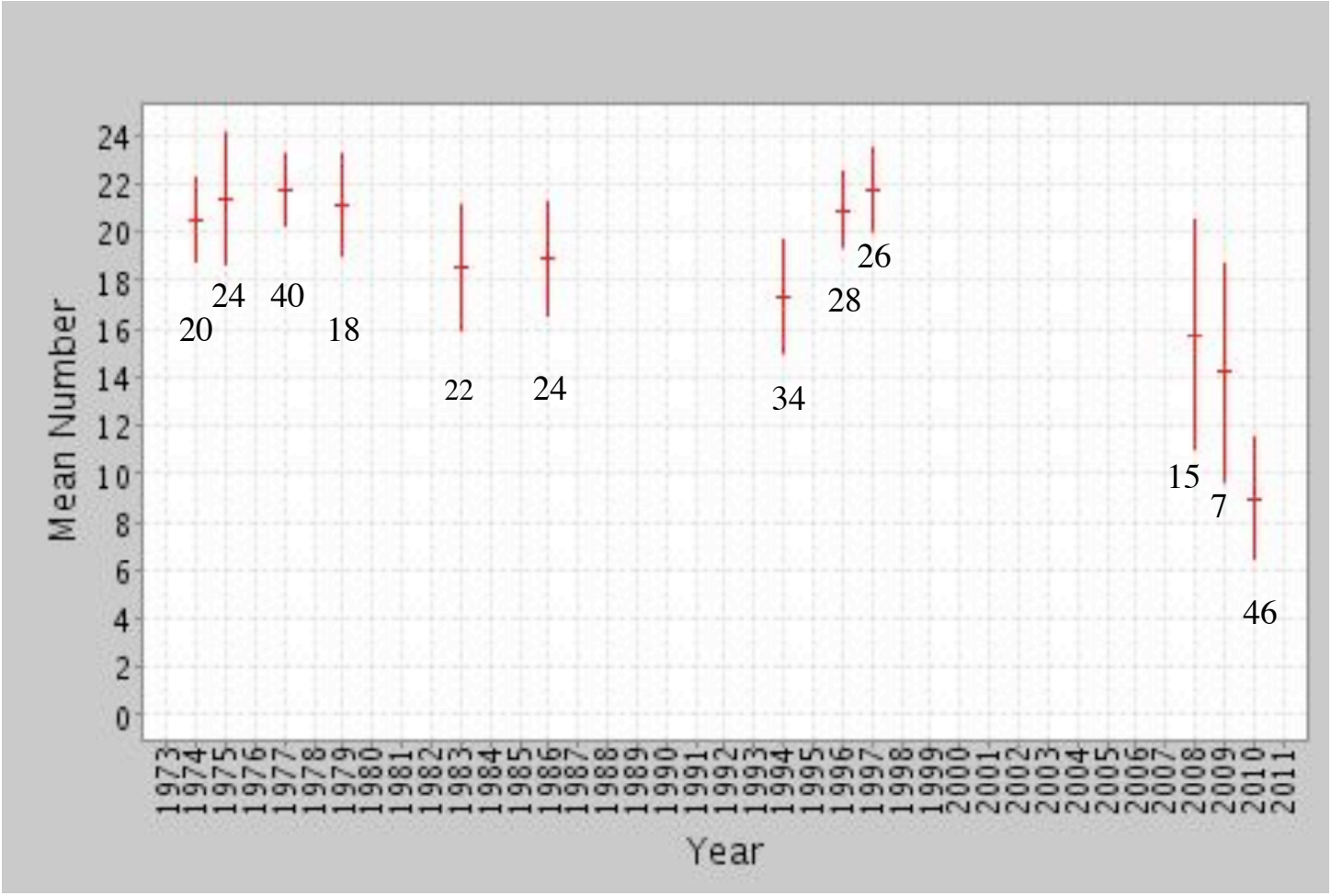
Mussel collectors - Davenport Landing - Fall 2004

Davenport Landing mussel plot
6 November 1976

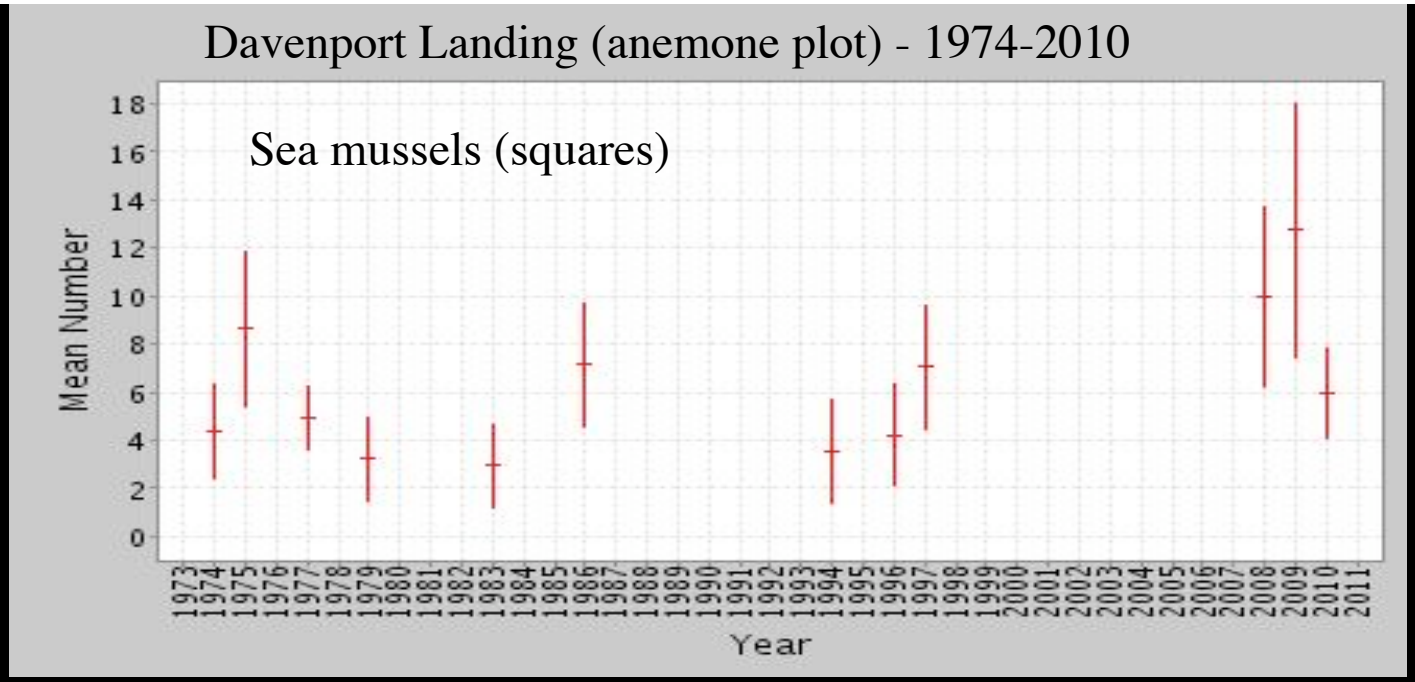
Mussel abundance in mussel bed at Davenport Landing

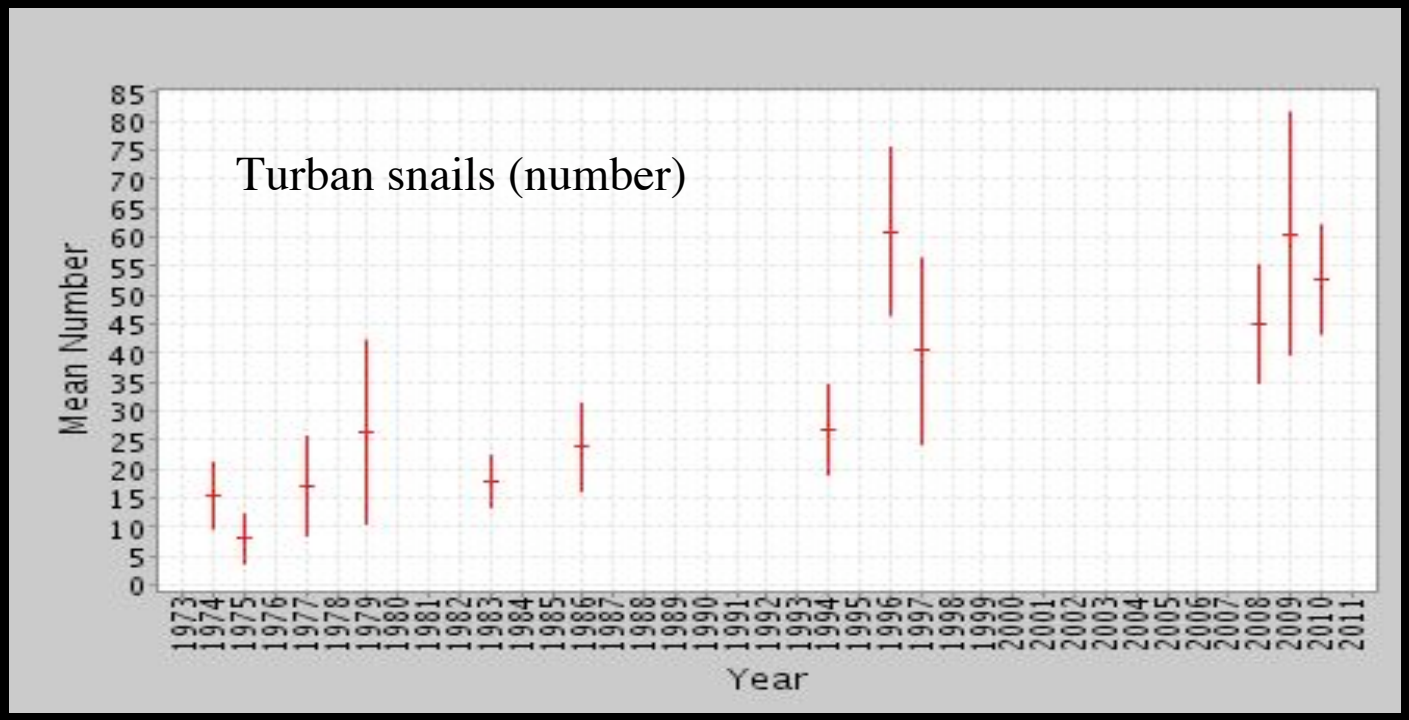


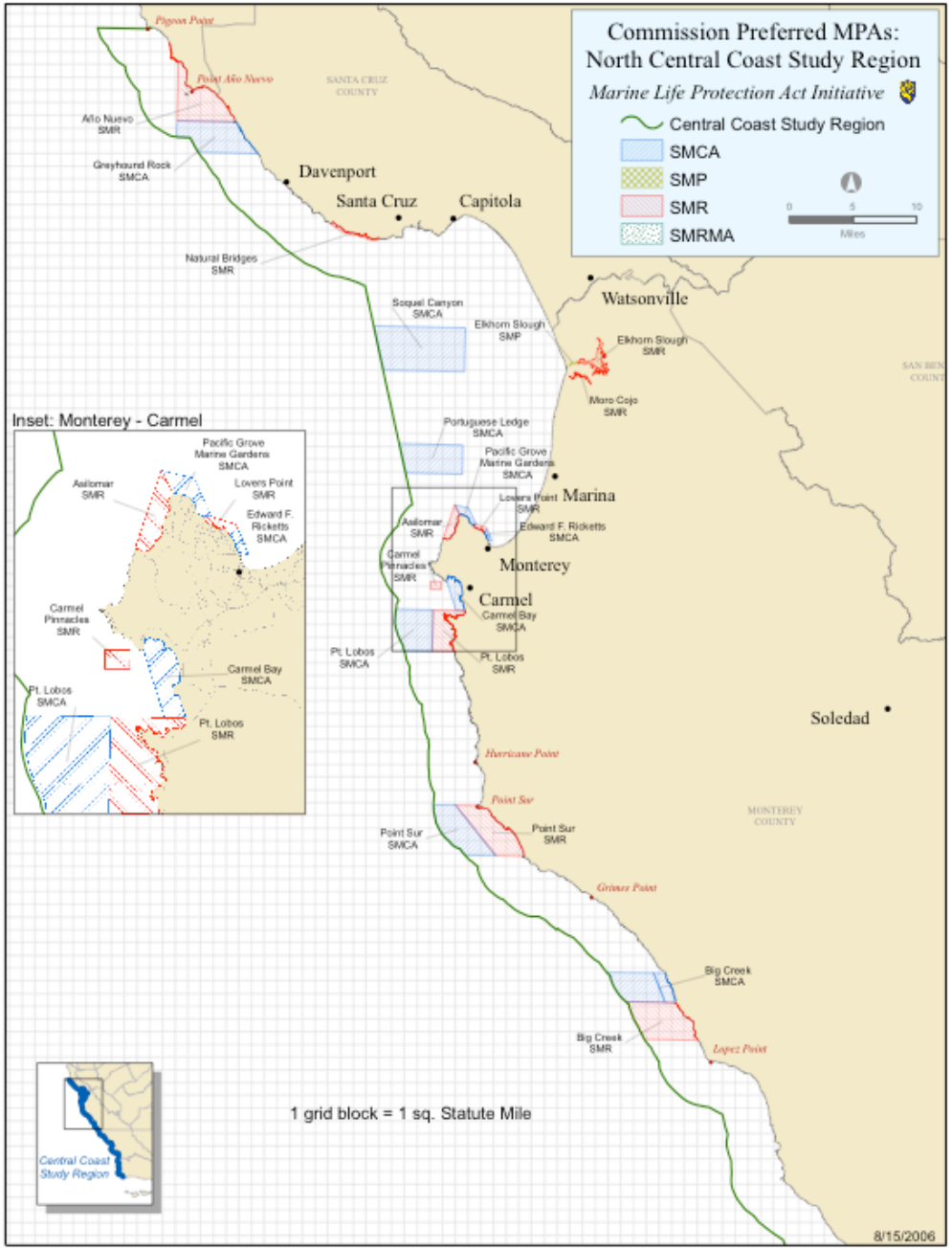
San Lorenzo Valley High students counting a quadrat in the anemone plot at Davenport Landing Dec 09



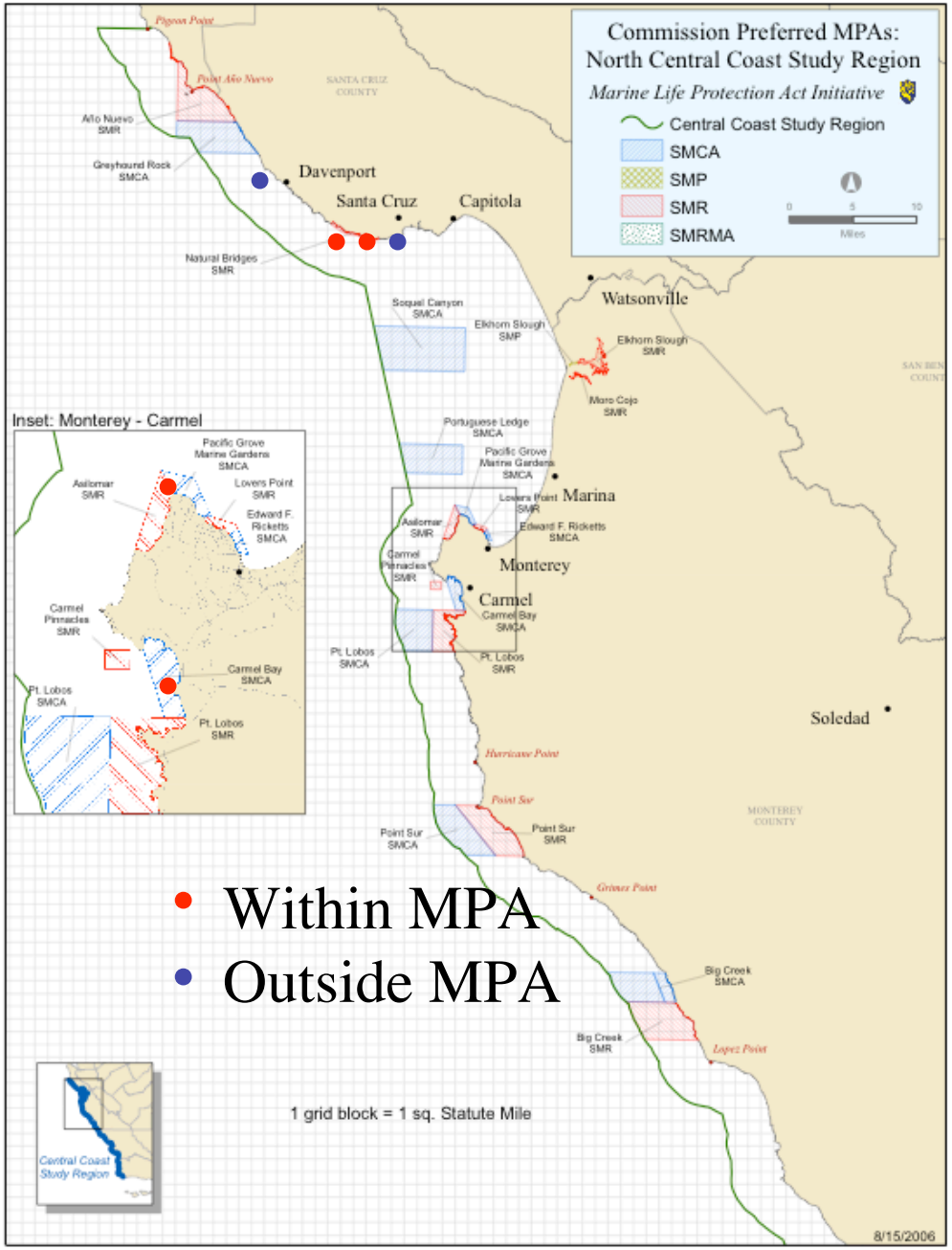
Abundance of aggregating sea anemones, *Anthopleura elegantissima,* within a 15x15m plot on an intertidal bench at Davenport Landing, Santa Cruz County, California. Each year is from June to July. Mean number of 10x10cm squares with anemones within a 25x25cm quadrat; vertical lines: 95% confidence limits. Numbers are number of samples on each date.


Davenport Landing (anemone plot) - 1974-2010
Sea mussels (squares)
Mean Number
Year


Turban snails (number)
Mean Number
Year



SMCA = state marine conservation area SMP = state marine park
SMR = state marine reserve SMRMA = state marine recreational management area



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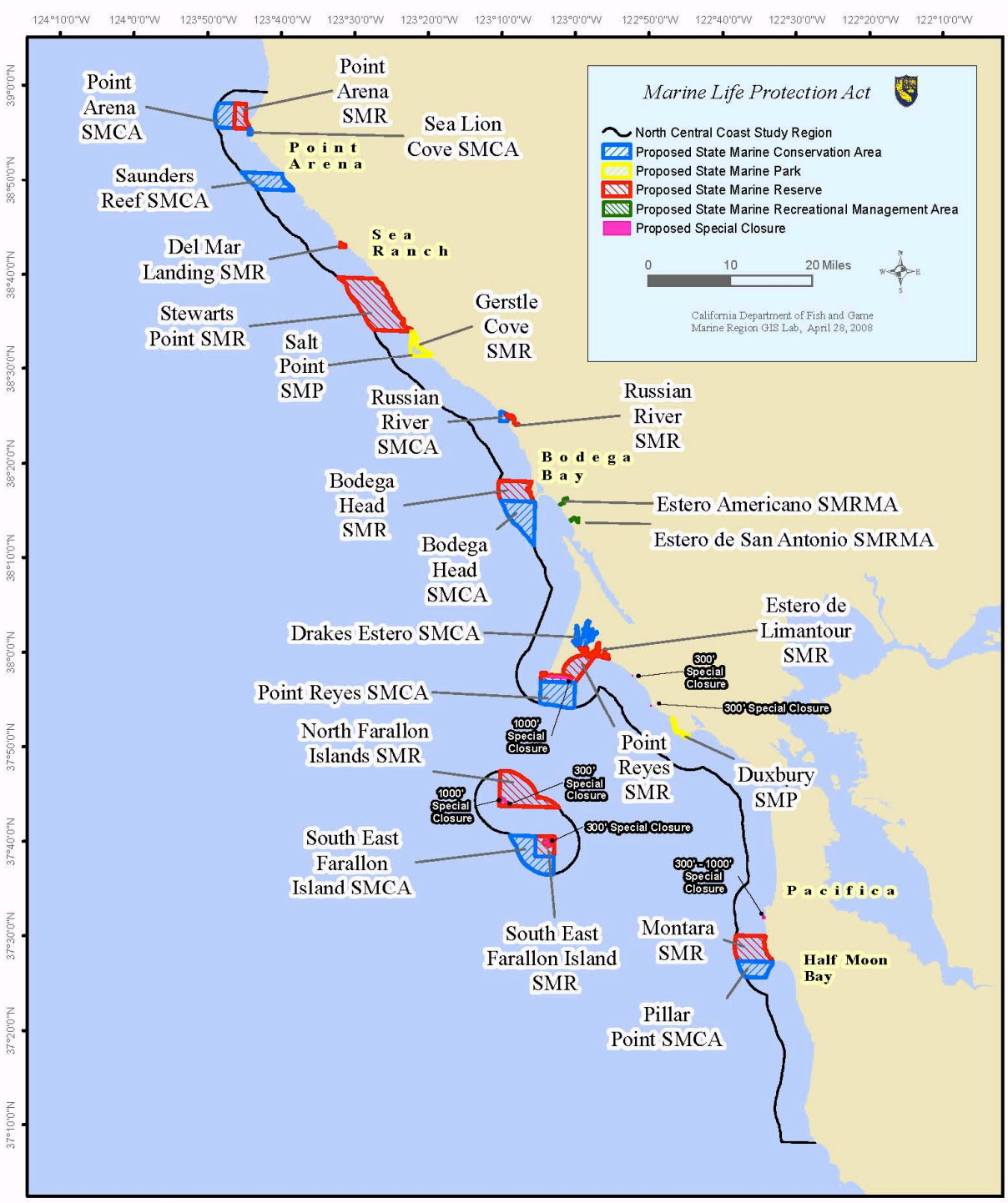
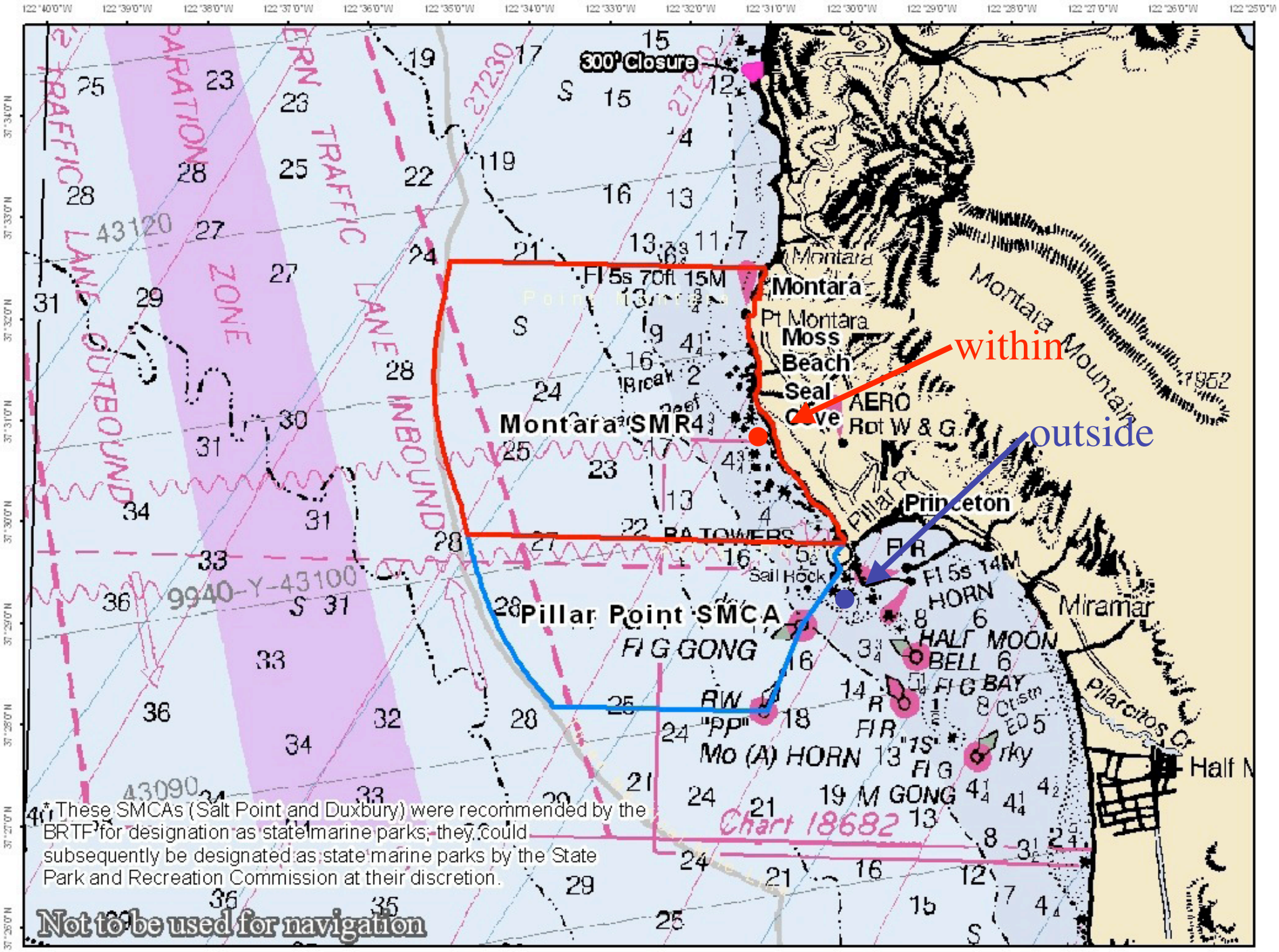

Marine Life Protection Act
North Central Coast Study Region
Proposed State Marine Conservation Area
Proposed State Marine Park
Proposed State Marine Reserve
Proposed State Marine Recreational Management Area
Proposed Special Closure
0
10
20 Miles
California Department of Fish and Game
Marine Region GIS Lab, April 28, 2008
124°10'0"W
124°0'0"W
123°50'0"W
123°40'0"W
123°30'0"W
123°20'0"W
123°10'0"W
123°0'0"W
122°50'0"W
122°40'0"W
122°30'0"W
122°20'0"W
122°10'0"W
39°0'0"N
38°50'0"N
38°40'0"N
38°30'0"N
38°20'0"N
38°10'0"N
38°0'0"N
37°50'0"N
37°40'0"N
37°30'0"N
37°20'0"N
37°10'0"N
Point Arena SMCA
Point Arena SMR
Sea Lion Cove SMCA
Point Arena
Saunders Reef SMCA
Sea Ranch
Del Mar Landing SMR
Stewarts Point SMR
Gerstle Cove SMR
Salt Point SMP
Russian River SMCA
Russian River SMR
Bodega Bay
Bodega Head SMR
Estero Americano SMRMA
Estero de San Antonio SMRMA
Bodega Head SMCA
Estero de Limantour SMR
Drakes Estero SMCA
300' Special Closure
Point Reyes SMCA
300' Special Closure
North Farallon Islands SMR
1000' Special Closure
Point Reyes SMR
Duxbury SMP
300' Special Closure
1000' Special Closure
300' Special Closure
South East Farallon Island SMCA
300' - 1000' Special Closure
Pacifica
South East Farallon Island SMR
Montara SMR
Half Moon Bay
Pillar Point SMCA


300' Closure
Montara
Pt Montara
Moss Beach
Seal Cove
AERO
Rot W & G
Montara SMR4
within
outside
Princeton
Pillar Point SMCA
Fl G GONG
Mo (A) HORN
HALF MOON BELL
Fl G BAY
Fl 5s 14M HORN
Miramar
Half M
Montara Mountain
Pillar Point
Sail Rock
Fl 5s 70ft 15M
TRAFFIC SEPARATION ZONE
TRAFFIC LANE INBOUND
TRAFFIC LANE OUTBOUND
43120
9940-Y-43100
43090
Chart 18682
These SMCAs (Salt Point and Duxbury) were recommended by the BRTF for designation as state marine parks; they could subsequently be designated as state marine parks by the State Park and Recreation Commission at their discretion.
Not to be used for navigation

THANKS!