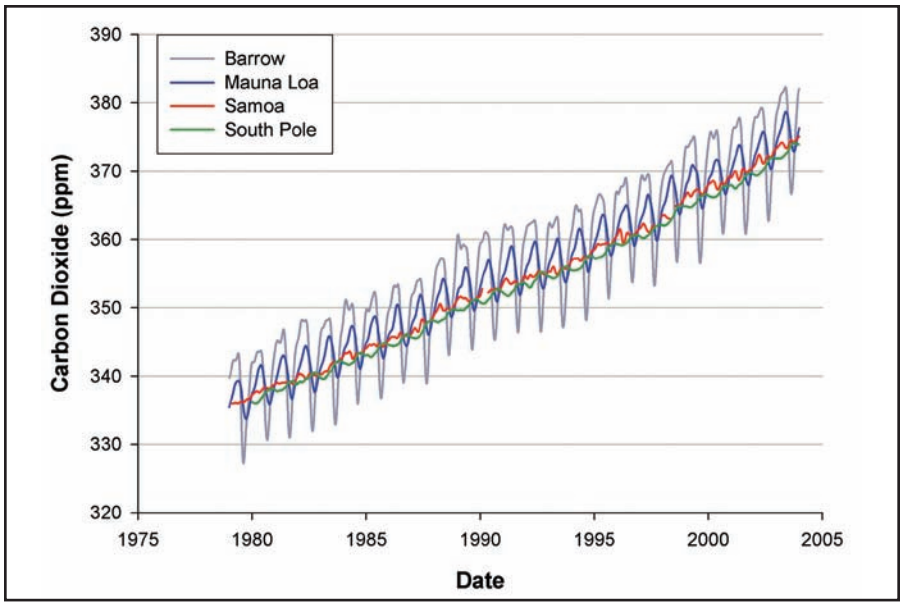
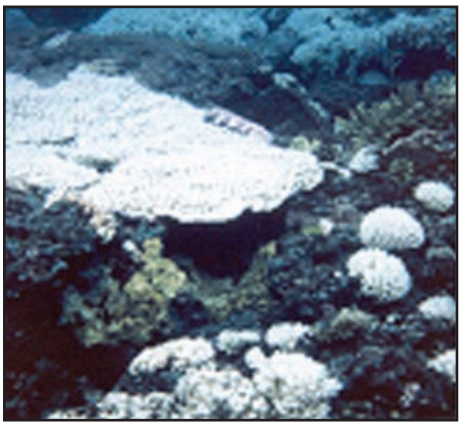
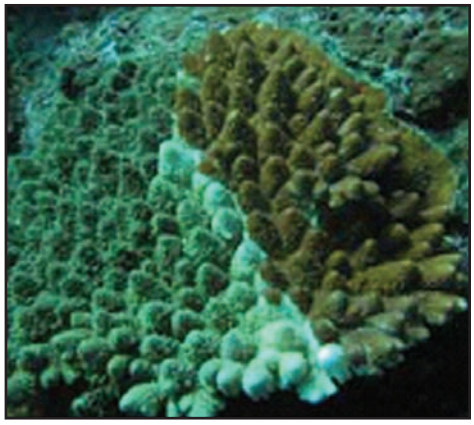
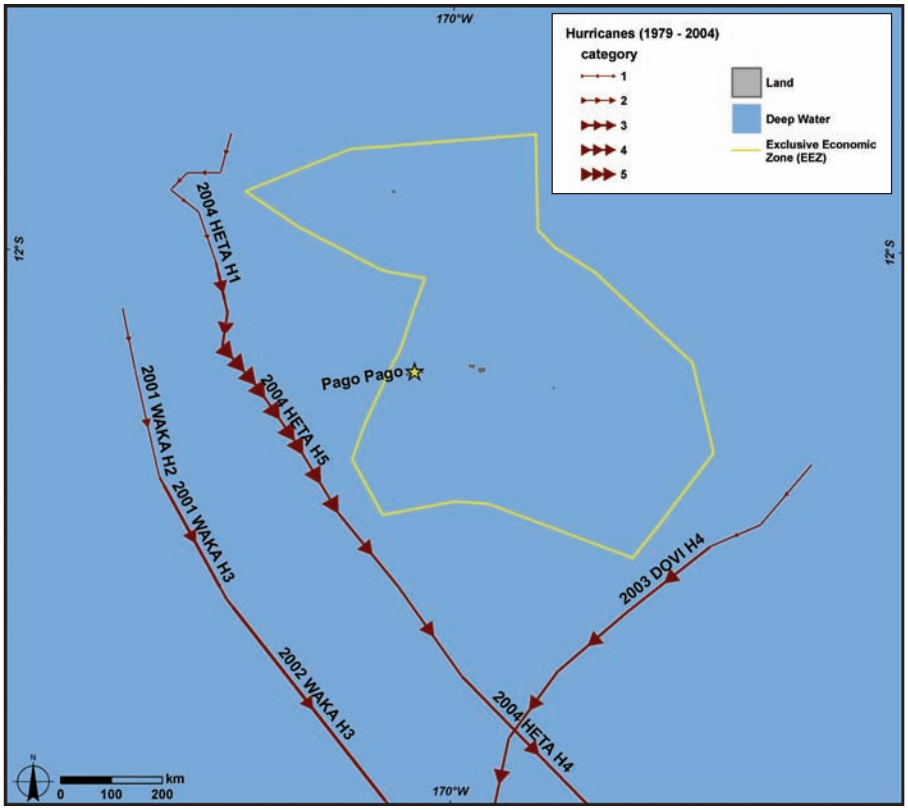
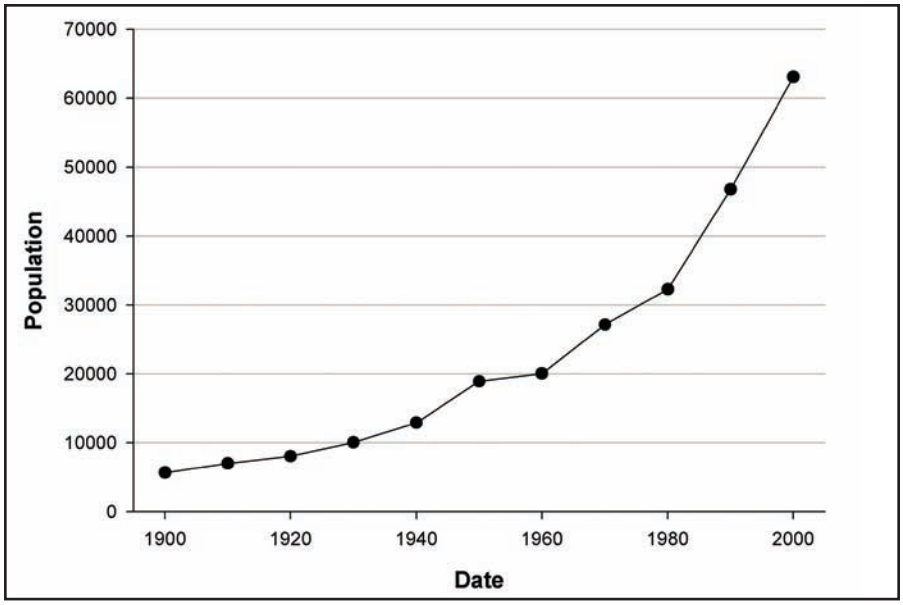
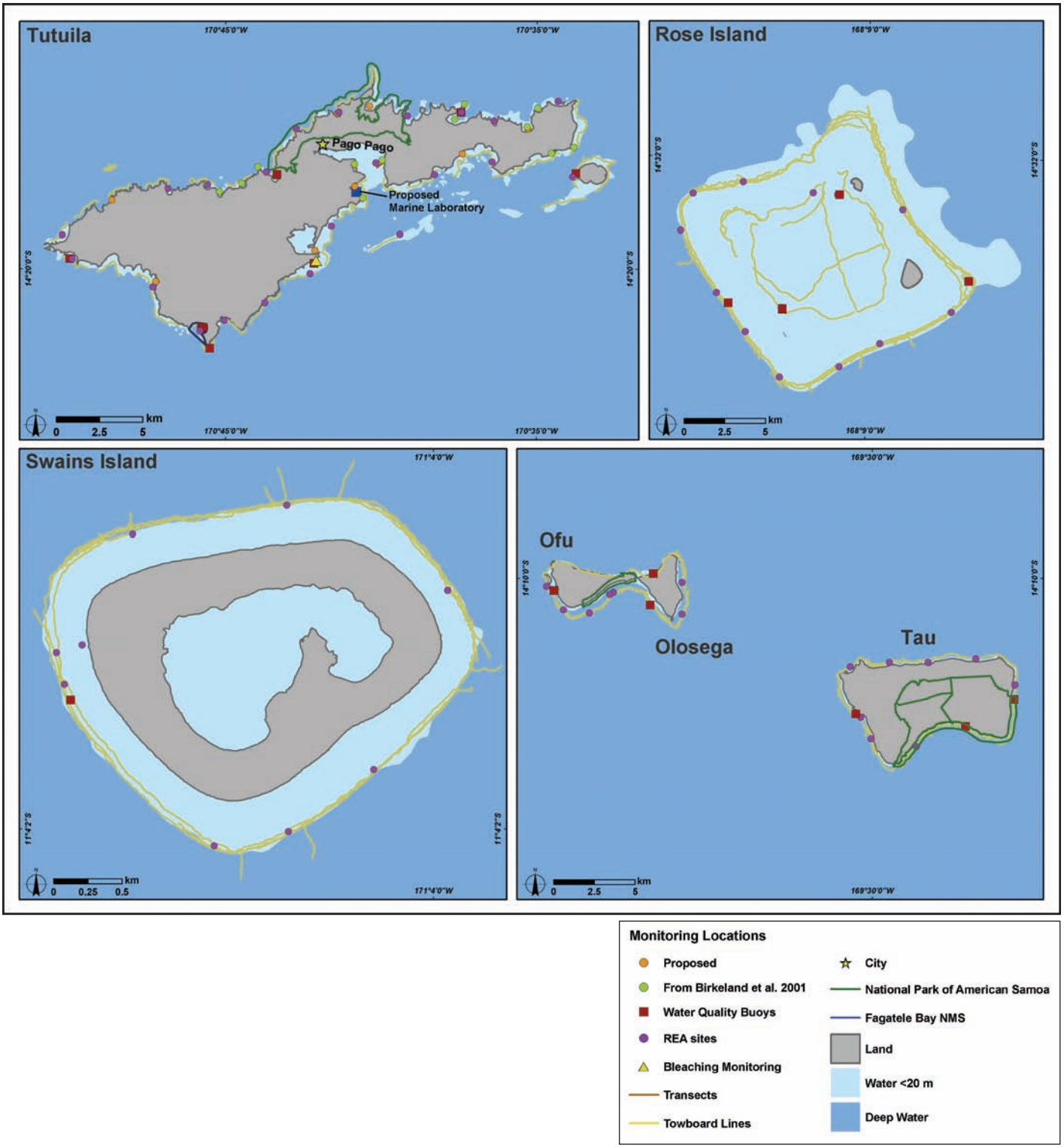

Barrow
Mauna Loa
Samoa
South Pole
Carbon Dioxide (ppm)
390
380
370
360
350
340
330
320
1975
1980
1985
1990
1995
2000
2005
Date

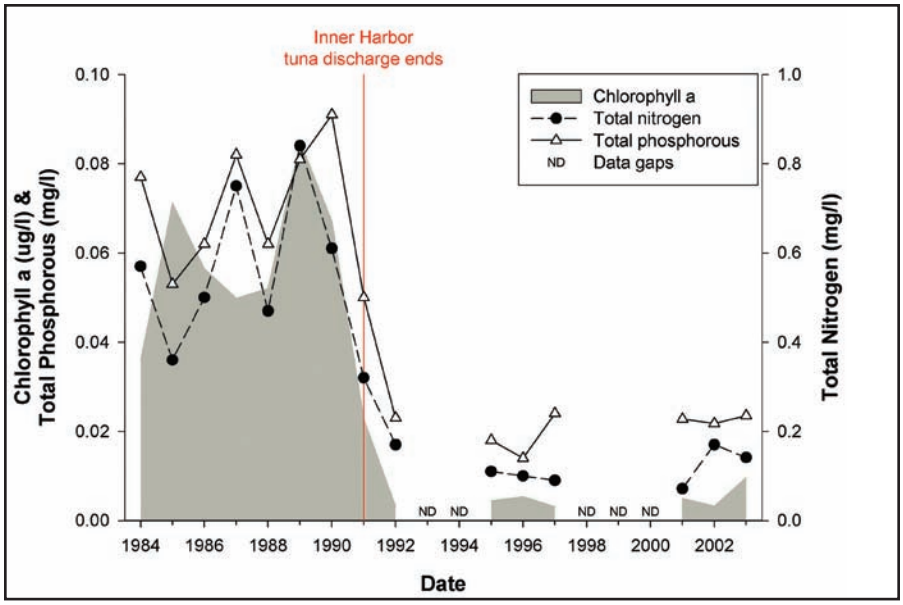


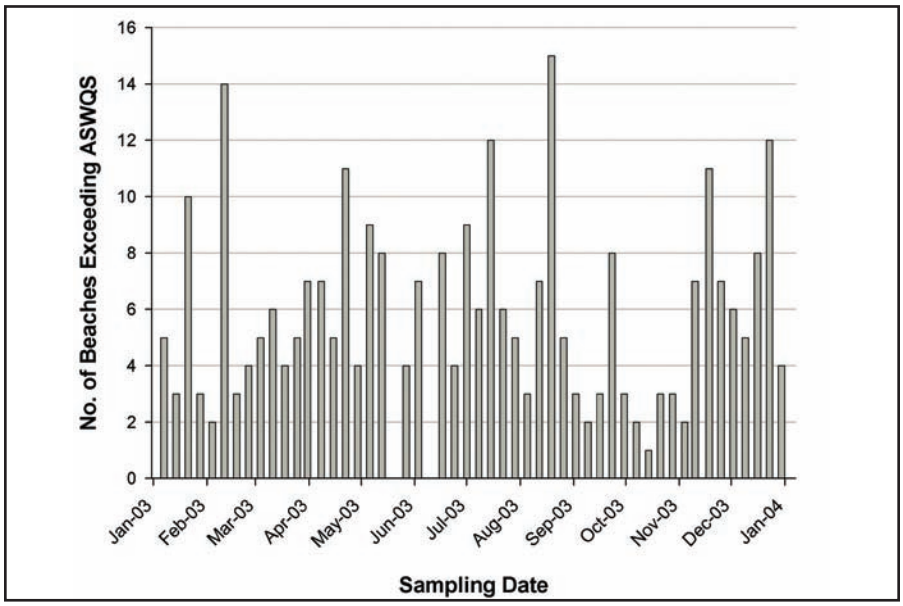


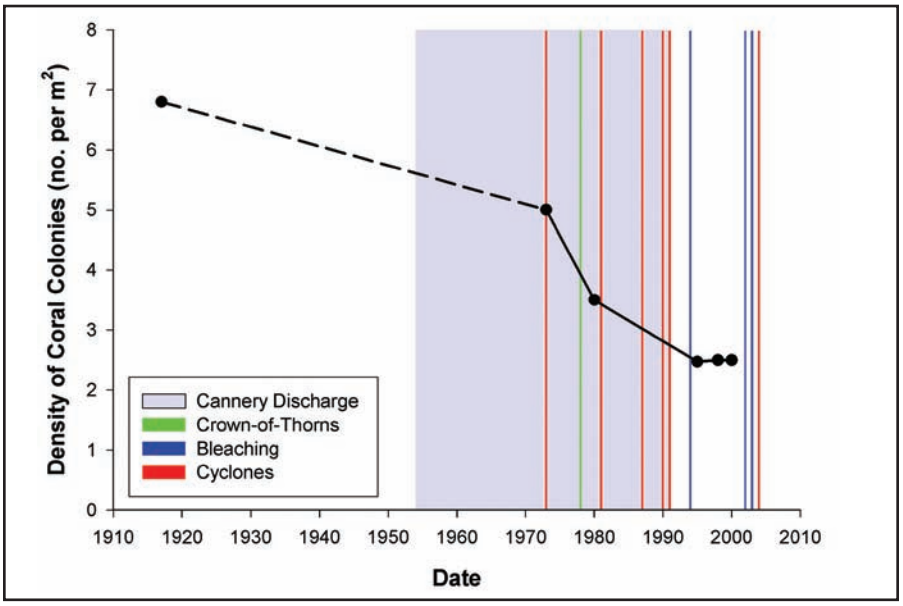

Hurricanes (1979 - 2004)
category
1
2
3
4
5
Land
Deep Water
Exclusive Economic Zone (EEZ)
170°W
12°S
Pago Pago
2004 HETA H1
2004 HETA H5
2001 WAKA H2
2001 WAKA H3
2002 WAKA H3
2003 DOVI H4
2004 HETA H4
N
km
0
100
200

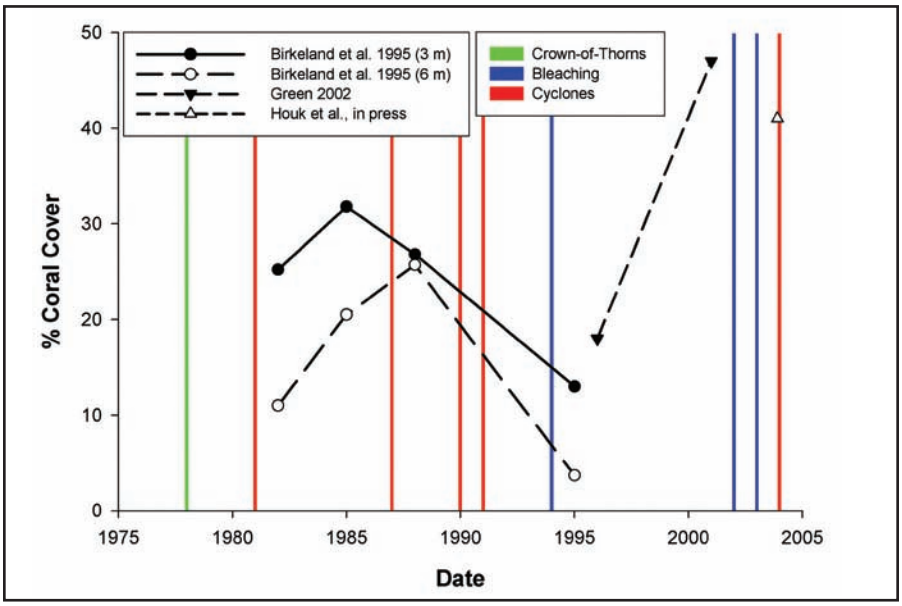

70000
60000
50000
40000
30000
20000
10000
0
Population
1900
1920
1940
1960
1980
2000
Date

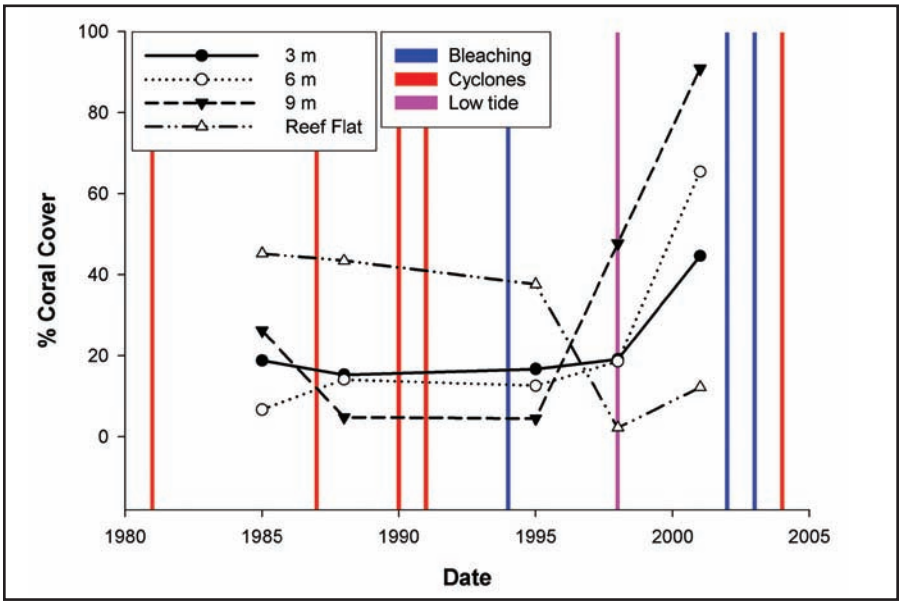

Tutuila
Pago Pago
Proposed
Marine Laboratory
Rose Island
Swains Island
Ofu
Olosega
Tau
km
Monitoring Locations
Proposed
From Birkeland et al. 2001
Water Quality Buoys
REA sites
Bleaching Monitoring
Transects
Towboard Lines
City
National Park of American Samoa
Fagatele Bay NMS
Land
Water <20 m
Deep Water

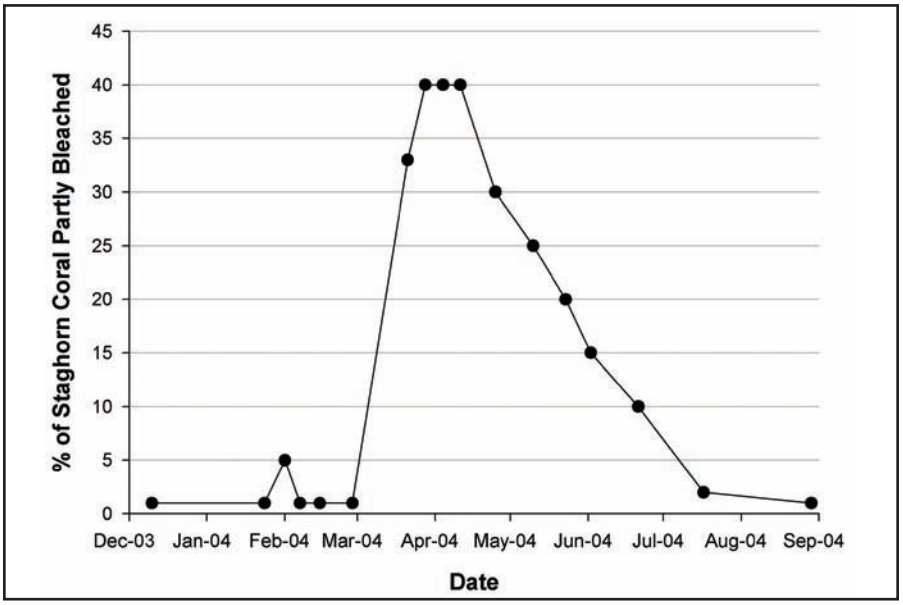

Inner Harbor
tuna discharge ends
Chlorophyll a
Total nitrogen
Total phosphorous
ND Data gaps
Chlorophyll a (ug/l) &
Total Phosphorous (mg/l)
Total Nitrogen (mg/l)
0.10
0.08
0.06
0.04
0.02
0.00
1.0
0.8
0.6
0.4
0.2
0.0
ND ND
ND ND ND
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
Date

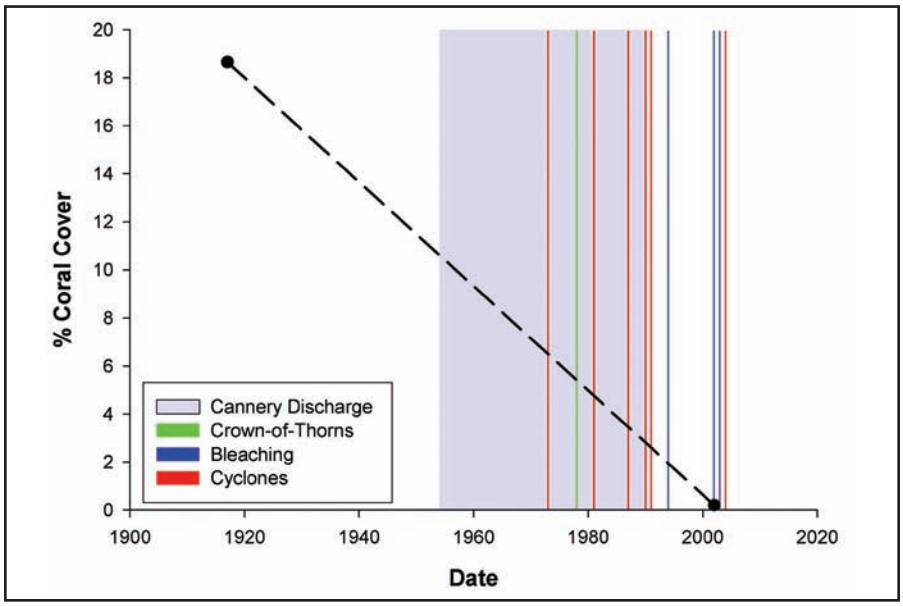

No. of Beaches Exceeding ASWQS
16
14
12
10
8
6
4
2
0
Jan-03
Feb-03
Mar-03
Apr-03
May-03
Jun-03
Jul-03
Aug-03
Sep-03
Oct-03
Nov-03
Dec-03
Jan-04
Sampling Date

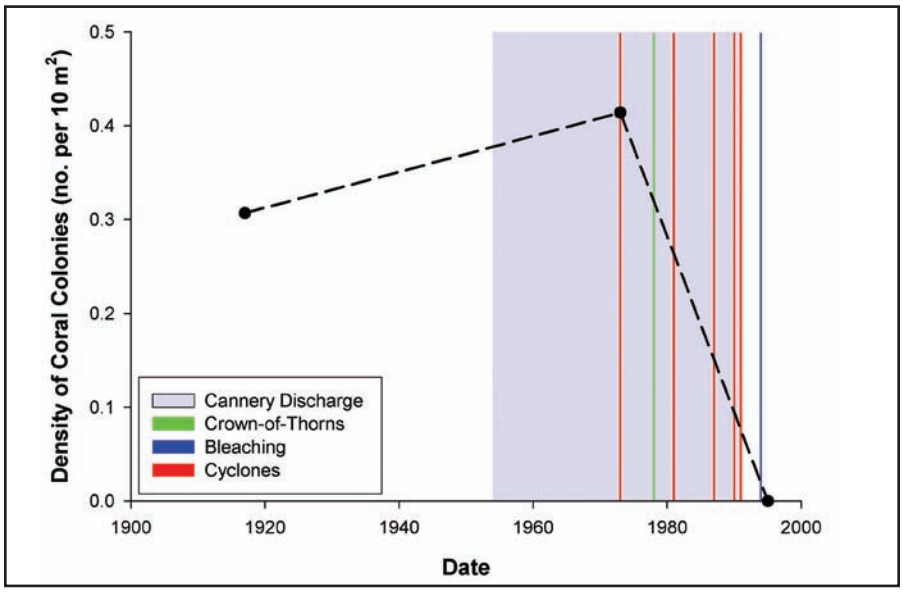

Density of Coral Colonies (no. per m²)
8
7
6
5
4
3
2
1
0
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
Date
Cannery Discharge
Crown-of-Thorns
Bleaching
Cyclones

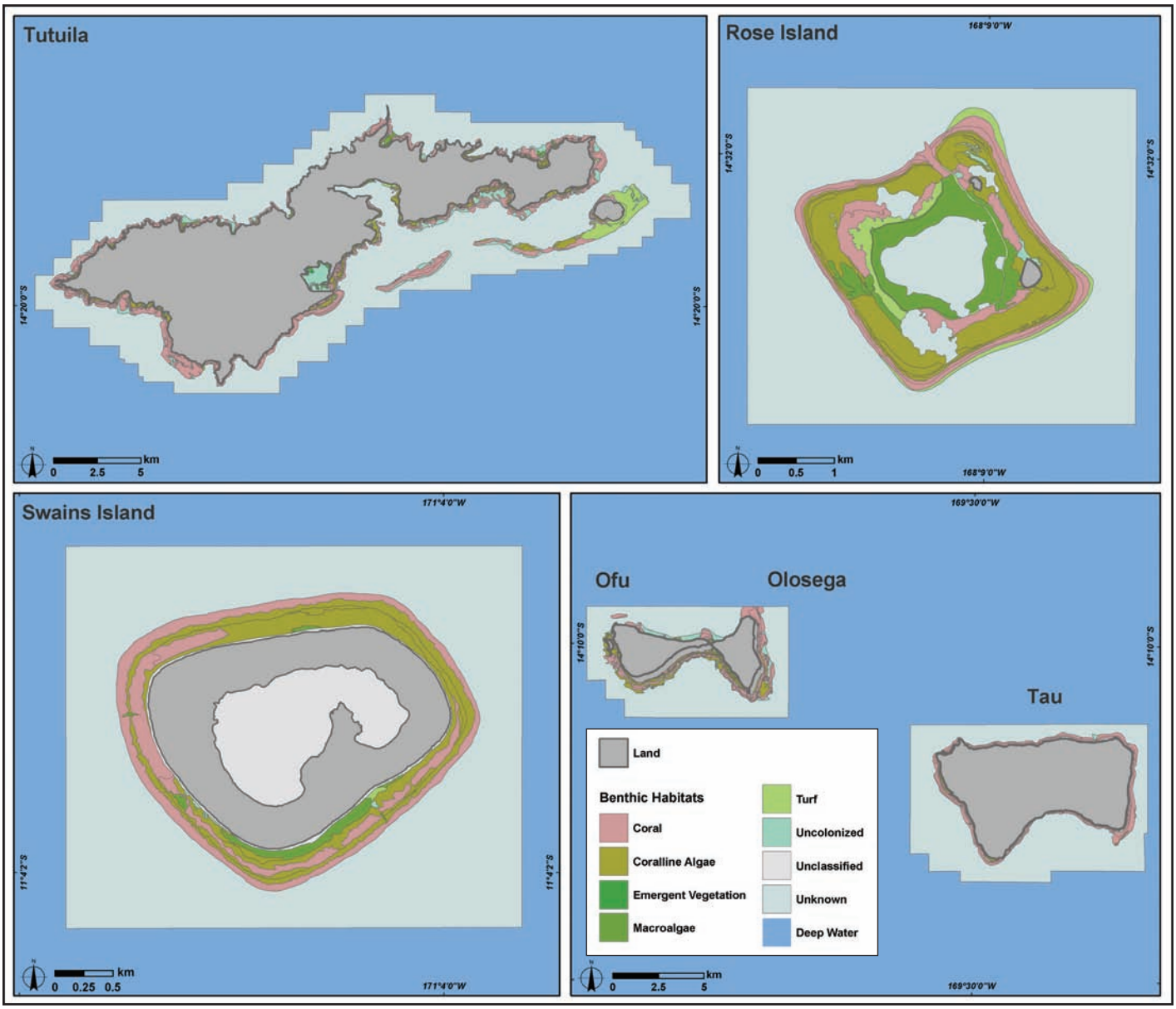

Birkeland et al. 1995 (3 m)
Birkeland et al. 1995 (6 m)
Green 2002
Houk et al., in press
Crown-of-Thorns
Bleaching
Cyclones
% Coral Cover
Date
0
10
20
30
40
50
1975
1980
1985
1990
1995
2000
2005

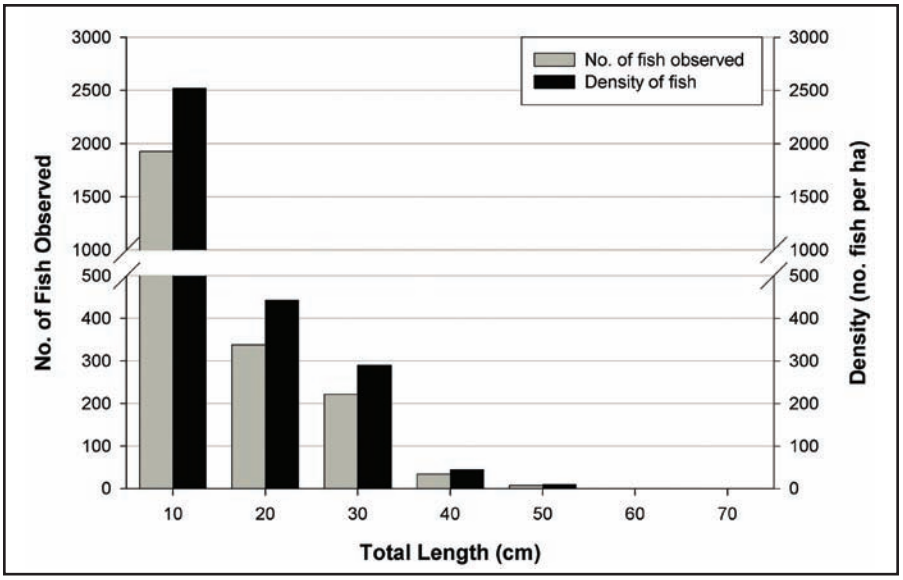

3 m
6 m
9 m
Reef Flat
Bleaching
Cyclones
Low tide
% Coral Cover
Date
0
20
40
60
80
100
1980
1985
1990
1995
2000
2005

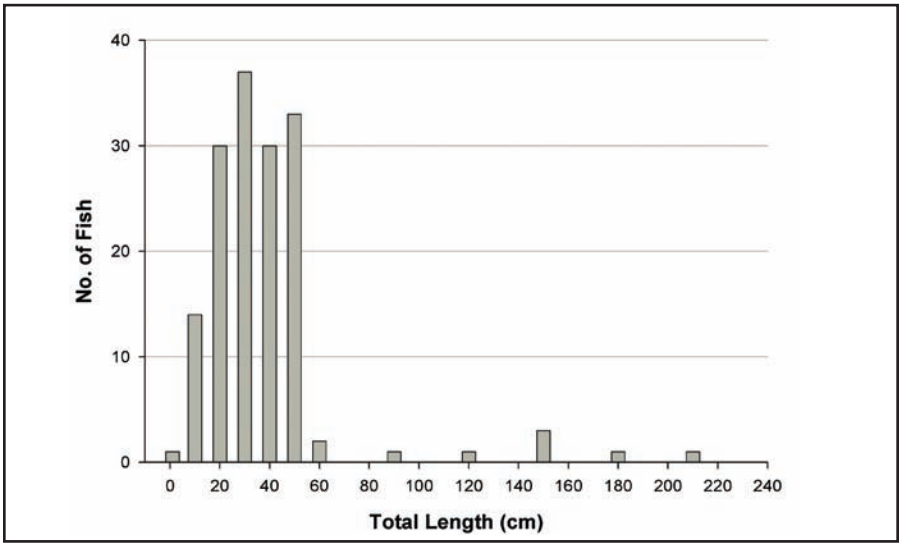

% of Staghorn Coral Partly Bleached
45
40
35
30
25
20
15
10
5
0
Dec-03
Jan-04
Feb-04
Mar-04
Apr-04
May-04
Jun-04
Jul-04
Aug-04
Sep-04
Date

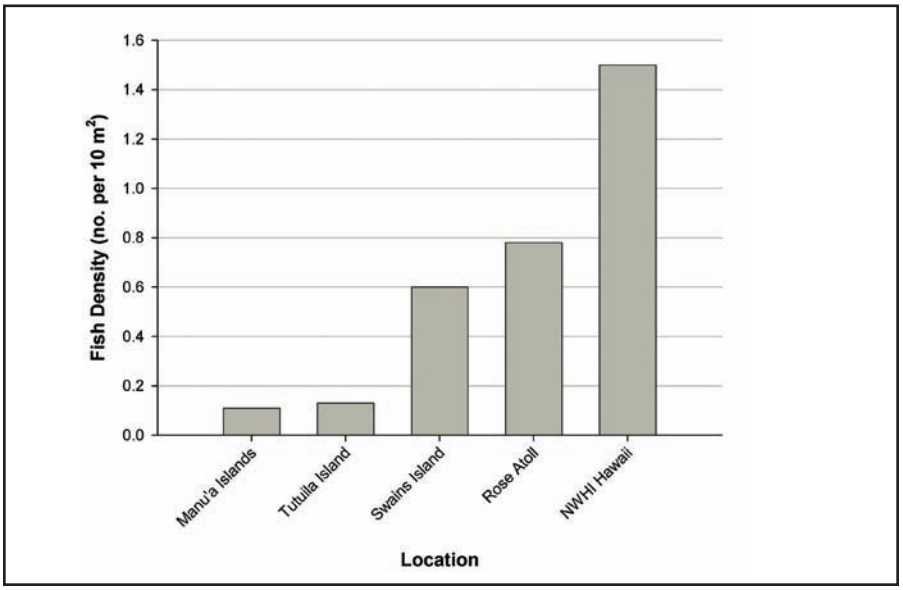

% Coral Cover
Date
Cannery Discharge
Crown-of-Thorns
Bleaching
Cyclones
0
2
4
6
8
10
12
14
16
18
20
1900
1920
1940
1960
1980
2000
2020

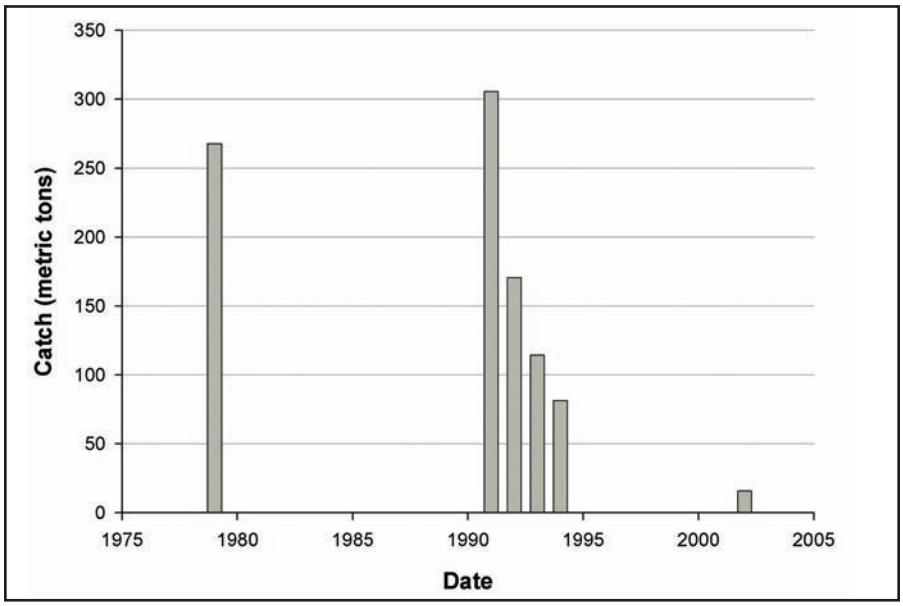

Density of Coral Colonies (no. per 10 m²)
Date
Cannery Discharge
Crown-of-Thorns
Bleaching
Cyclones
0.0
0.1
0.2
0.3
0.4
0.5
1900
1920
1940
1960
1980
2000

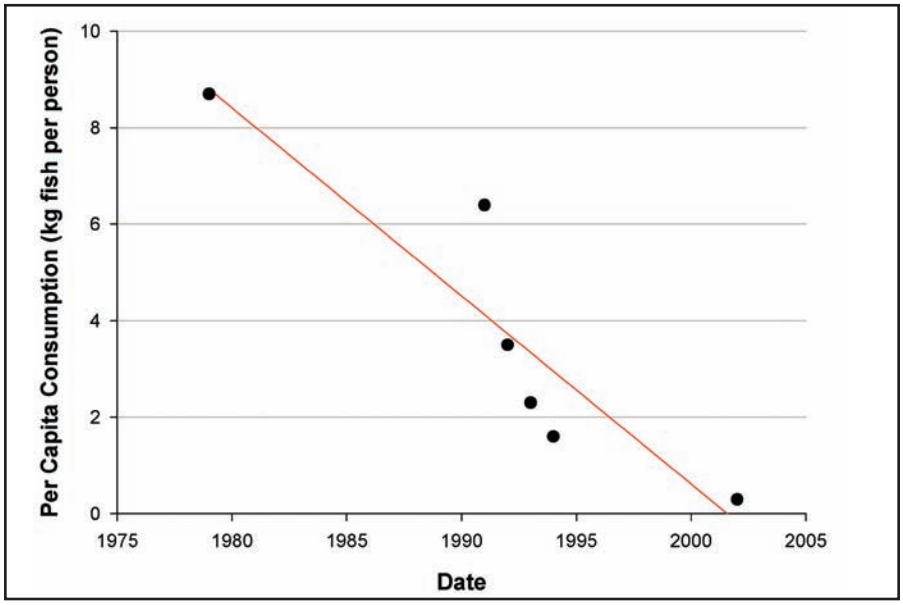

Tutuila
14°20'0"S
14°20'0"S
0 2.5 5 km
Rose Island
168°9'0"W
14°32'0"S
14°32'0"S
0 0.5 1 km
168°9'0"W
Swains Island
171°4'0"W
11°4'2"S
11°4'2"S
0 0.25 0.5 km
171°4'0"W
169°30'0"W
Ofu
Olosega
14°10'0"S
14°10'0"S
Tau
Land
Benthic Habitats
Coral
Coralline Algae
Emergent Vegetation
Macroalgae
Turf
Uncolonized
Unclassified
Unknown
Deep Water
0 2.5 5 km
169°30'0"W

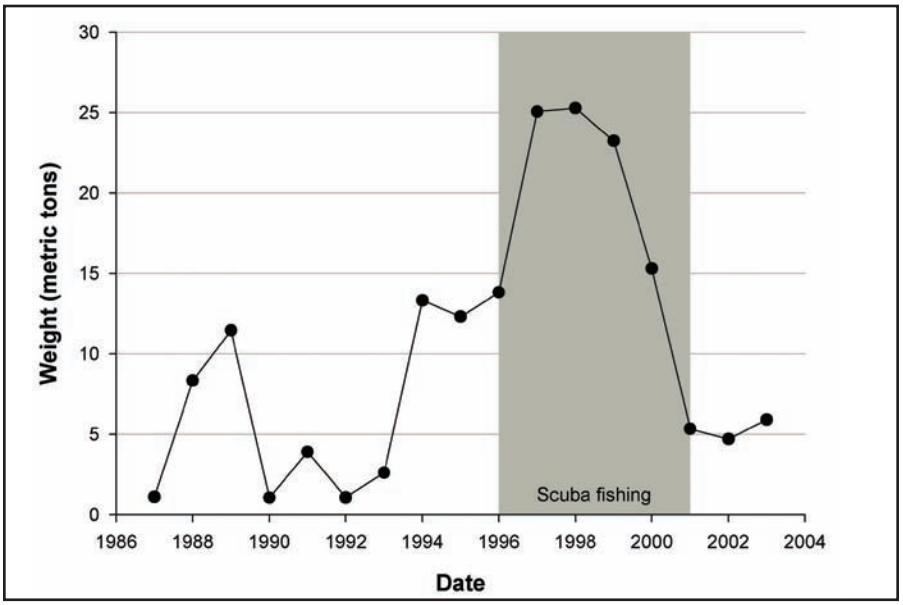

No. of fish observed
Density of fish
No. of Fish Observed
Density (no. fish per ha)
Total Length (cm)

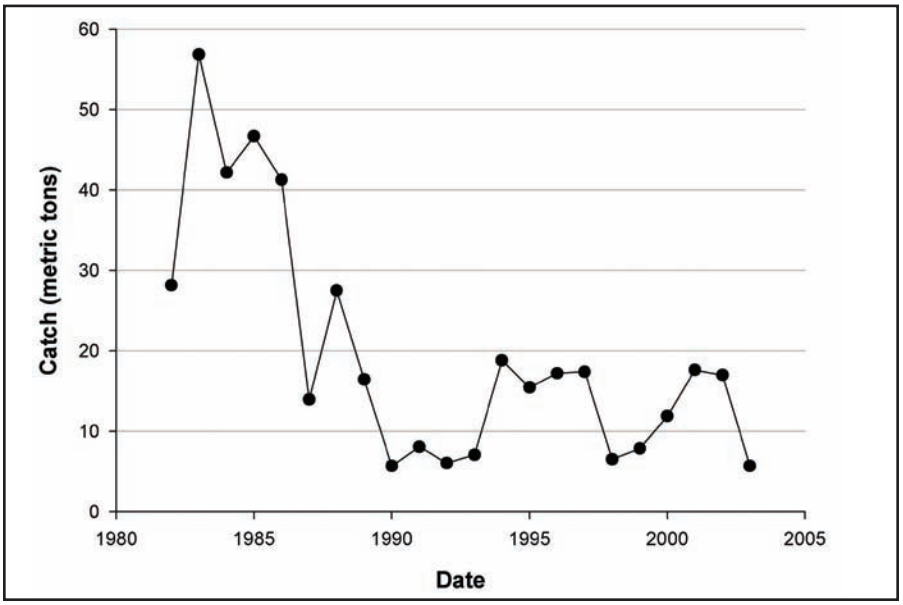

No. of Fish
Total Length (cm)


Fish Density (no. per 10 m²)
Manu'a Islands
Tutuila Island
Swains Island
Rose Atoll
NWHI Hawaii
Location


Catch (metric tons)
350
300
250
200
150
100
50
0
1975
1980
1985
1990
1995
2000
2005
Date


Per Capita Consumption (kg fish per person)
10
8
6
4
2
0
1975
1980
1985
1990
1995
2000
2005
Date


Weight (metric tons)
30
25
20
15
10
5
0
Scuba fishing
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
Date


Catch (metric tons)
60
50
40
30
20
10
0
1980
1985
1990
1995
2000
2005
Date