Campsite Monitoring in Grand Canyon

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And
GCMRC, NPS, Nams, etc…

History of Campsite Monitoring

Weeden et al (1975), F. Yates Borden (1976)

Brian and Thomas (1984)

Kearsley et al. (1991 to 1997)

Grand Canyon River Trip Simulator (1998 to 1999)

GCRG Adopt A Beach (1996 to present)

Kaplinski et al. (1998 to 2003)

Harmer Weeden et al. (1975)

June 16-19, 1973 Air Photos, plus U2 photos (unknown date)!

area-based estimates of capacity (#'s of people)

336 campsites identified

169 visited – ground truth photointerp., topography, human impacts, 35mm slides, veg. mapping, mooring, bathing safety, pit toilet effects, etc.

Comprehensive analysis of camping beaches

ledge camps not included

Brian and Thomas (1984)

Post 1983 high flows

438 camps identified

Float by assessment of camp size (small, medium, large)

Included ledge camps, some camps not identified by Weeden (77 camps)

Some camps identified by Weeden were not actually used as camps!

Kearsley et al. (1991 to 1997)

Kearsley, L.H., and K. Warren, (1993)
Kearsley, L. H., J. C. Schmidt, and K. D. Warren, (1994),
Kearsley, L.H., (1995),
Kearsley, L. H. and Quartoroli, R., (1997)

Inventory and area measurements in 1991, 1994, 1996

226 campsites in 1991

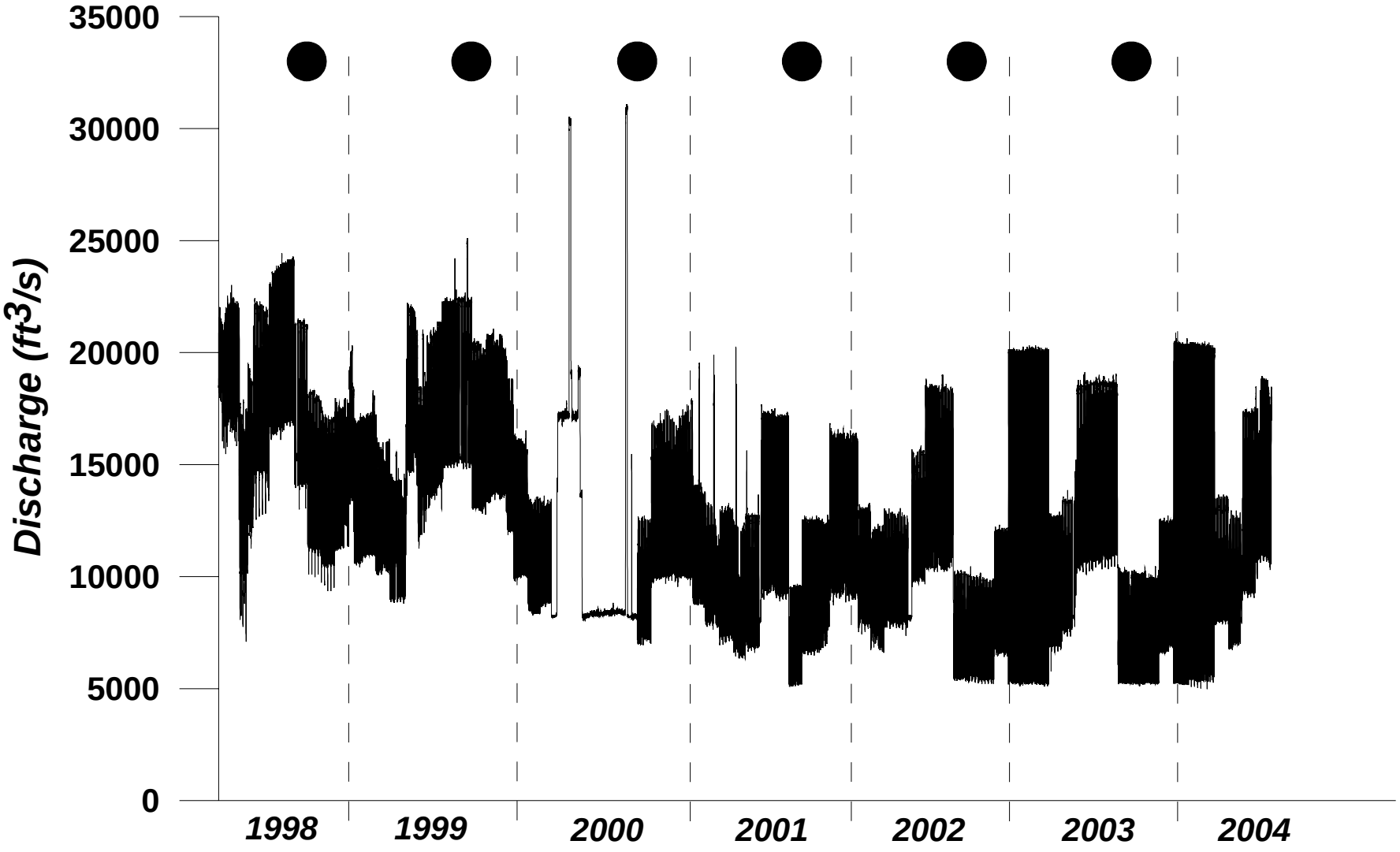
9% loss of campsite area from 1991 to 1994

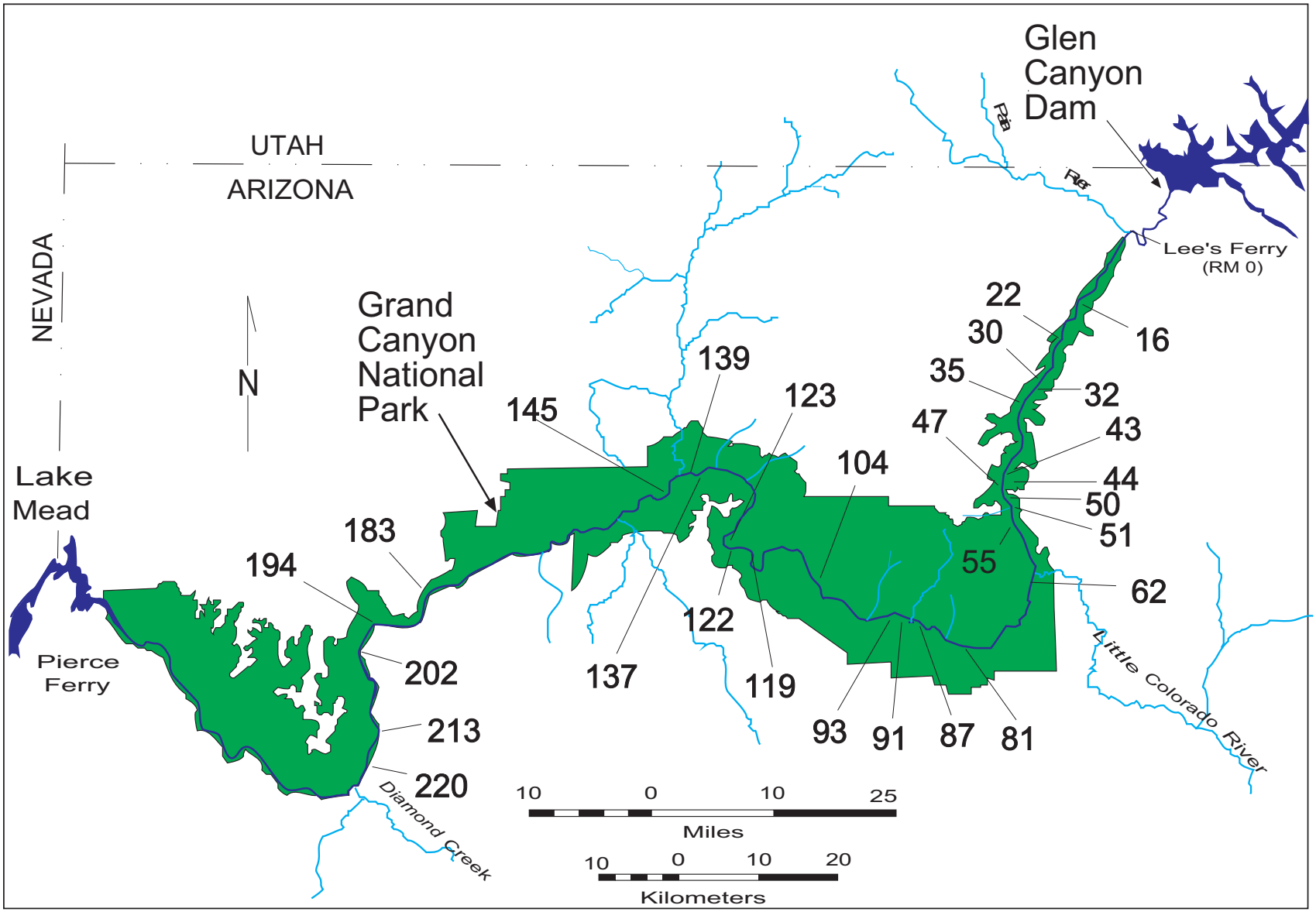
218 pre-1996 flood

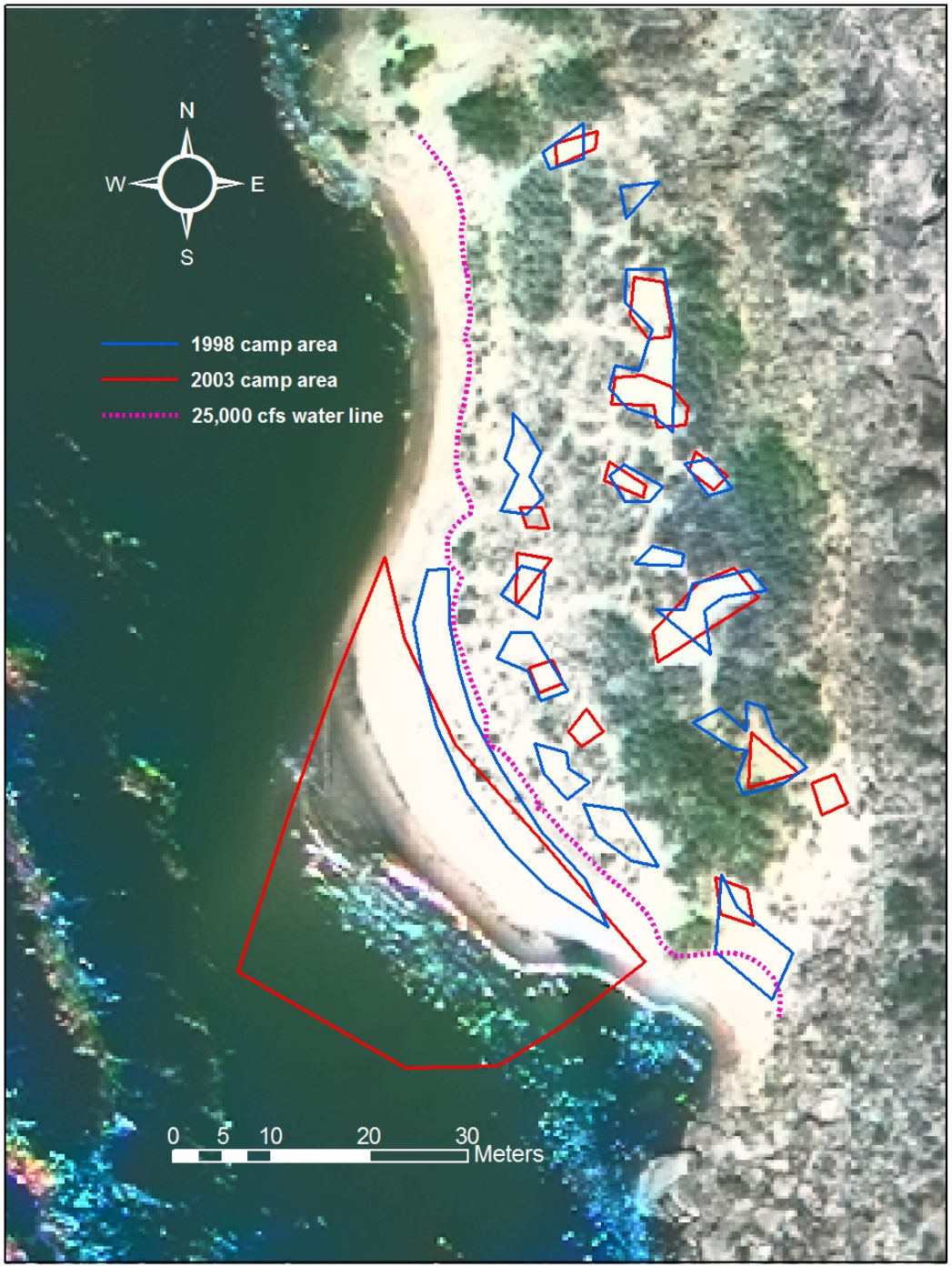
301 post-1996

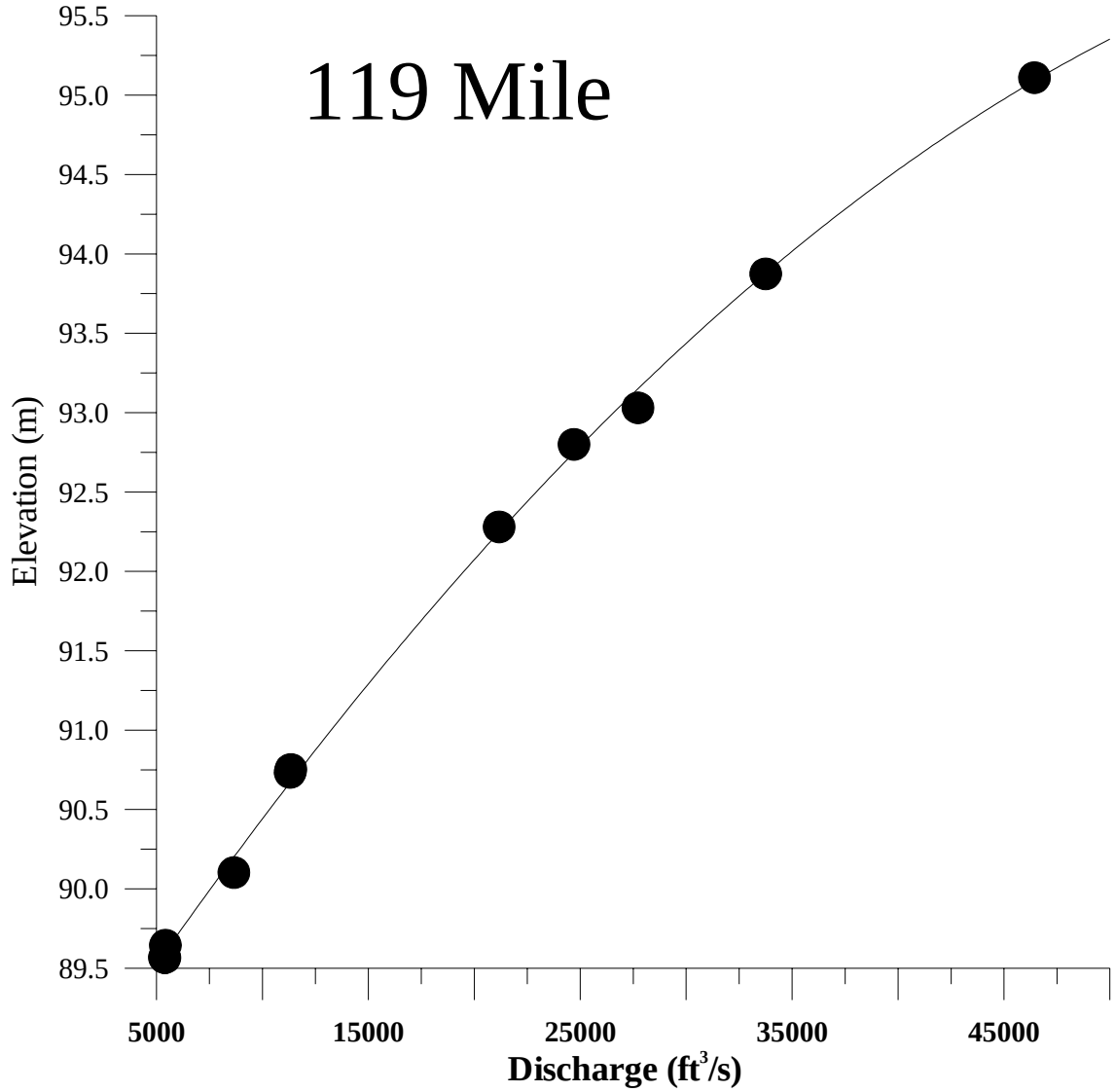
57% increase in camp area at measured sites

NAMDOR

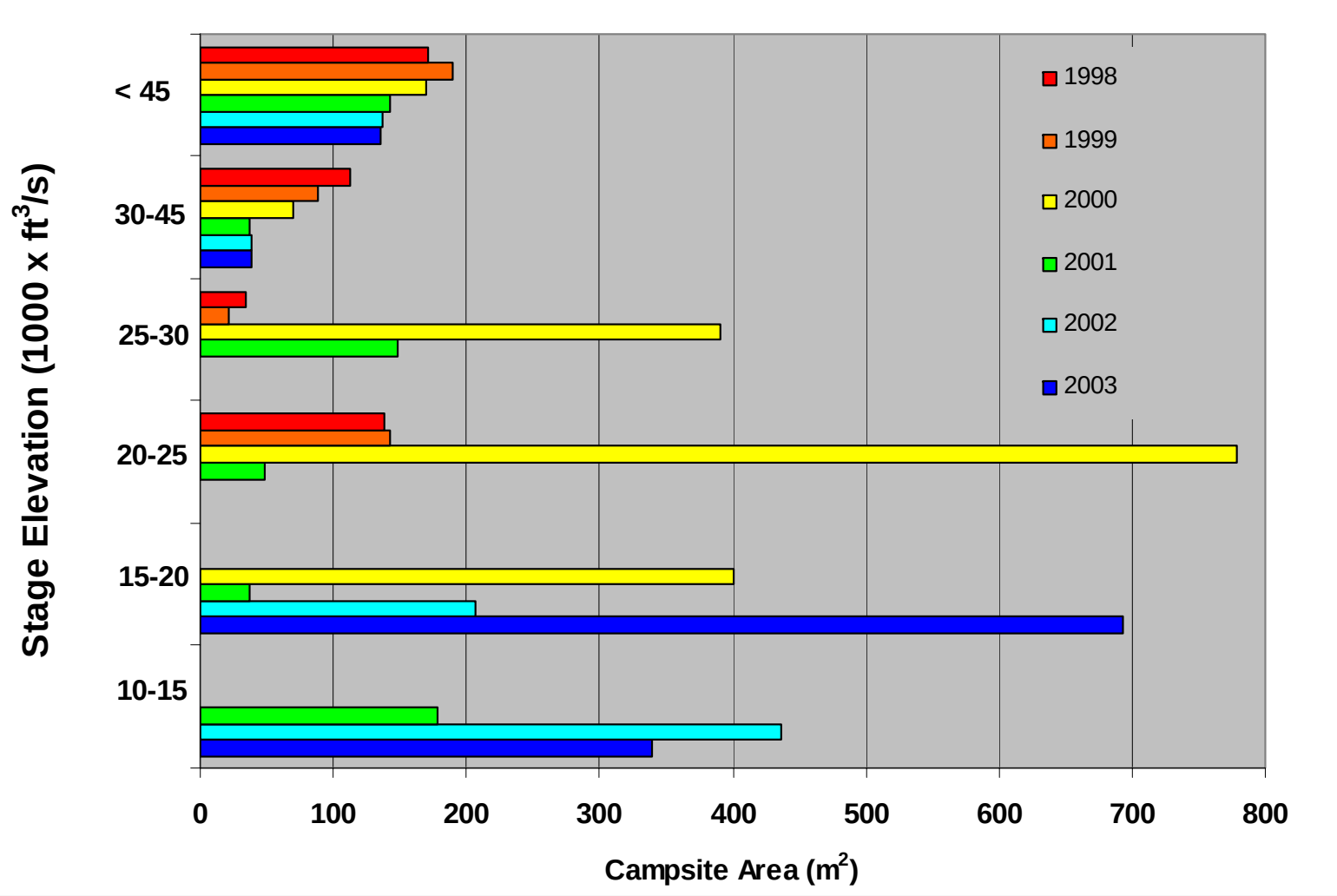

35000
30000
25000
20000
15000
10000
5000
0
Discharge (ft3/s)
1998
1999
2000
2001
2002
2003
2004


Glen
Canyon
Dam
UTAH
ARIZONA
NEVADA
N
Lee's Ferry
(RM 0)
Grand
Canyon
National
Park
Lake
Mead
Pierce
Ferry
Diamond Creek
Little Colorado River
16
22
30
32
35
43
44
47
50
51
55
62
81
87
91
93
104
119
122
123
137
139
145
183
194
202
213
220
10 0 10 25
Miles
10 0 10 20
Kilometers

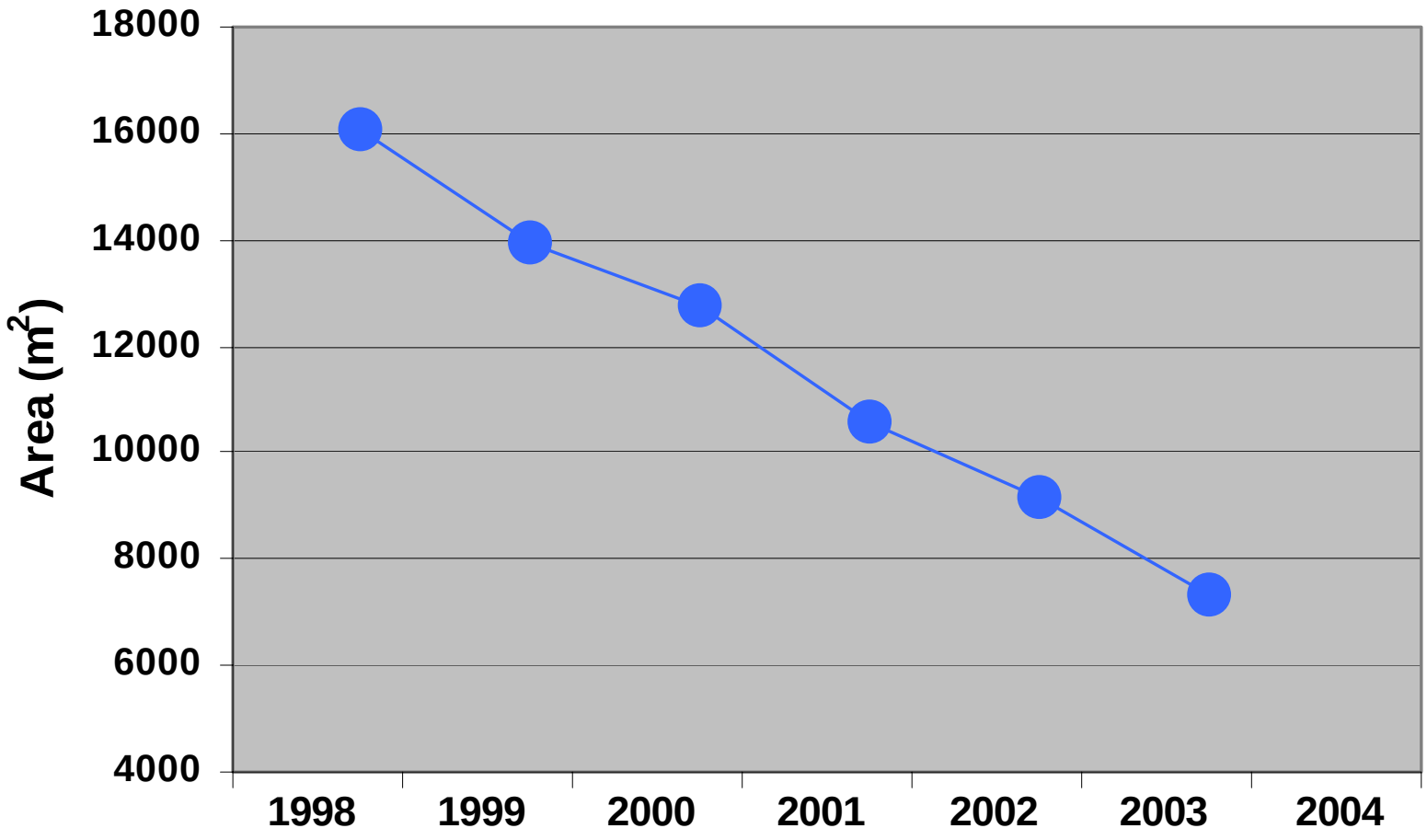

N
W
E
S
1998 camp area
2003 camp area
25,000 cfs water line
0 5 10 20 30
Meters

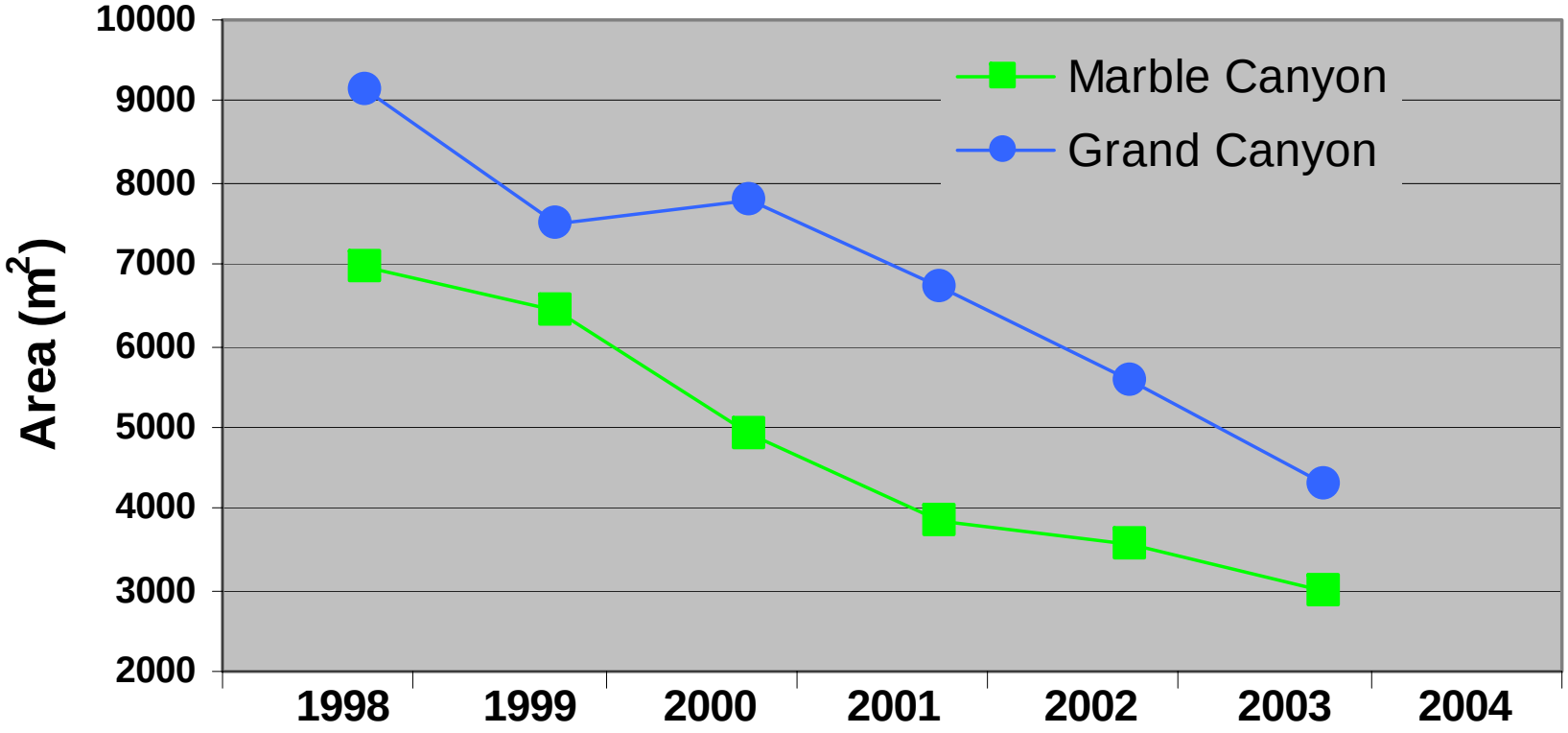

119 Mile
Elevation (m)
95.5
95.0
94.5
94.0
93.5
93.0
92.5
92.0
91.5
91.0
90.5
90.0
89.5
5000
15000
25000
35000
45000
Discharge (ft3/s)

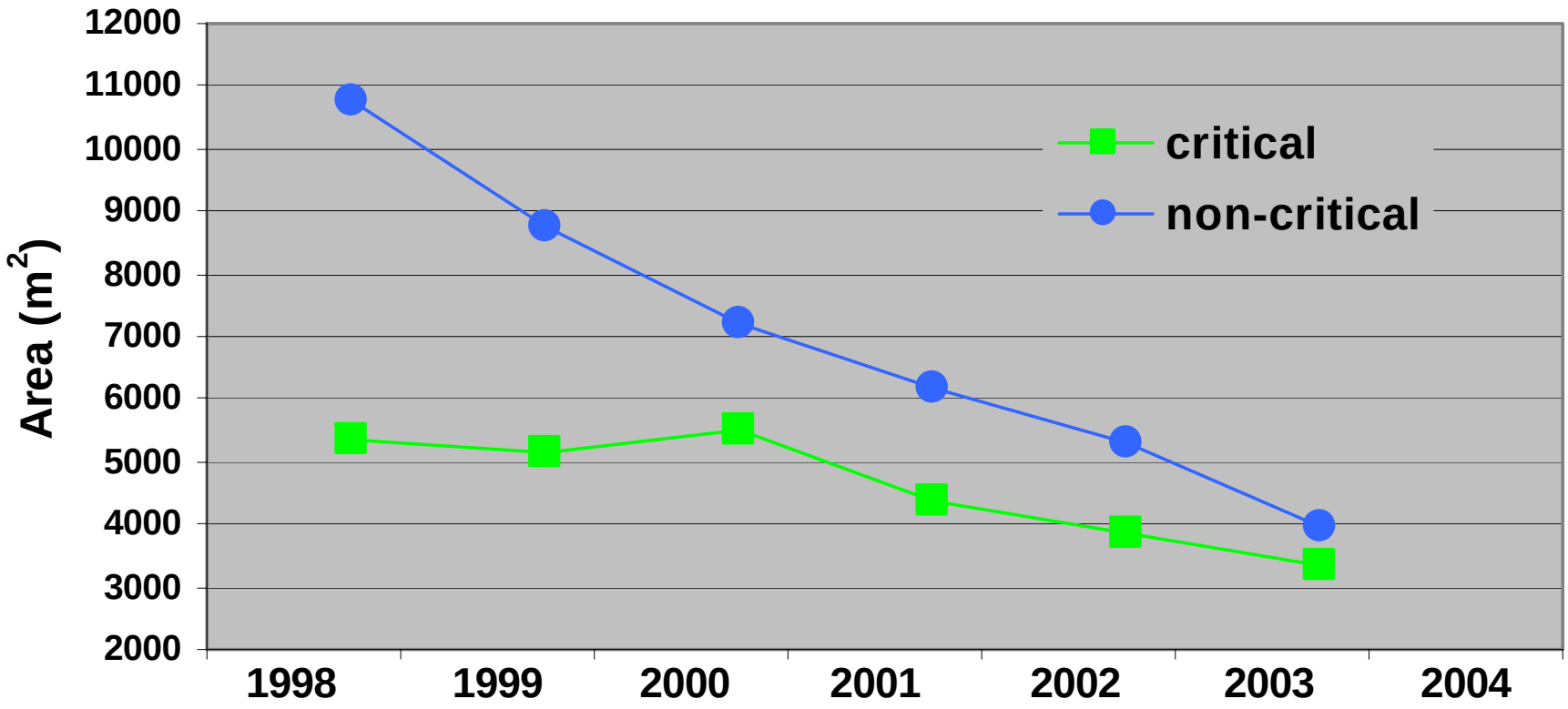
119 Mile

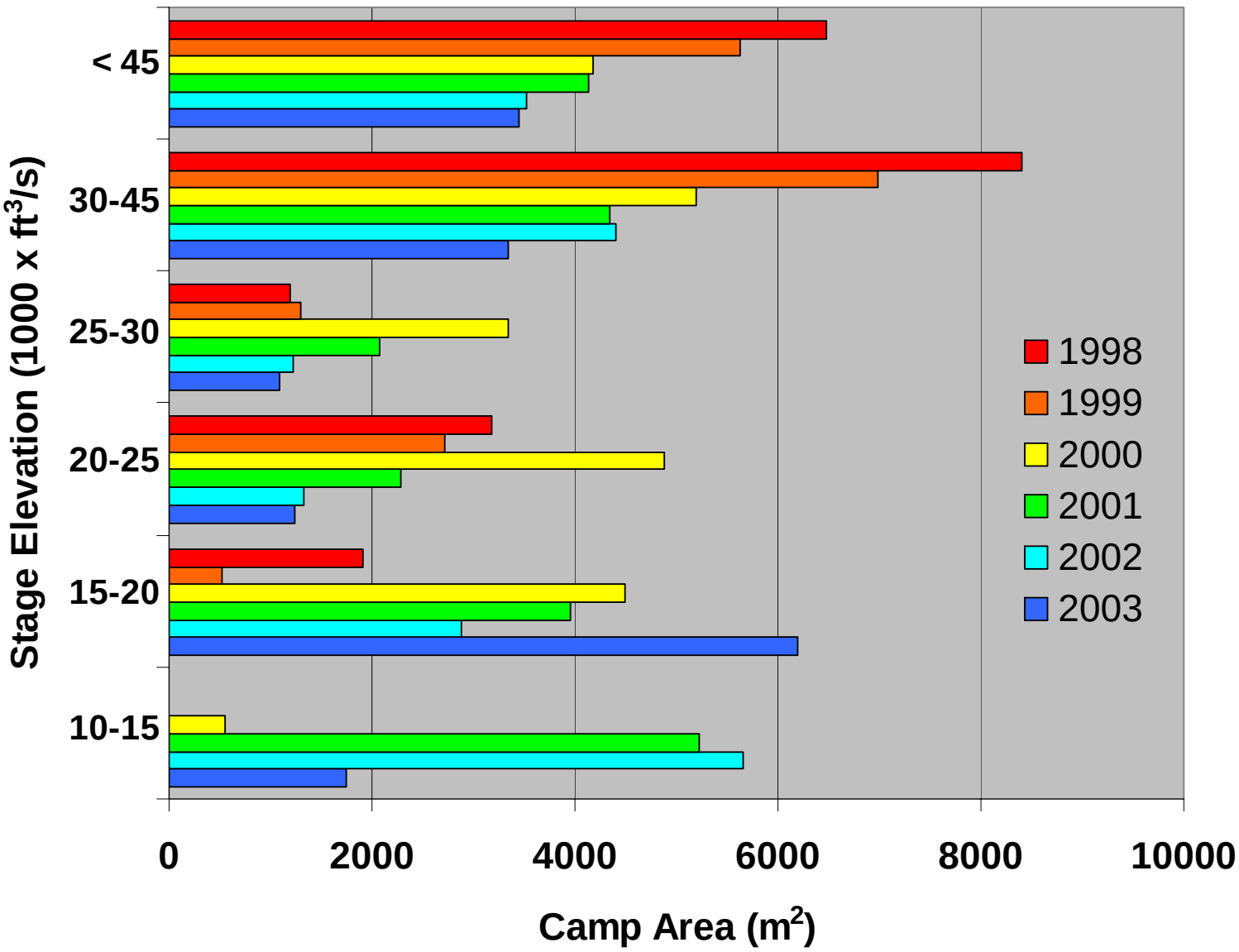

Stage Elevation (1000 x ft3/s)
< 45
30-45
25-30
20-25
15-20
10-15
0
100
200
300
400
500
600
700
800
Campsite Area (m2)
1998
1999
2000
2001
2002
2003

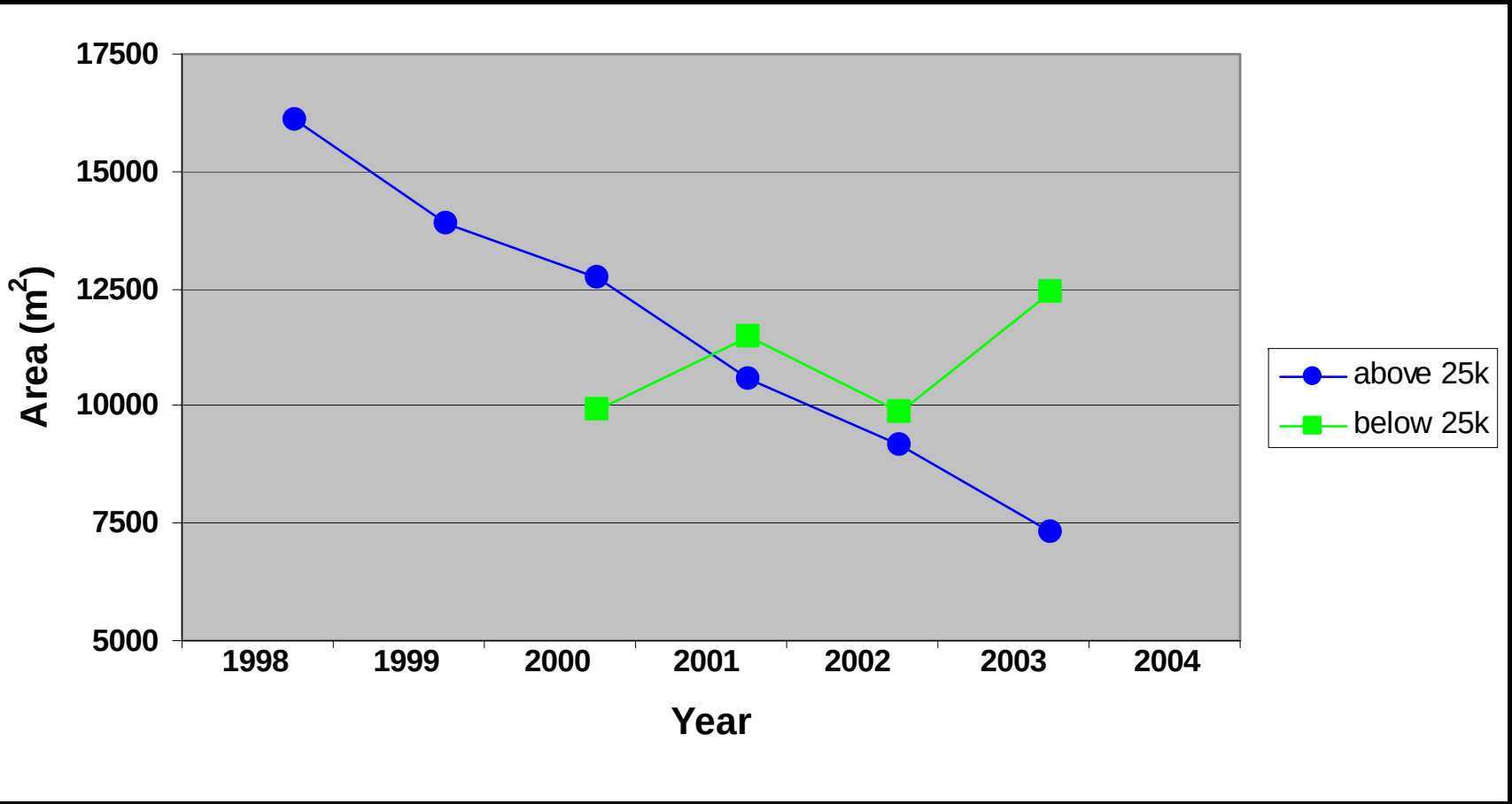
Total campsite area

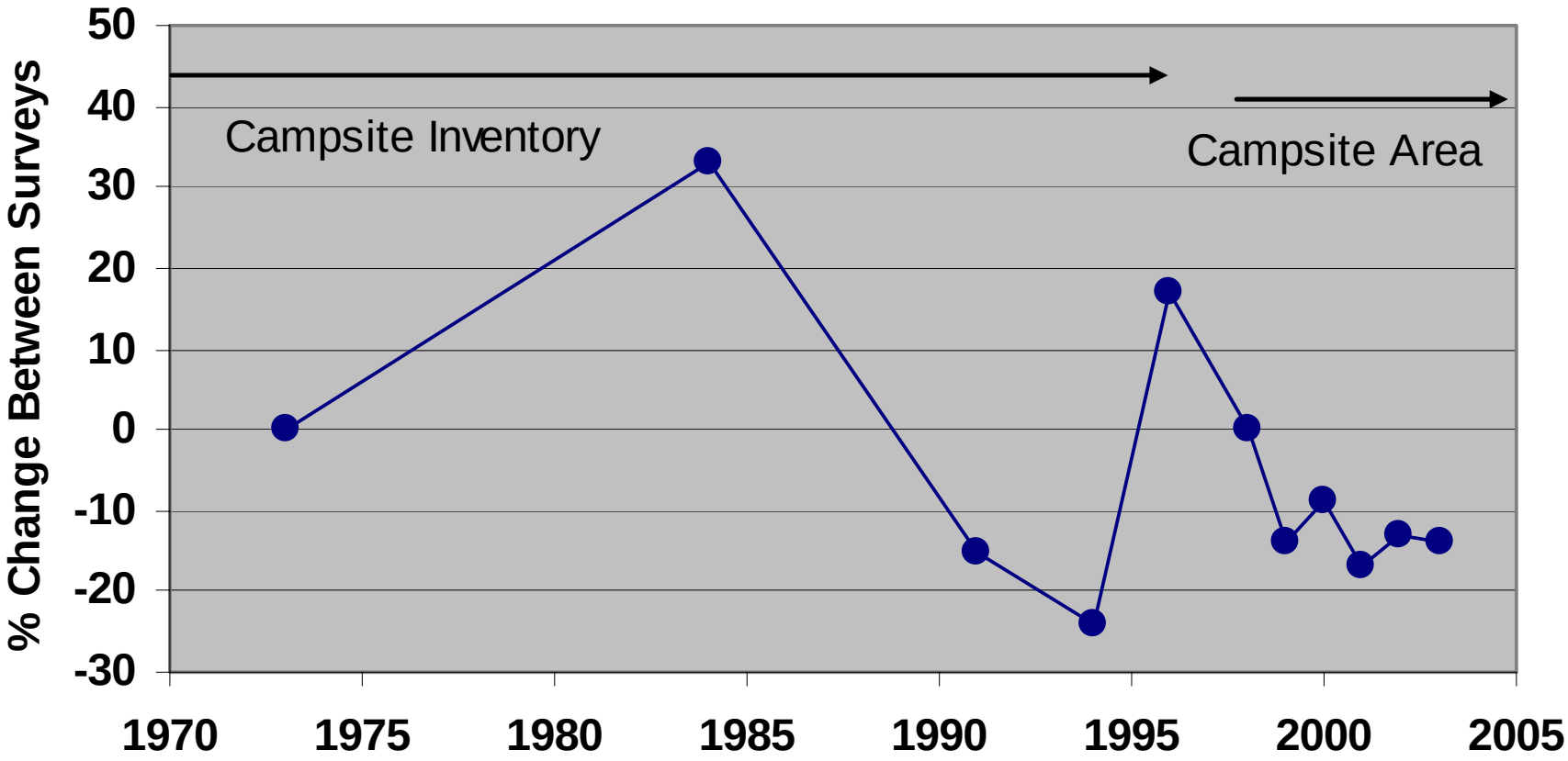


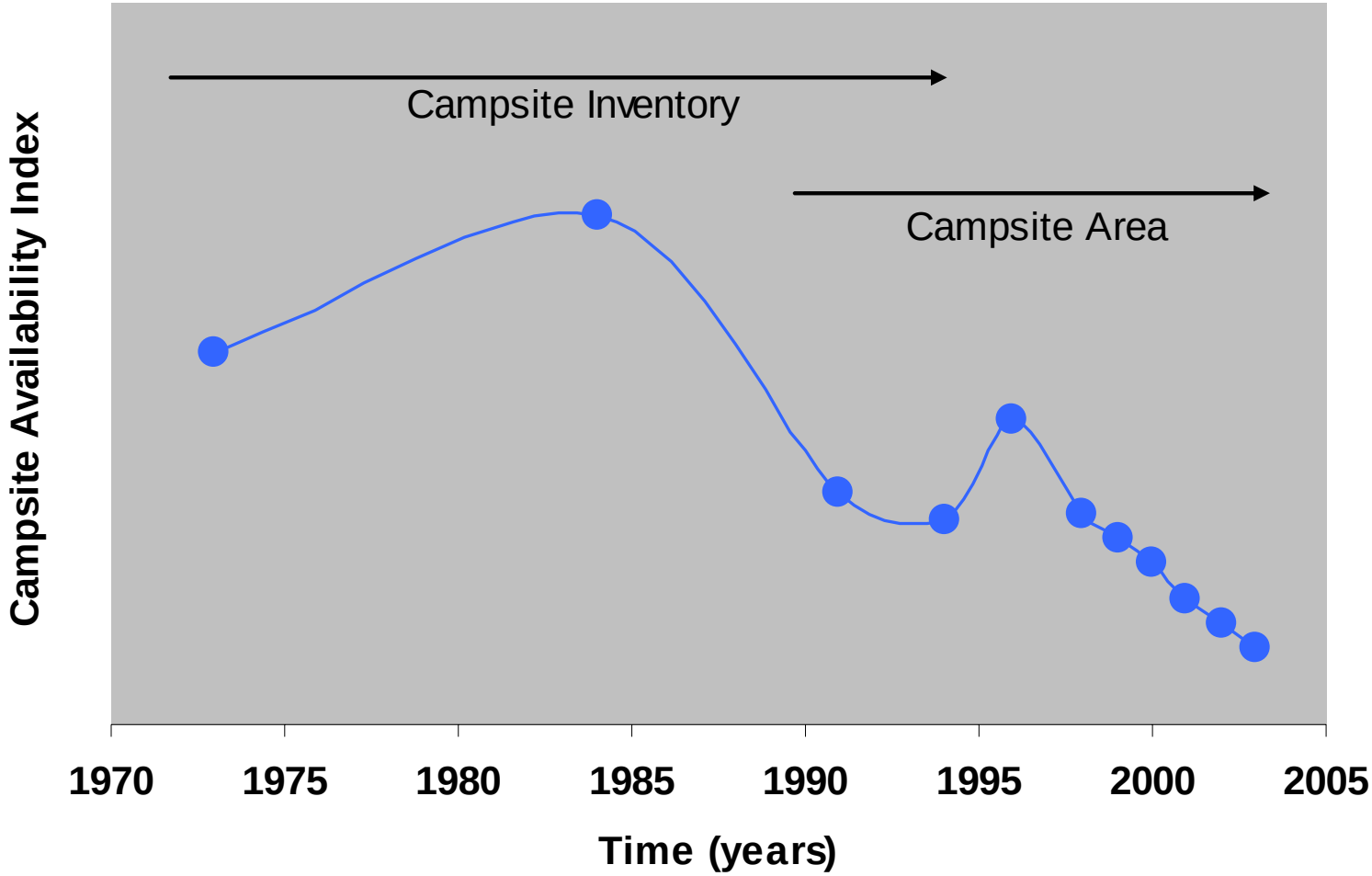

Area (m2)
10000
9000
8000
7000
6000
5000
4000
3000
2000
1998
1999
2000
2001
2002
2003
2004
Marble Canyon
Grand Canyon


12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
Area (m2)
1998
1999
2000
2001
2002
2003
2004
critical
non-critical


Stage Elevation (1000 x ft3/s)
< 45
30-45
25-30
20-25
15-20
10-15
0
2000
4000
6000
8000
10000
Camp Area (m2)
1998
1999
2000
2001
2002
2003


17500
15000
12500
10000
7500
5000
Area (m2)
1998
1999
2000
2001
2002
2003
2004
Year
above 25k
below 25k


% Change Between Surveys
50
40
30
20
10
0
-10
-20
-30
1970
1975
1980
1985
1990
1995
2000
2005
Campsite Inventory
Campsite Area


Campsite Inventory
Campsite Area
Campsite Availability Index
1970
1975
1980
1985
1990
1995
2000
2005
Time (years)

Recommendations for Future Campsite Monitoring

1. Campsite Area should be collected using total station or orthophoto methods.

2. Conduct a comprehensive Inventory of all campsites within the CRE.

3. Develop an estimate of visitor capacity within the CRE.

4. Develop an integrated long-term monitoring program for measuring campsite area and visitor capacity within the CRE.

5. Convene an expert panel to begin the development of a LTMP and discuss managerial and institutional issues. (PEP ?)