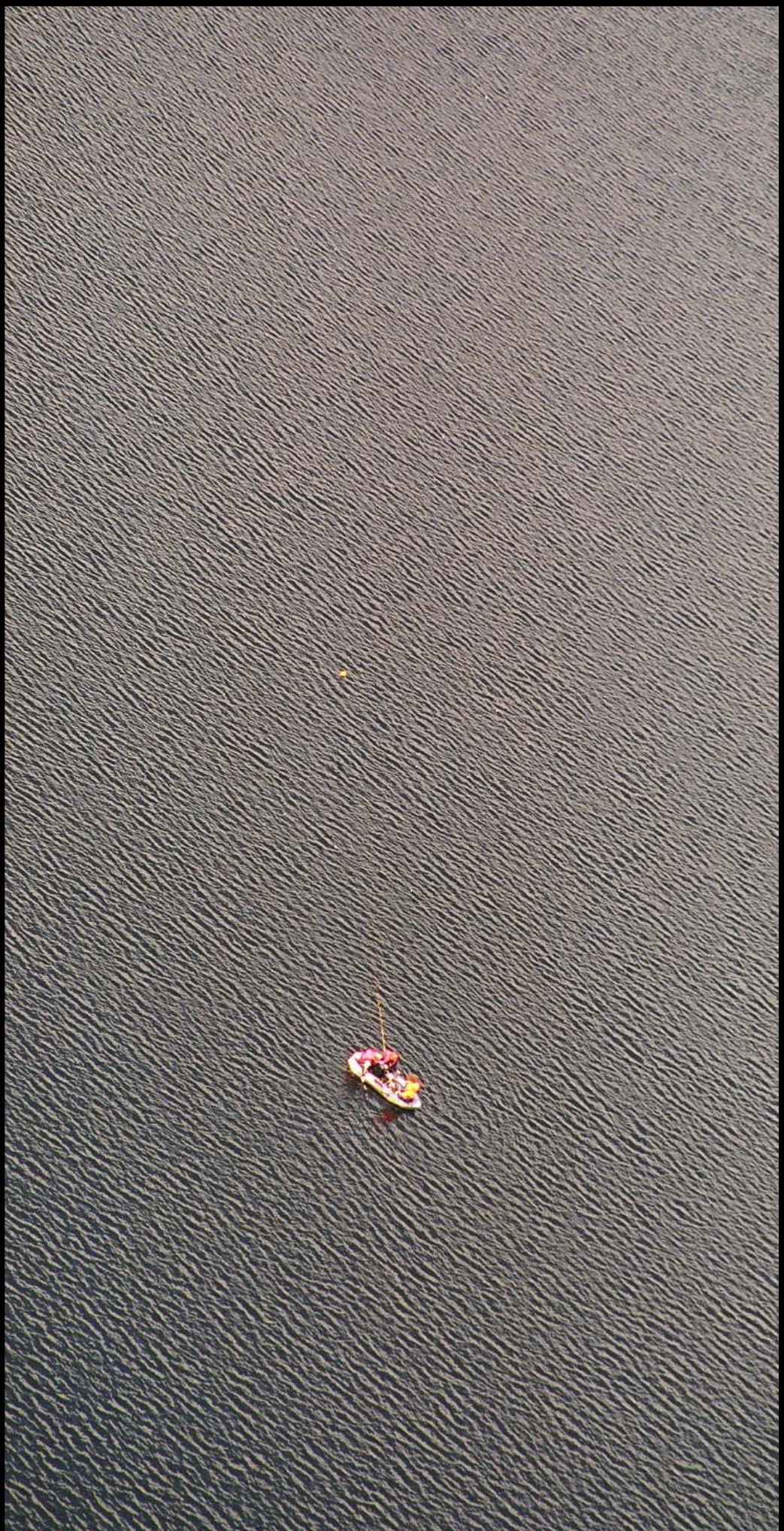

THE UNITED KINGDOM ACID WATERS MONITORING NETWORK

DATA REPORT FOR 2002 – 2003 (YEAR 15)

THE UNITED KINGDOM ACID WATERS MONITORING NETWORK

DATA REPORT FOR 2002 – 2003 (YEAR 15)

Report to the Department for Environment, Food and Rural Affairs
(Contract EPG 1/3/160)
and the Department of the Environment Northern Ireland
(Contract CON 4/4 (38))

2003

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INTRODUCTION

The UK Acid Waters Monitoring Network (UKAWMN) has been in continuous operation since 1988. For the first ten years biological and chemical data were summarised in an annual series of printed reports and these were followed by a detailed analysis of data in an interpretative report (Monteith and Evans, 2000), which is available on the UKAWMN web page. From the year 2000 annual data reports have been available from the UKAWMN web page. These are of a similar format to earlier annual reports but focus on graphical representations of time trends in raw data and diagnostic statistics (e.g. species richness and diversity indices). An analytical report, providing an interpretation of the first 15 years of data will be completed and made available on the project web page in the near future. A full description of sampling methods and analytical procedures, together with site descriptions, is presented in Patrick *et al.* (1991).

THE MONITORING NETWORK

The UKAWMN, funded by the UK Department of the Environment, originally consisted of 10 stream sites and 10 lakes, situated in those parts of the country most susceptible to acidification (see map, page 14). In 1990, two additional sites, Blue Lough and Coneyglen Burn, were added to the Network with funding from the Department of Environment (Northern Ireland). In January 1991 site 18, the Nant y Gronwen, was withdrawn from the Network at the request of the landowner and was replaced by a nearby moorland stream, the Afon Gwy. Due to water abstraction and damming by a local fish farm at site 1, Coire nan Arr, a nearby replacement control site has been chosen, site 23, named Loch Coire Fionnaraich. Data for this site will be included within the next annual report. Since 2001 the entire network has been funded by the UK Department of the Environment Food and Rural Affairs (DEFRA).

All sites are monitored chemically and biologically according to methodologies described by Patrick *et al*. (1991). Water samples are collected monthly at stream sites and quarterly at lake sites. Epilithic diatoms and benthic invertebrates are sampled annually. Aquatic macrophytes are surveyed bi-annually between June and September. Stream sites and the outflow streams of lake sites are electro-fished annually in the autumn.

In addition to the annual surveys, sediment cores were taken from all lake sites during the first five years of monitoring. These were radiometrically dated and analysed for diatoms, carbonaceous particles (derived from the combustion of fossil fuels) (Rose *et al.* 1995) and trace metals. Results of this work are presented in Patrick *et al.* (1995). Sediment traps have now been installed in all lakes and are emptied annually. The contents are analysed for diatom species composition and the flux of carbonaceous particles, allowing direct comparisons to be made with the historical (sediment core) record.

Water chemistry and macroinvertebrate sampling was prevented at several sites in the spring of 2001 by foot-and-mouth related access restrictions. Sampling was resumed across the Network in June 2001.

All chemical, physical and biological data are stored in a database managed by the Centre for Ecology and Hydrology and ENSIS. Summary data are available to scientific and other interested organisations on request. Further information on the UKAWMN, including site descriptions and photographs, is available via the Internet at the new address: http//www.ukawmn.ucl.ac.uk

DATA FORMAT

The chemical and biological data are presented in a series of sections, summarised below, on a site-by-site basis.

Section 1: Time series graphs of key spot sampled chemical determinands for individual samples.
Summary table for key chemical determinands including: the mean over the 1988-1993 baseline period; the mean for the current year (2001-2002), the standard deviation for the current year; the Seasonal Kendall (Hirsch *et al.*, 1982) slope estimate for the period 1988-2002; and, the Seasonal Kendall trend significance level (p) (we consider values of less the 0.05 as evidence for a significant temporal trend). The normal number of observations per year is 4 for lakes and 12 for streams.

Section 2: Macroinvertebrates. Time series of macroinvertebrate taxon % abundance in annual aggregated samples (5 kick samples from lake littoral habitats or from riffle areas in streams), and annual total number of individual animals. Some species occurring at less than 1% relative abundance are omitted.
Macroinvertebrate summary statistic time series:

1) total number of individuals;
2) number of individuals identified at Genus level only (excludes some ubiquitous groups such as the chironomids and oligochaetes);
3) total number of taxa;
4) Diversity Indices. Although we have observed a general between-site relationship between acidity and the total number of macroinvertebrate species found, it is difficult to predict how chemical recovery might influence measures of diversity at specific sites. However, trends in the diversity scores described below should provide an indication of directional changes in community structure.

a) Hill's N_1, the exponent of Shannon's Index and a measure of the number of abundant species in a sample (Hill, 1973).
b) Hill's N_2, the reciprocal of Simpson's Index and a measure of the number of very abundant species in a sample (Hill, 1973).
c) E_5, a measure of evenness based on the ratio $(N_2\text{-}1):(N_1\text{-}1)$. As a single species becomes more and more dominant, E_5 tends to zero.

Section 3: Salmonids. Summary histogram of mean density of trout and salmon, if present, in three 50m reaches (number of individuals caught per $100m^2$ survey area) for each year of the monitoring period. (0+ = new recruits, >0+ = all fish over one year of age).

Section 4: Epilithic diatoms. Time series of annual mean percentage frequency (from 3-4

replicate samples) of taxa occurring at greater than 2 % abundance in any one sample.

Epilithic diatom summary statistic time series. Mean, maximum and minimum for:

a) Hill's N_1 (see above)
b) Hill's N_2 (see above)
c) E_5 (see above)
d) Diatom inferred pH (Di pH), based on the weighted average of species pH optima in the surface sediments of the 167 lake Surface Water Acidification Project dataset (Stevenson *et al*. 1991).

pH reconstructions are intended only for application to sedimentary diatoms but directional trends in inferred pH of epilithic assemblages should provide an indication of the direction of a response to changing acidity.

Section 5: Aquatic macrophytes. For lakes relative species abundance was determined on a five point scale (comparable to the DAFOR scoring system, Palmer *et al*. 1992) following shoreline survey, shore transects and deep water grapnel trawls, as follows:

1. rare/infrequent
2. occasional but not abundant
3. widespread but not abundant
4. locally abundant
5. widespread and abundant

For streams, total macrophyte cover was estimated for 5m sections of a 50m survey stretch and each was then partitioned into proportional species abundance to provide percentage cover for each species. Data analysed for this report are the mean species cover estimates for the 50m stretches.

Section 6: For lake sites only. Histogram of diatom species composition and carbonaceous particle flux estimated from annually retrieved sediment traps. Species occurring at less than 1% abundance in all years are omitted. Carbonaceous particle flux data presented in units of number of particles accumulated per trap (uniform trap size for all sites) per day.

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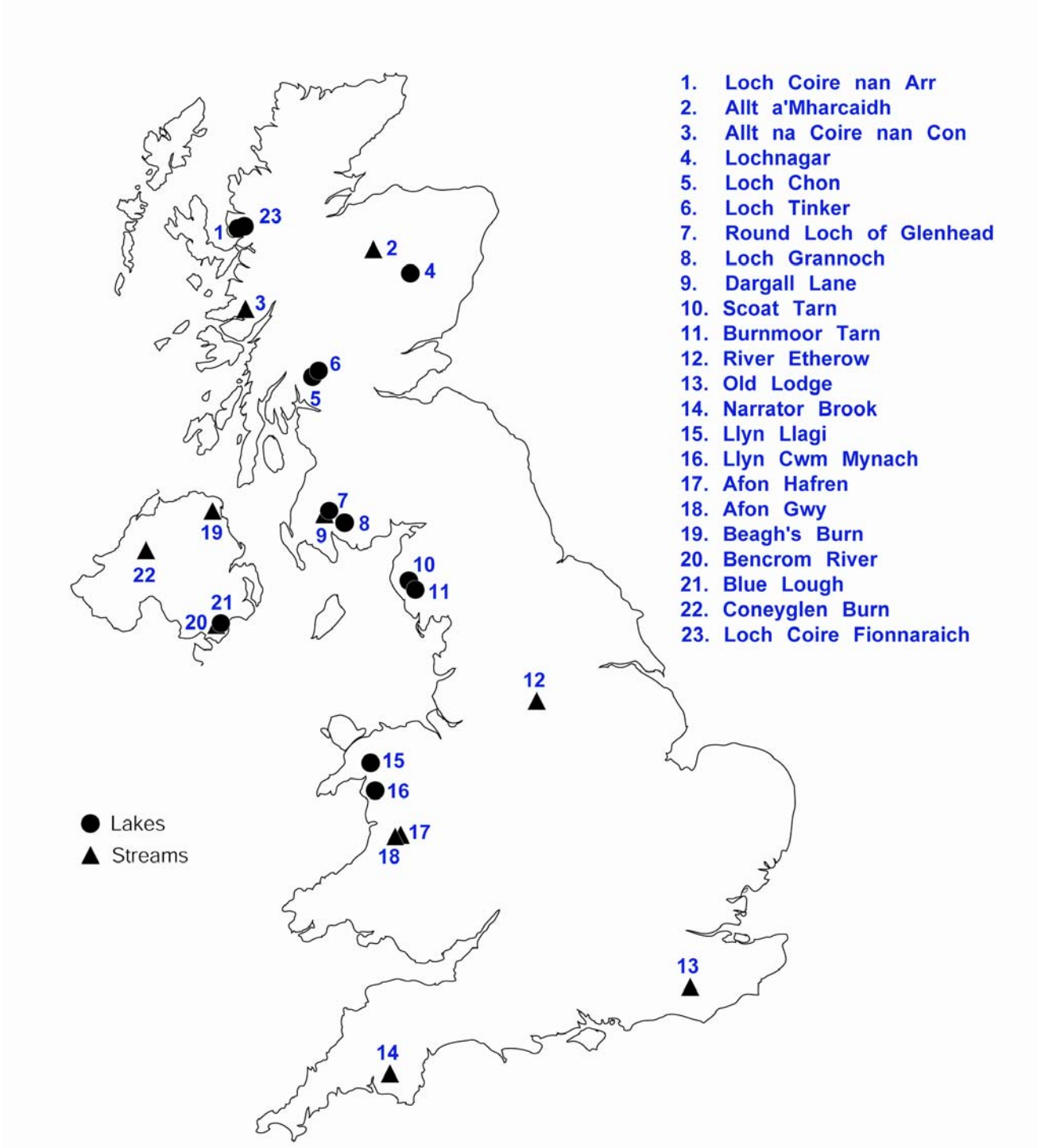
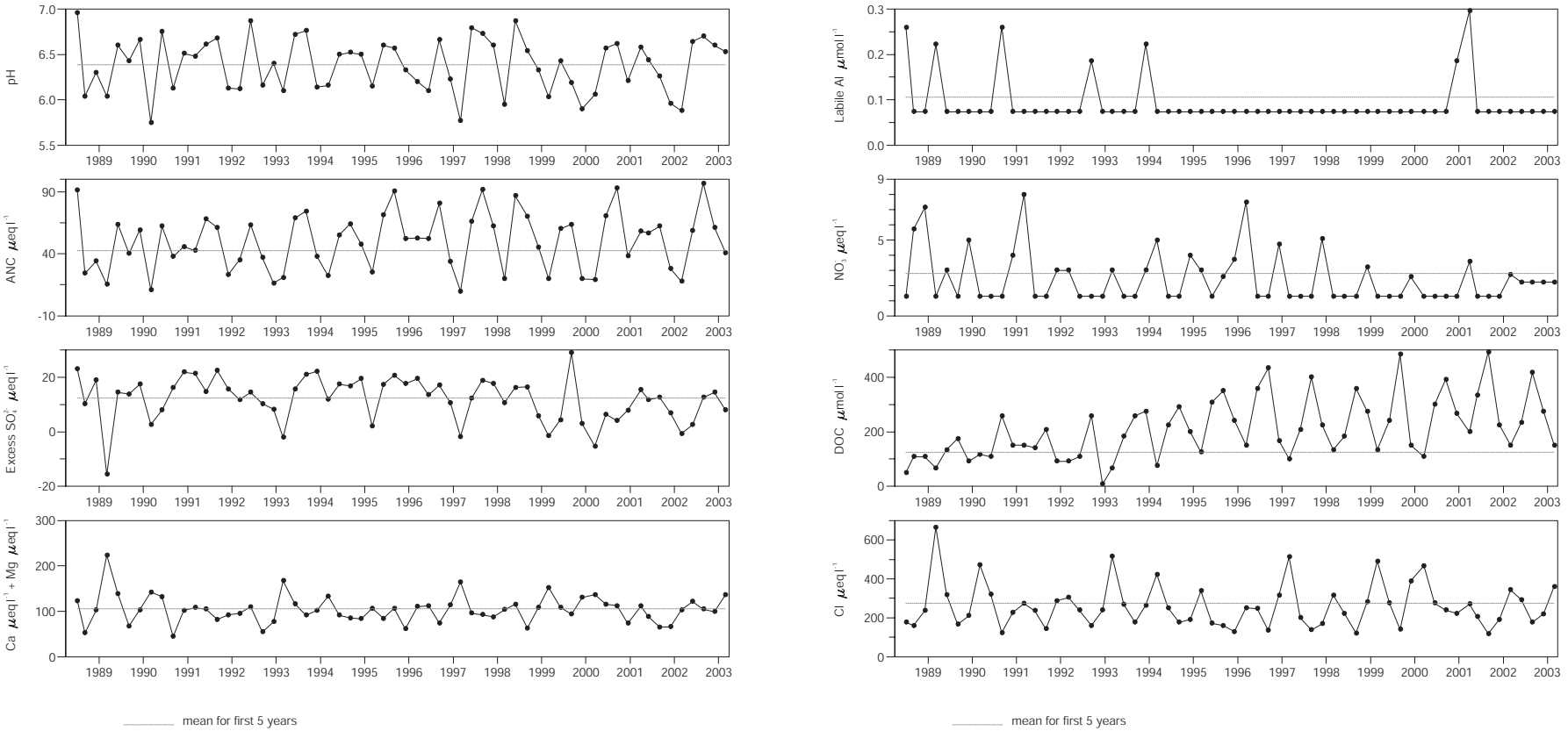
Stevenson, A.C., Juggins, S., Birks, H.J.B., Anderson, N.J., Battarbee, R.W., Berge, F., Davis, R.B., Flower, R.J., Haworth, E.Y., Jones, V.J., Kingston, J.C., Kreiser, A.M., Line, J.M., Munro, M.A.R. & Renberg, I. 1991 *The surface waters acidification project palaeolimnology programme: Modern diatom/lake-water chemistry data-set.* ENSIS Ltd, London.

LOCATION OF UKAWMN SITES



1. Loch Coire nan Arr

1.1. Spot sampled chemistry data



Determinand statistics

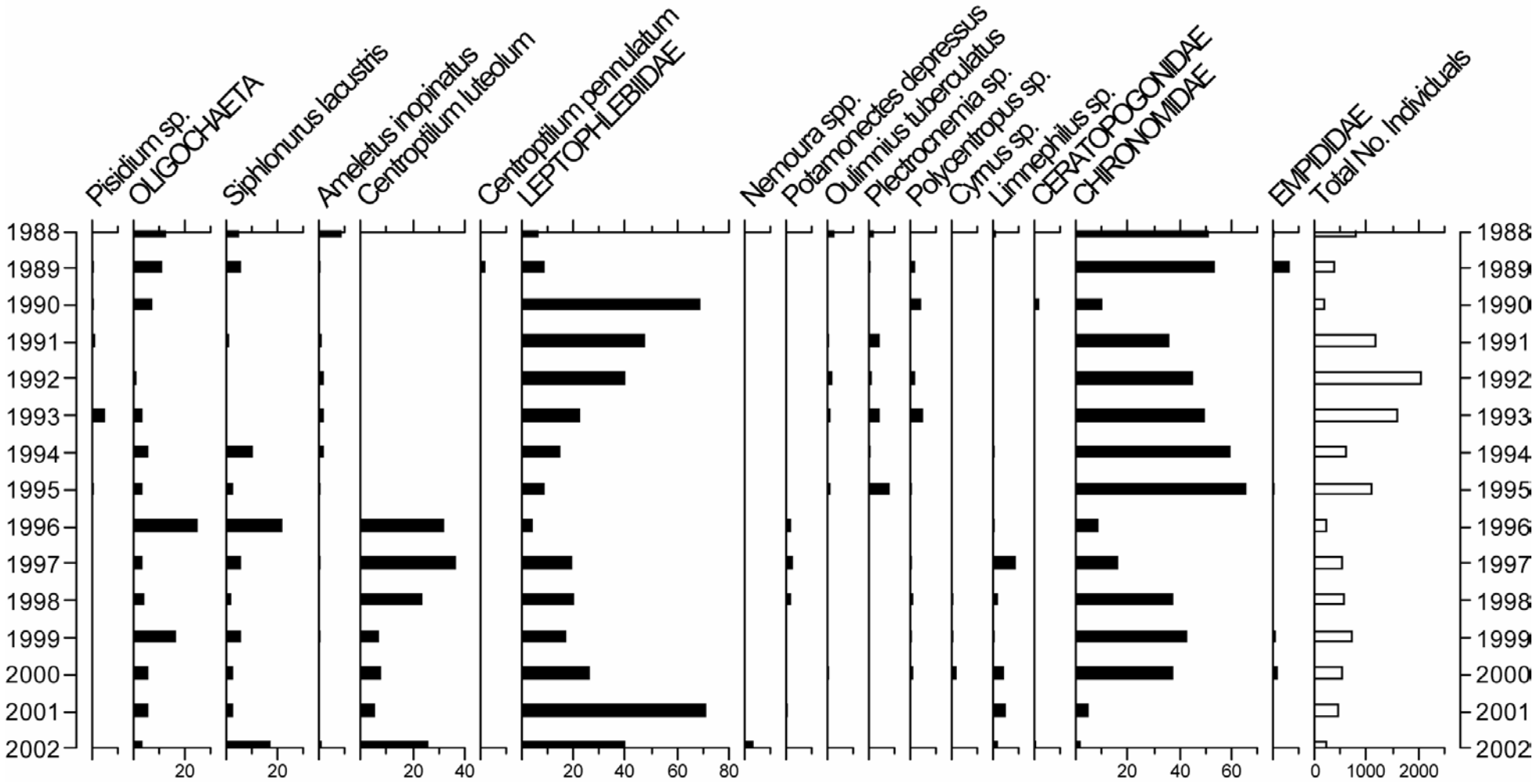
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	6.39	6.62	0.07	0.00	0.83
ANC	42.60	64.40	23.44	0.54	0.17
Ca	42.53	49.38	2.95	0.00	0.94
Mg	63.67	66.04	14.88	0.00	0.81
Na	239.60	219.6	53.19	-0.03	0.42
K	9.51	8.08	1.49	-0.01	0.09
Sol.Al	0.46	0.35	0.23	0.20	0.52

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	0.11	0.07	0.0	0.00	0.31
Cl	273.9	262.7	80.84	-0.03	0.64
SO_4	41.15	36.98	6.45	**-0.03**	**0.02**
XSO_4	12.38	9.39	5.30	-0.02	0.06
NO_3	2.80	2.21	0.00	0.00	0.12
Si	33.21	53.93	9.45	0.00	0.22
DOC	124.6	268.8	111.5	**0.16**	**0.00**

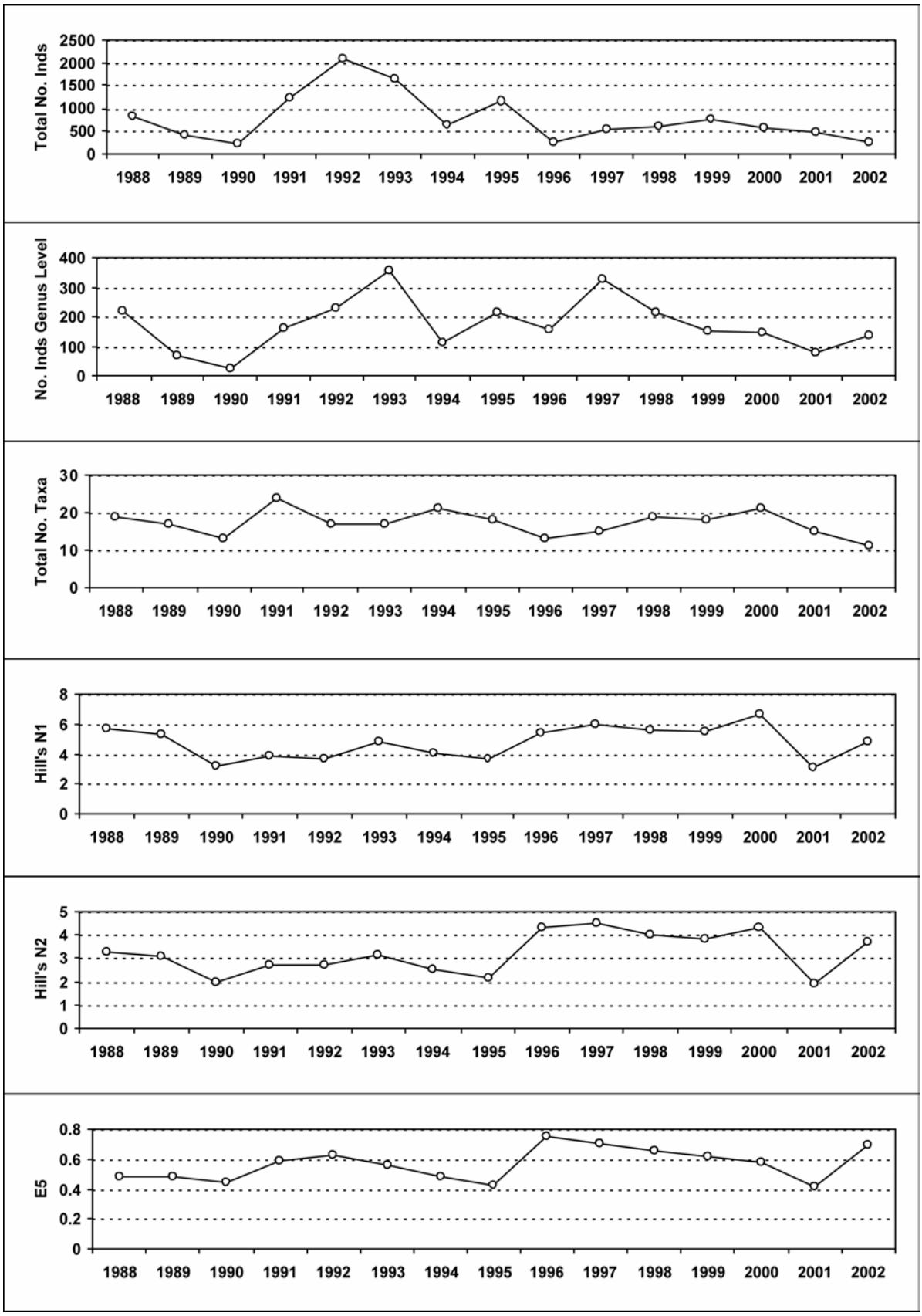
* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units μeq l^{-1}, except Sol.Al, Sol.lab.Al and DOC (μmol l^{-1})

1.2. Macroinvertebrate data

1.2.1. Percentage abundance summary, Loch Coire nan Arr

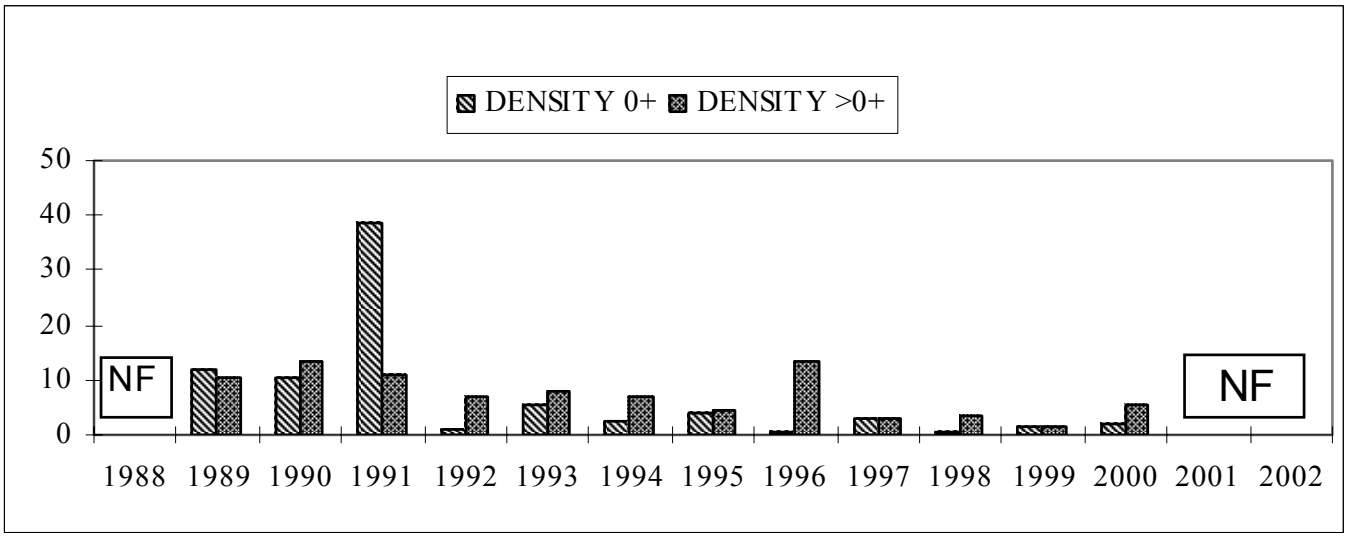


1.2.2. Summary statistics, Loch Coire nan Arr



1.3. Fish data (for outflow stream)

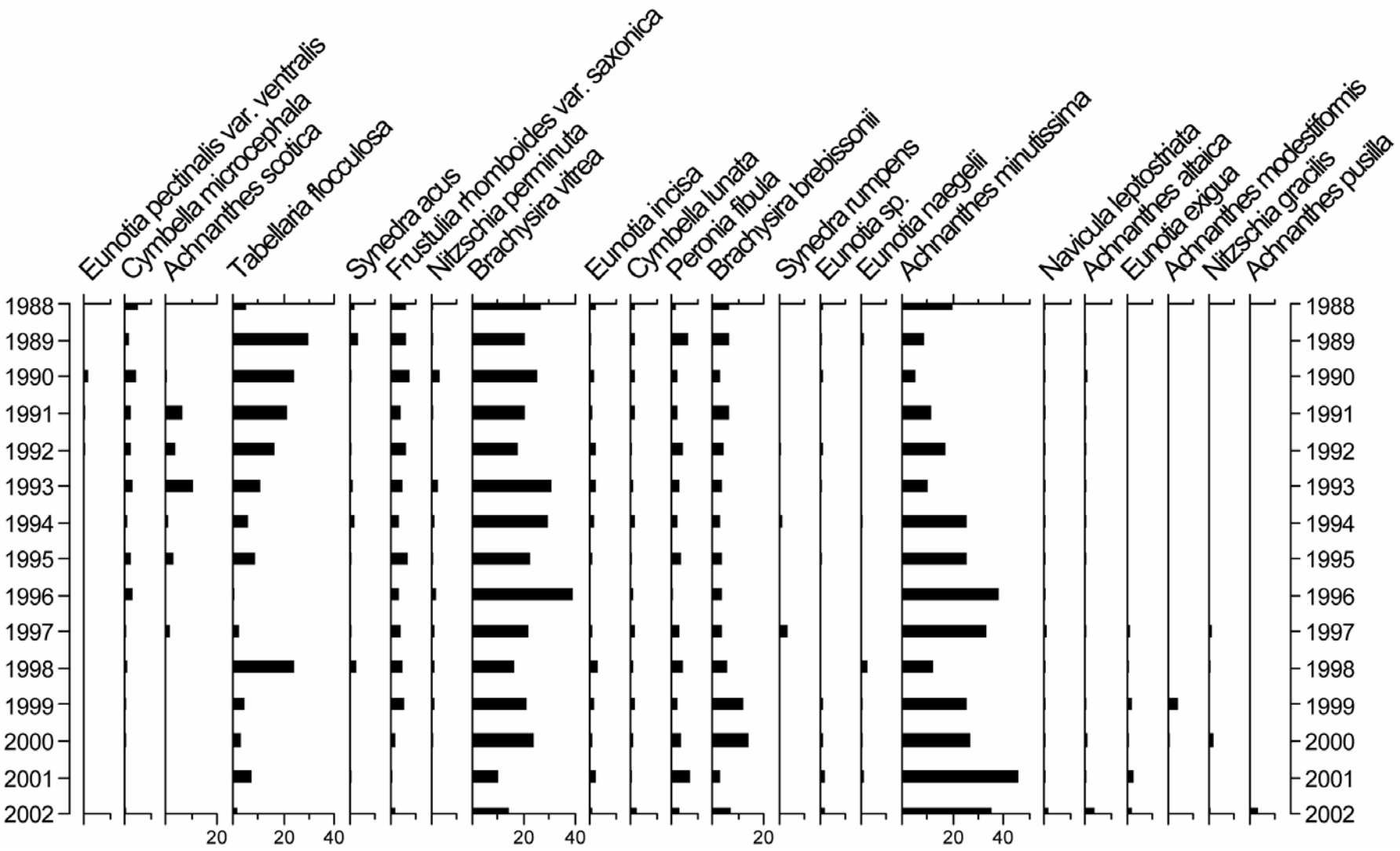
1.3.1. Summary of mean Trout density (numbers 100m^{-2}), Loch Coire nan Arr



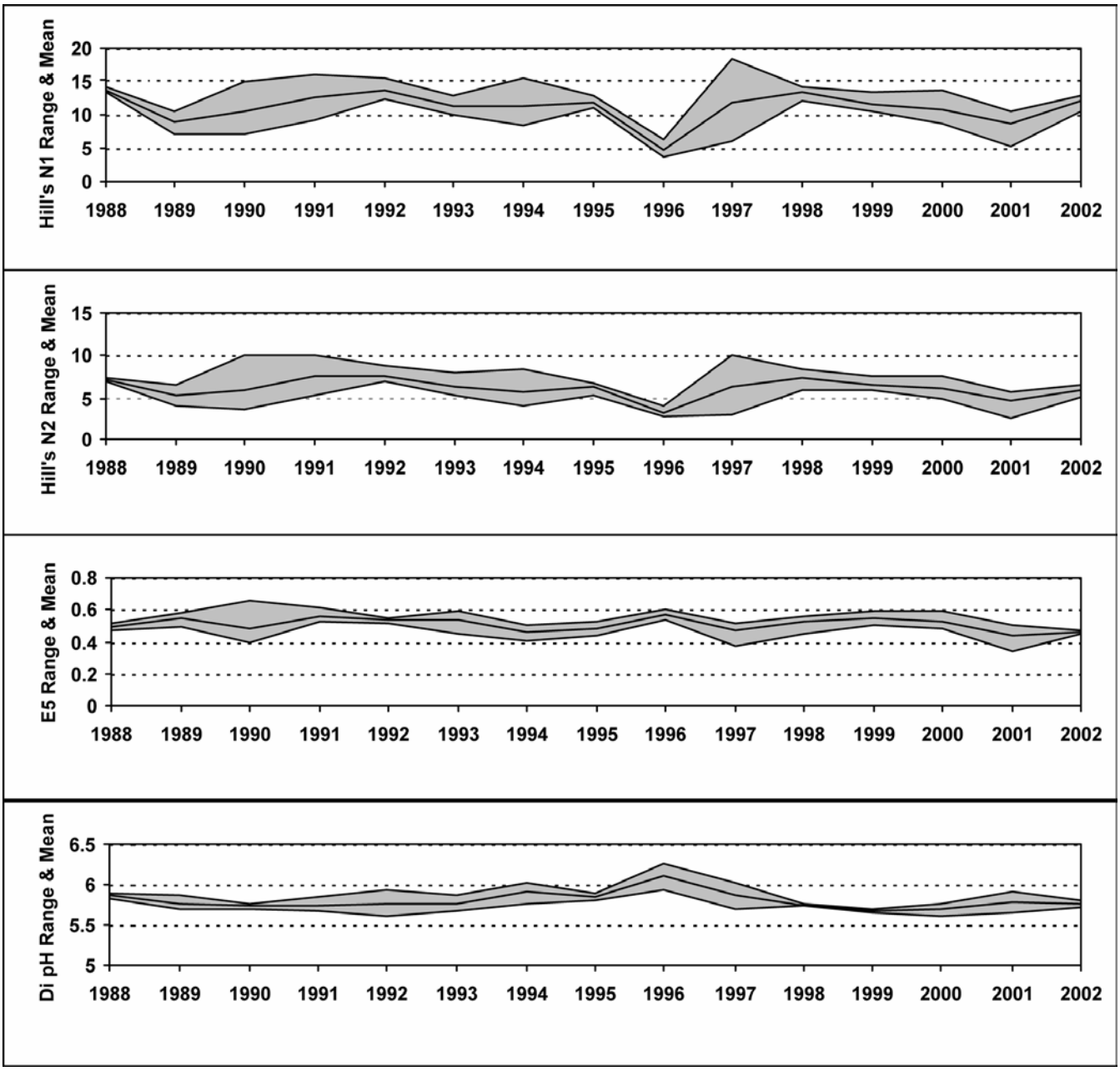
NF = Not fished

1.4. Epilithic diatom data

1.4.1. Percentage abundance summary, Loch Coire nan Arr

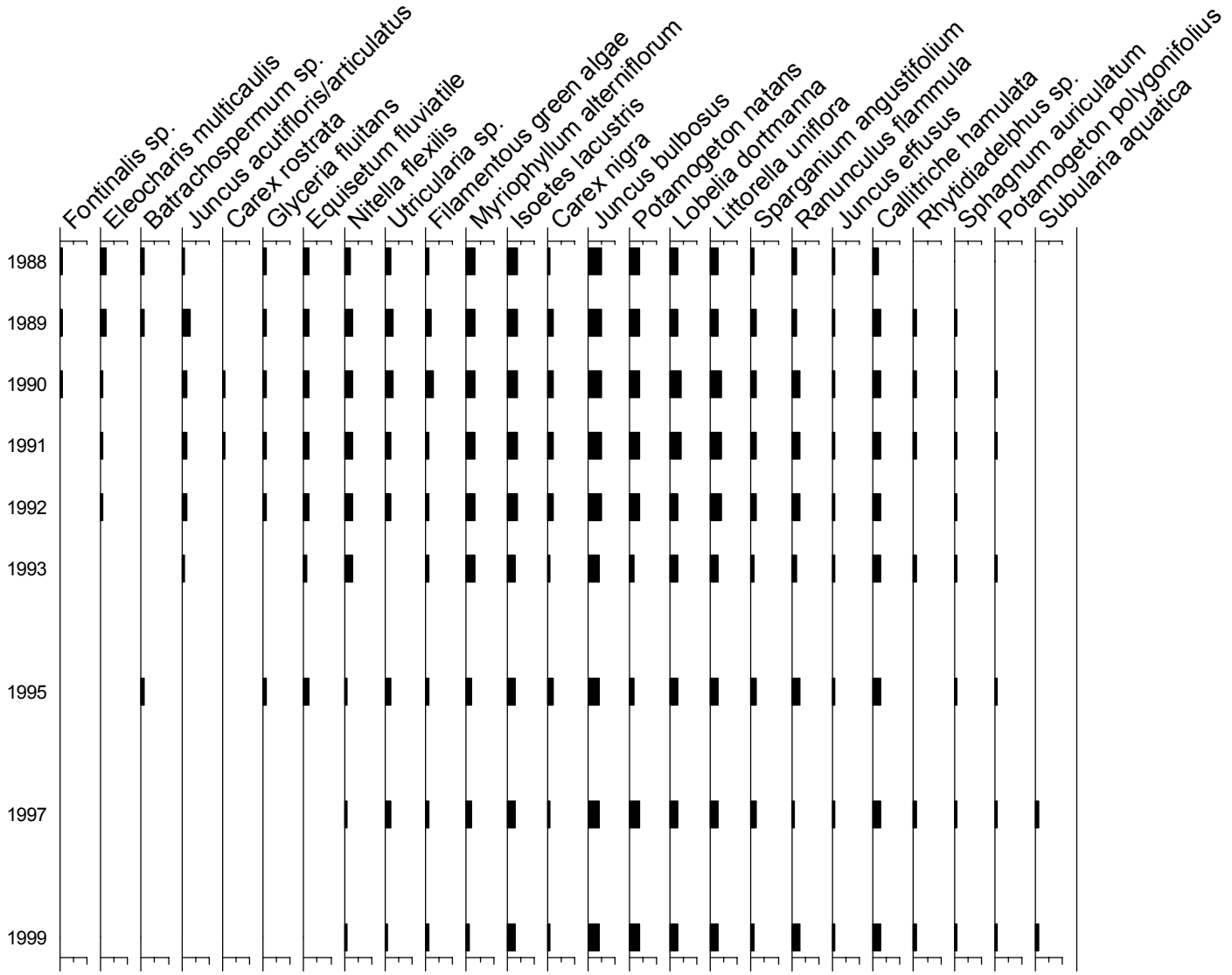


1.4.2. Summary statistics, Loch Coire nan Arr



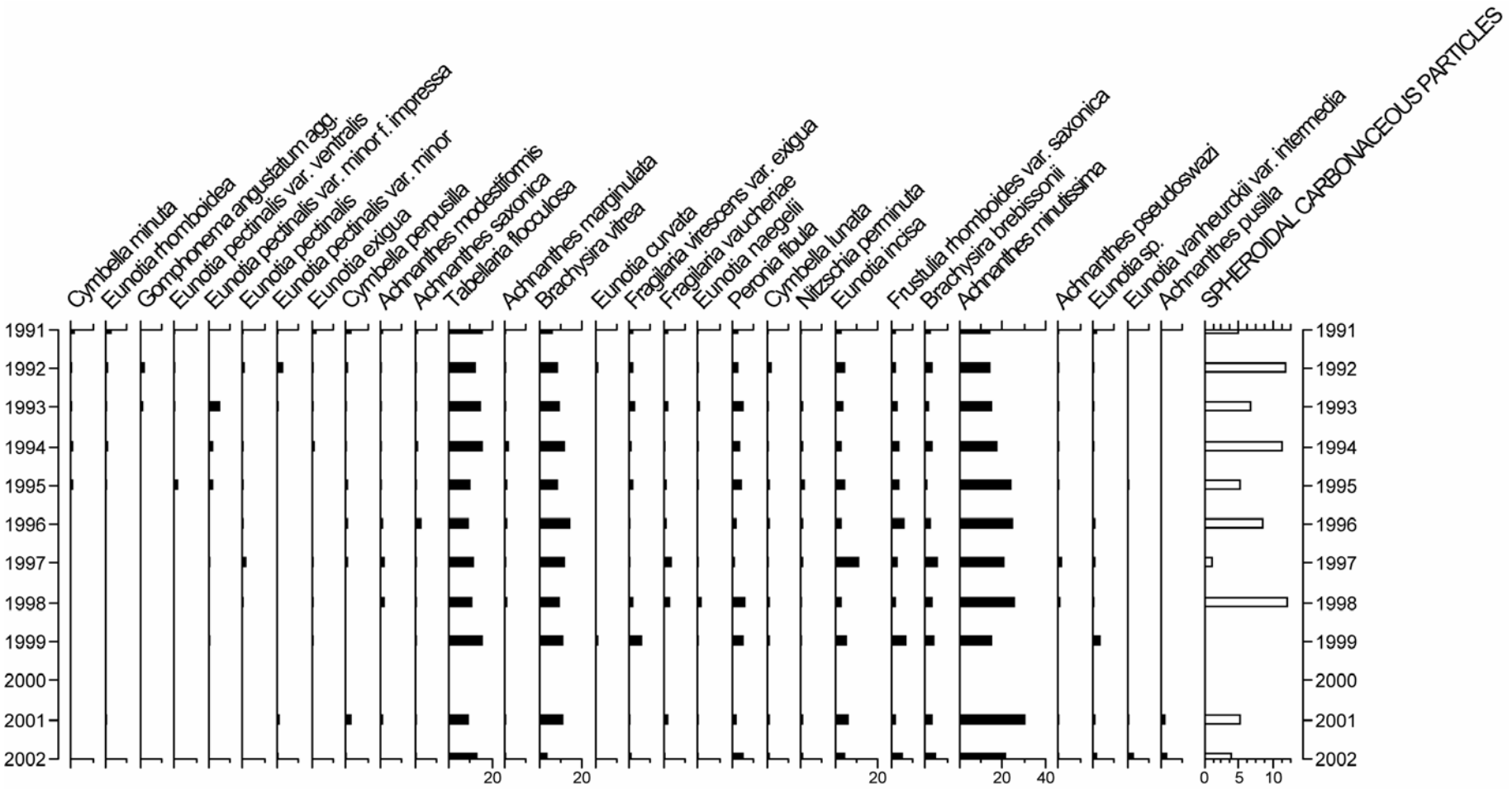
1.5. Aquatic macrophyte data, Loch Coire nan Arr

Species Scores (1-5)



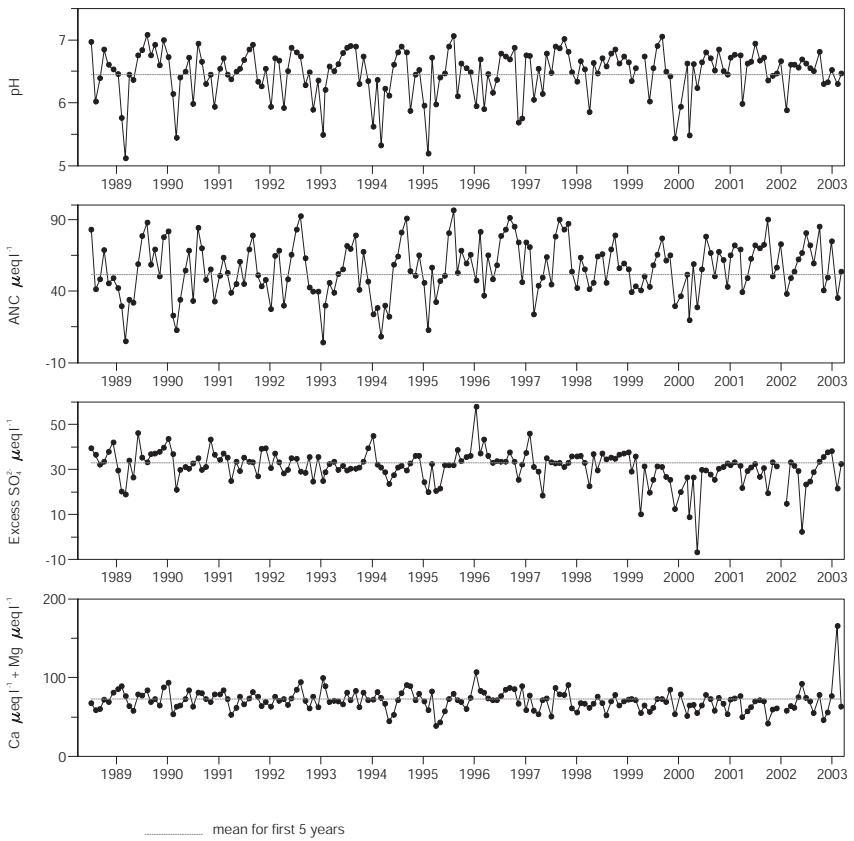
1.6. Sediment trap data, Loch Coire nan Arr

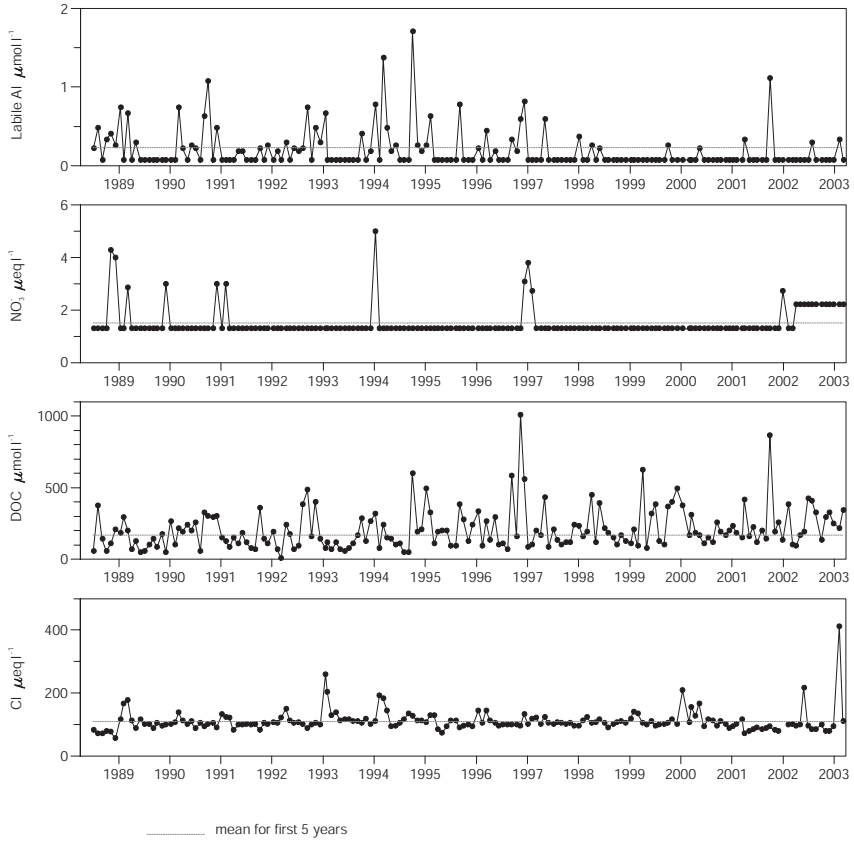
Relative percentage frequency of diatom taxa and carbonaceous particle flux (no. trap^{-1} day^{-1}).



2. Allt a'Mharcaidh

2.1. Spot sampled chemistry data





Determinand statistics

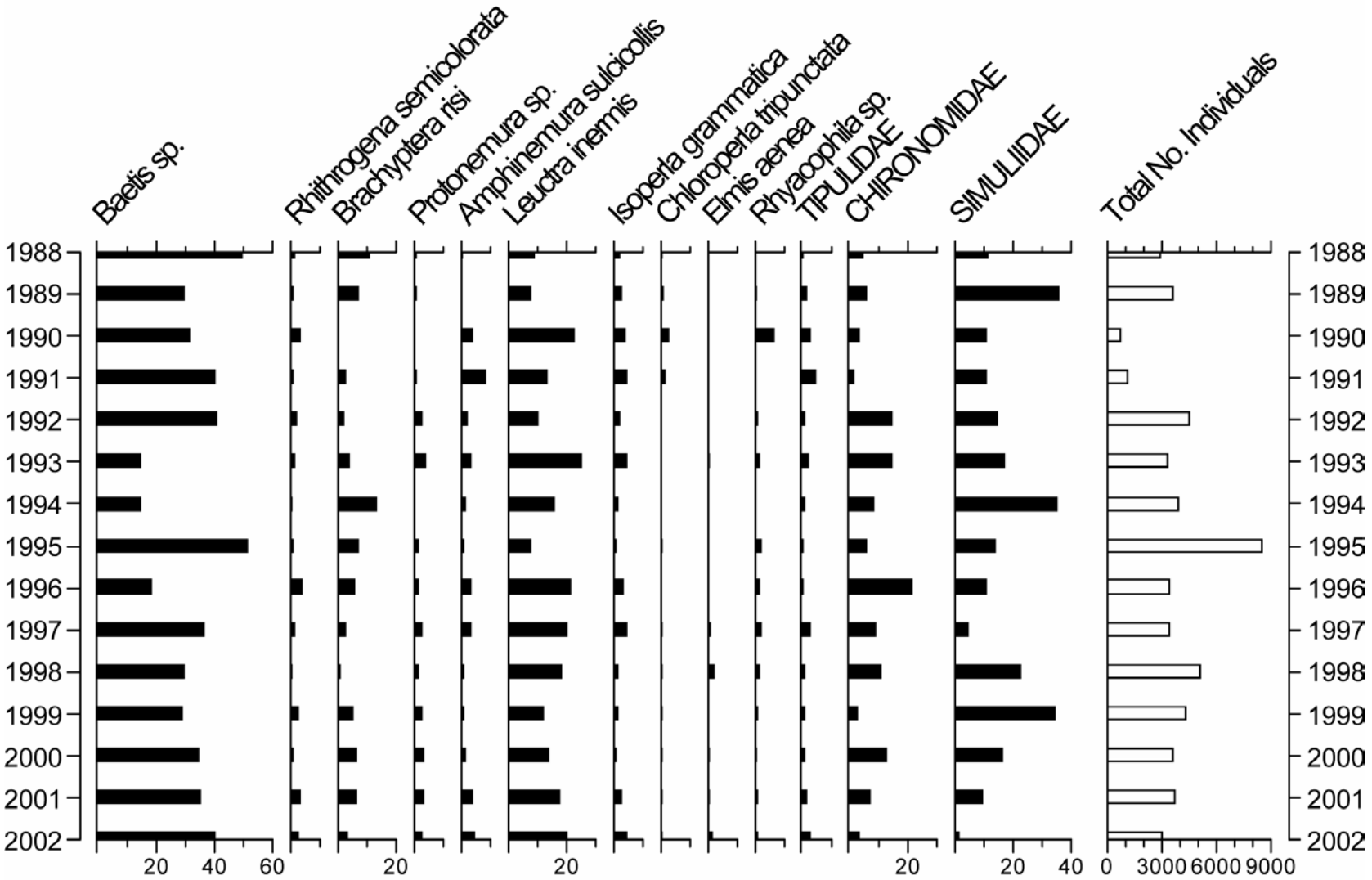
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	6.45	6.52	0.16	0.00	0.81
ANC	51.52	60.82	15.47	0.63	0.06
Ca	42.41	41.75	11.73	-0.01	0.10
Mg	30.39	33.89	19.93	**0.00**	**0.02**
Na	132.6	142.4	60.68	-0.01	0.28
K	6.75	5.77	1.24	**0.00**	**0.01**
Sol.Al	1.31	0.92	0.50	-0.15	0.76

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	0.23	0.11	0.09	-0.14	0.06
Cl	108.4	128.9	96.35	-0.02	0.51
SO_4	44.41	41.67	9.69	**-0.02**	**0.02**
XSO_4	33.02	28.13	9.79	**-0.02**	**0.01**
NO_3	1.50	2.21	0.00	0.00	0.31
Si	170.8	172.9	68.37	0.00	0.58
DOC	167.7	263.9	106.6	**0.08**	**0.01**

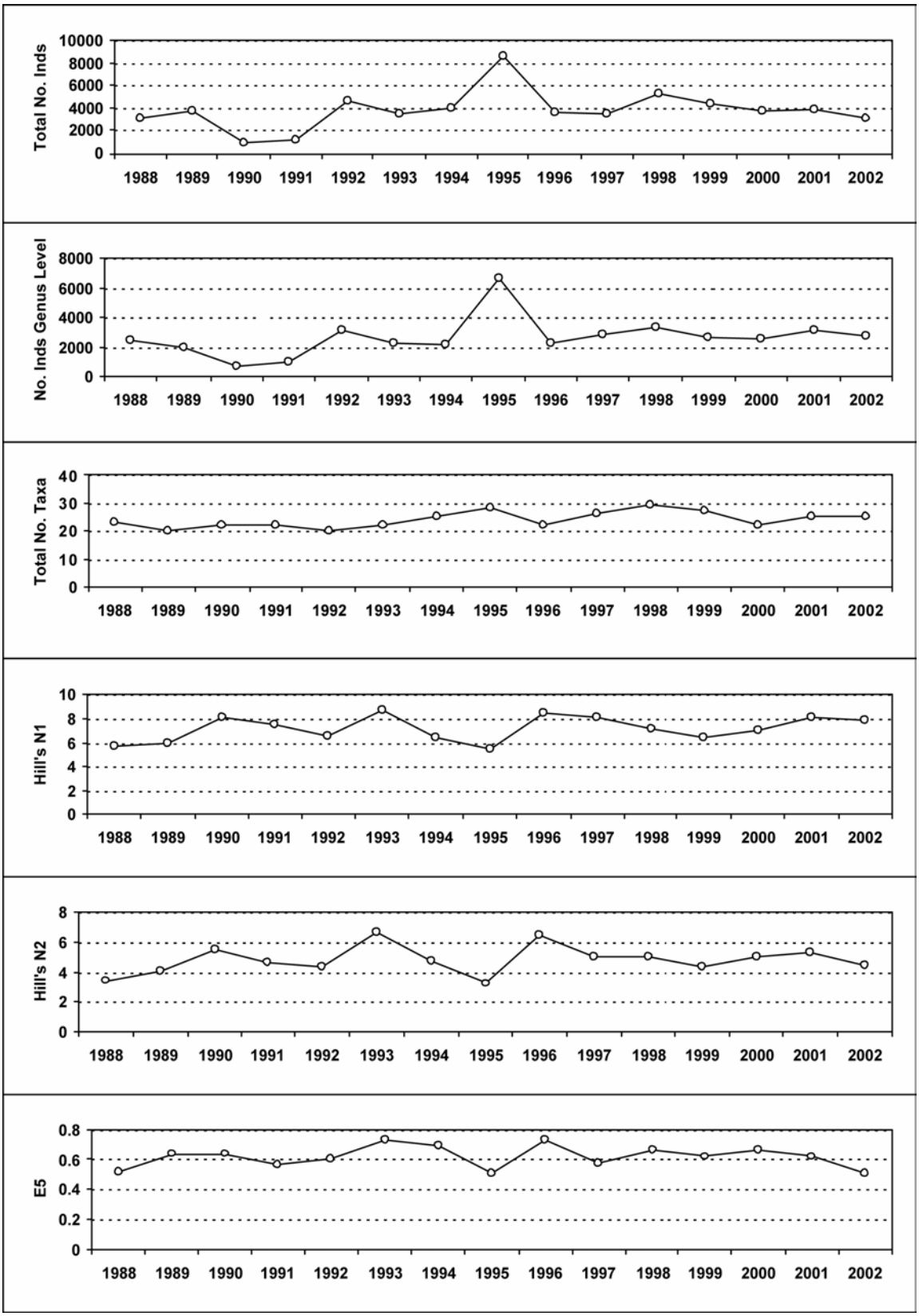
* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units μeq l^{-1}, except Sol.Al, Sol.lab.Al and DOC (μmol l^{-1})

2.2. Macroinvertebrate data

2.2.1. Percentage abundance summary, Allt a'Mharcaidh

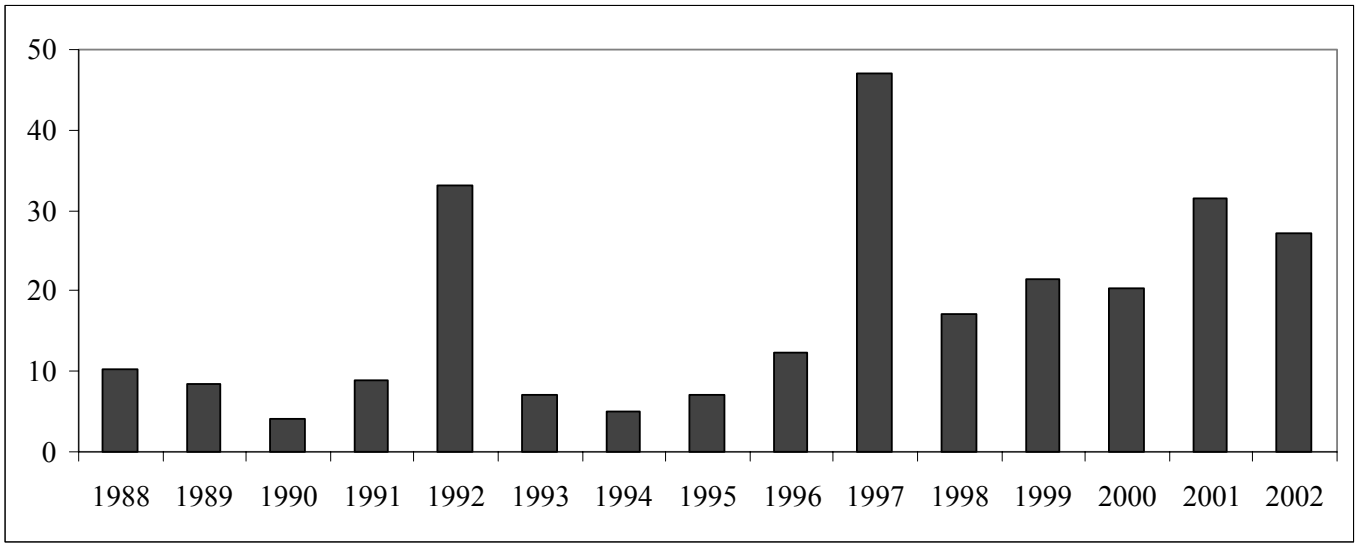


2.2.2. Summary statistics, Allt a'Mharcaidh

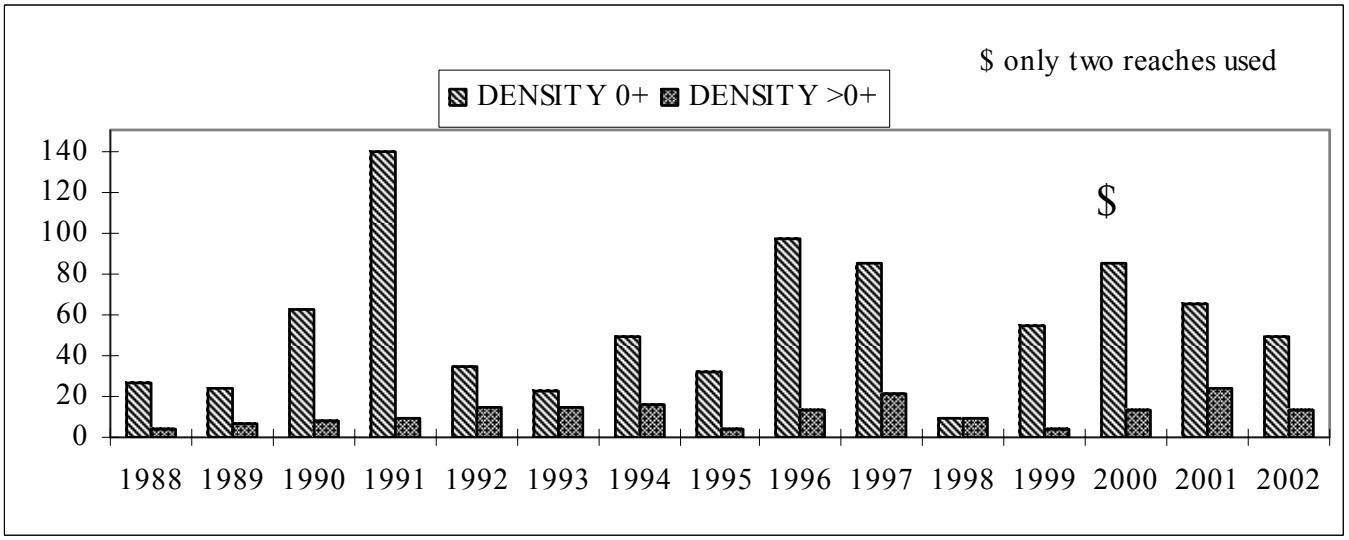


2.3. Fish data

2.3.1. Summary of mean Salmon density (total numbers 100m^{-2}), Allt a'Mharcaidh

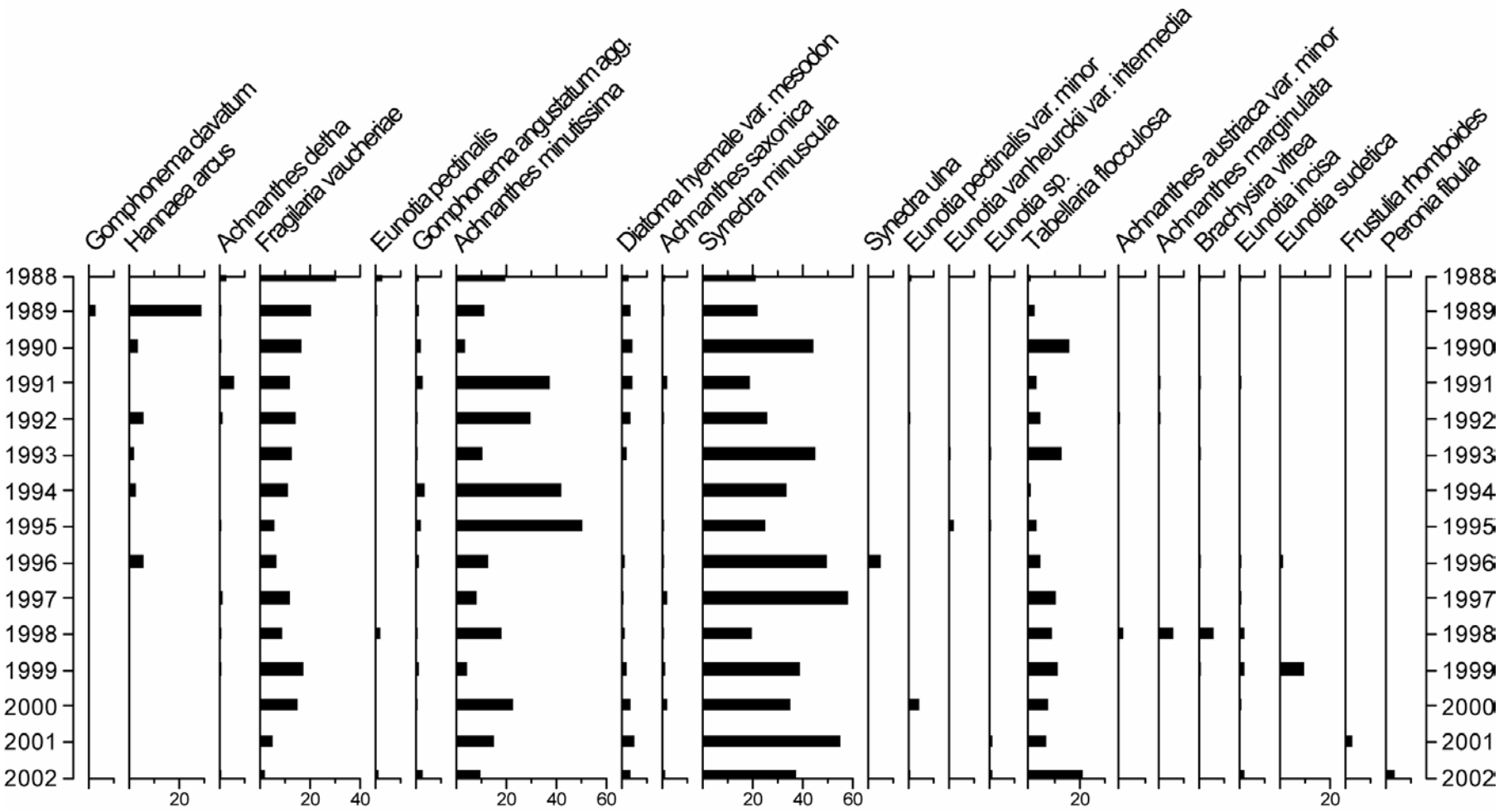


2.3.2. Summary of mean Trout density (numbers 100m^{-2}), Allt a'Mharcaidh

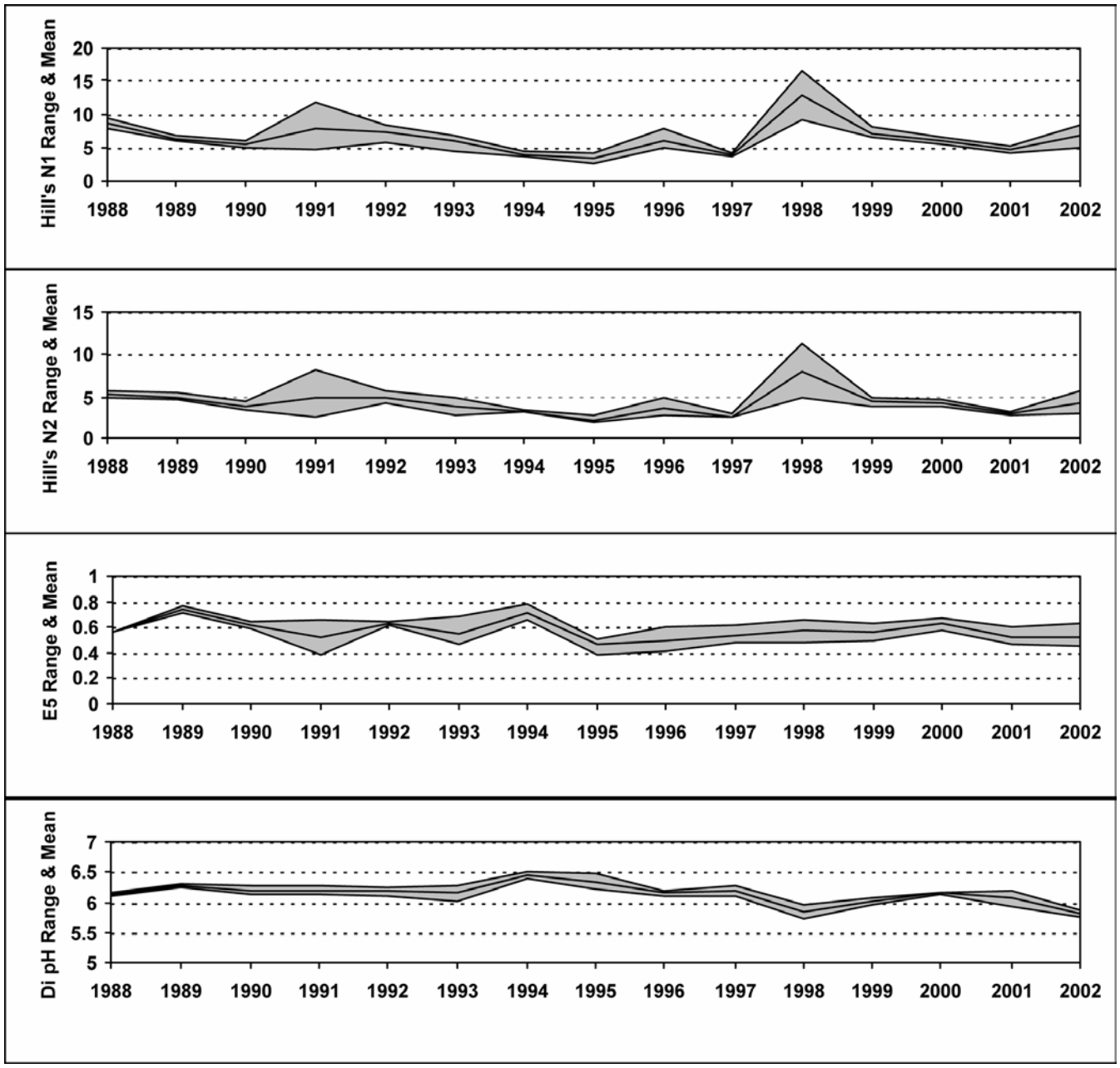


2.4. Epilithic diatom data

2.4.1. Percentage abundance summary, Allt a'Mharcaidh

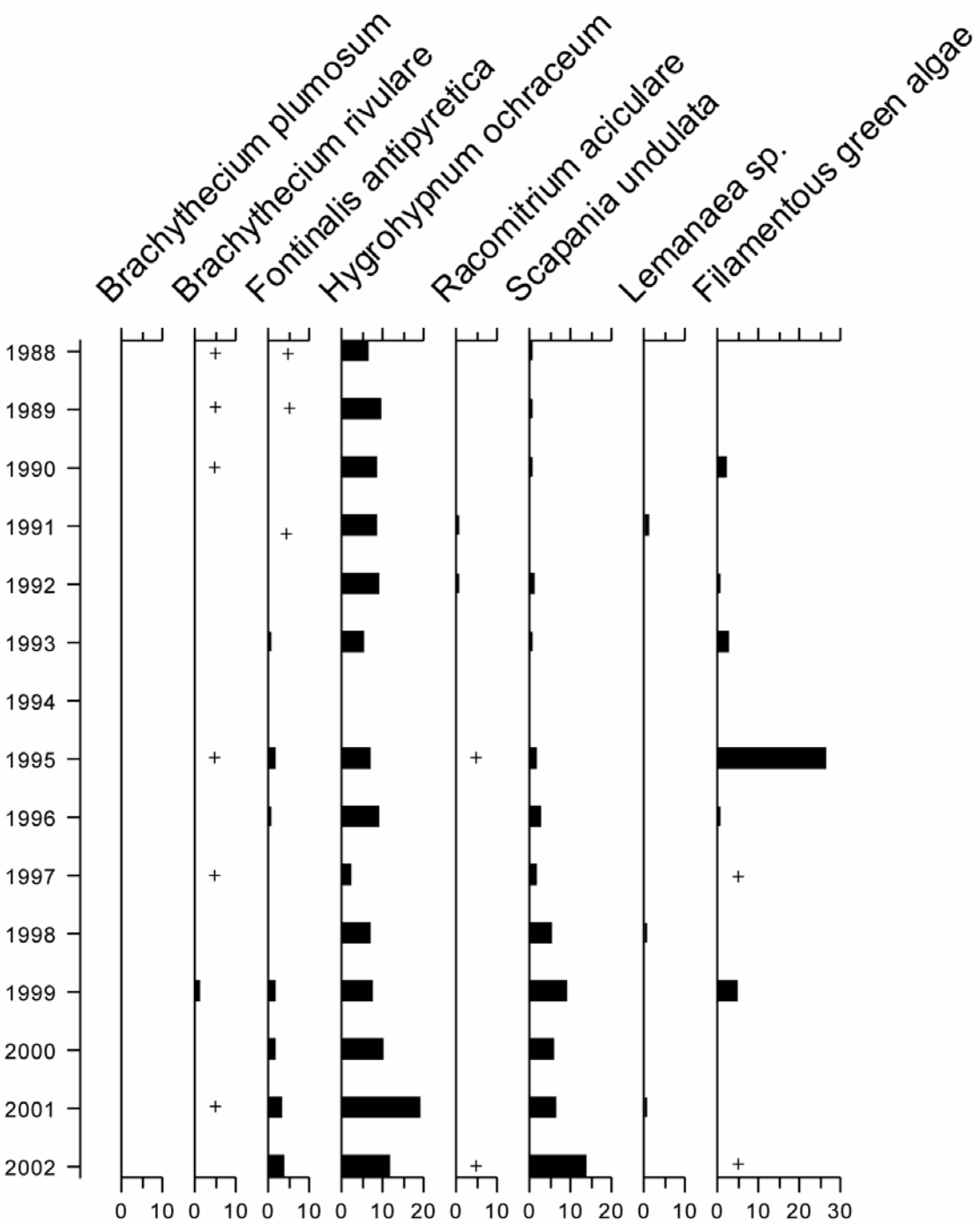


2.4.2. Summary statistics, Allt a'Mharcaidh



2.5. Aquatic macrophyte data, Allt a'Mharcaidh

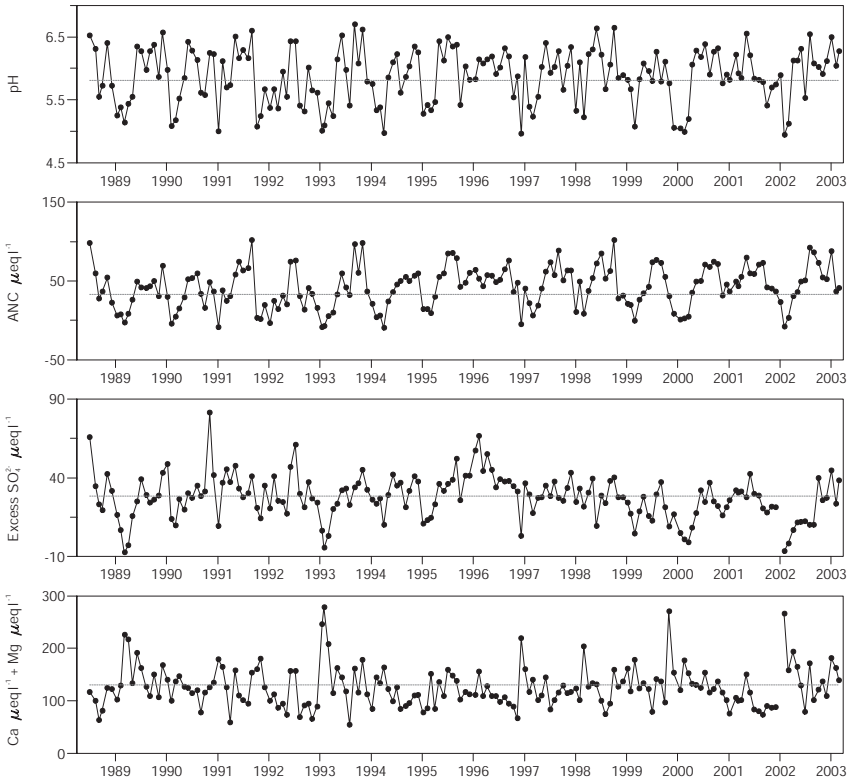
Percentage Species Cover

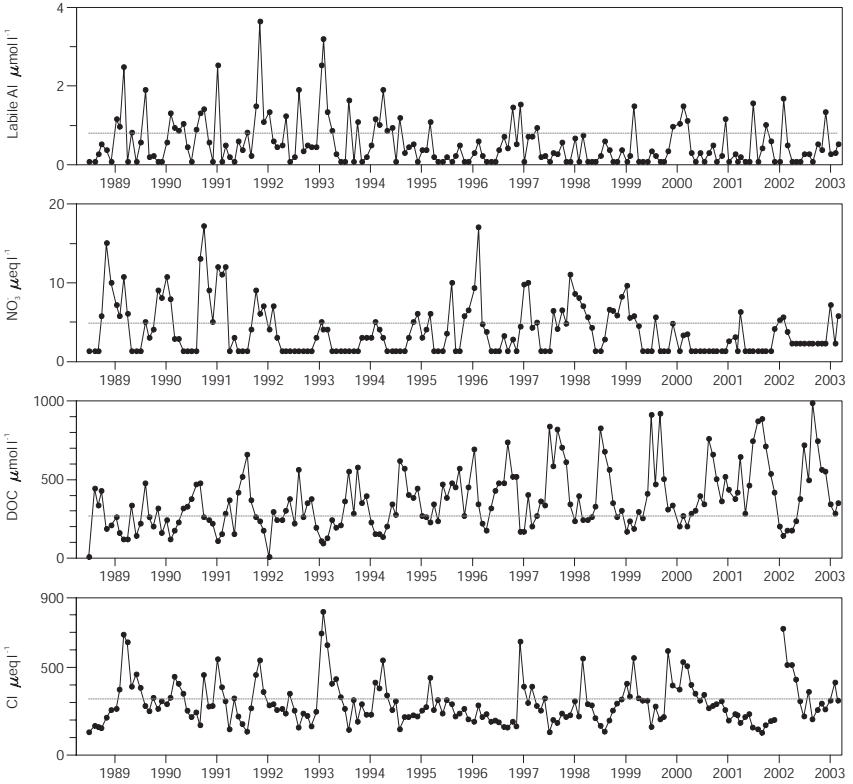


+ Represents <0.1% abundance

3. Allt na Coire nan Con

3.1. Spot sampled chemistry data





Determinand statistics

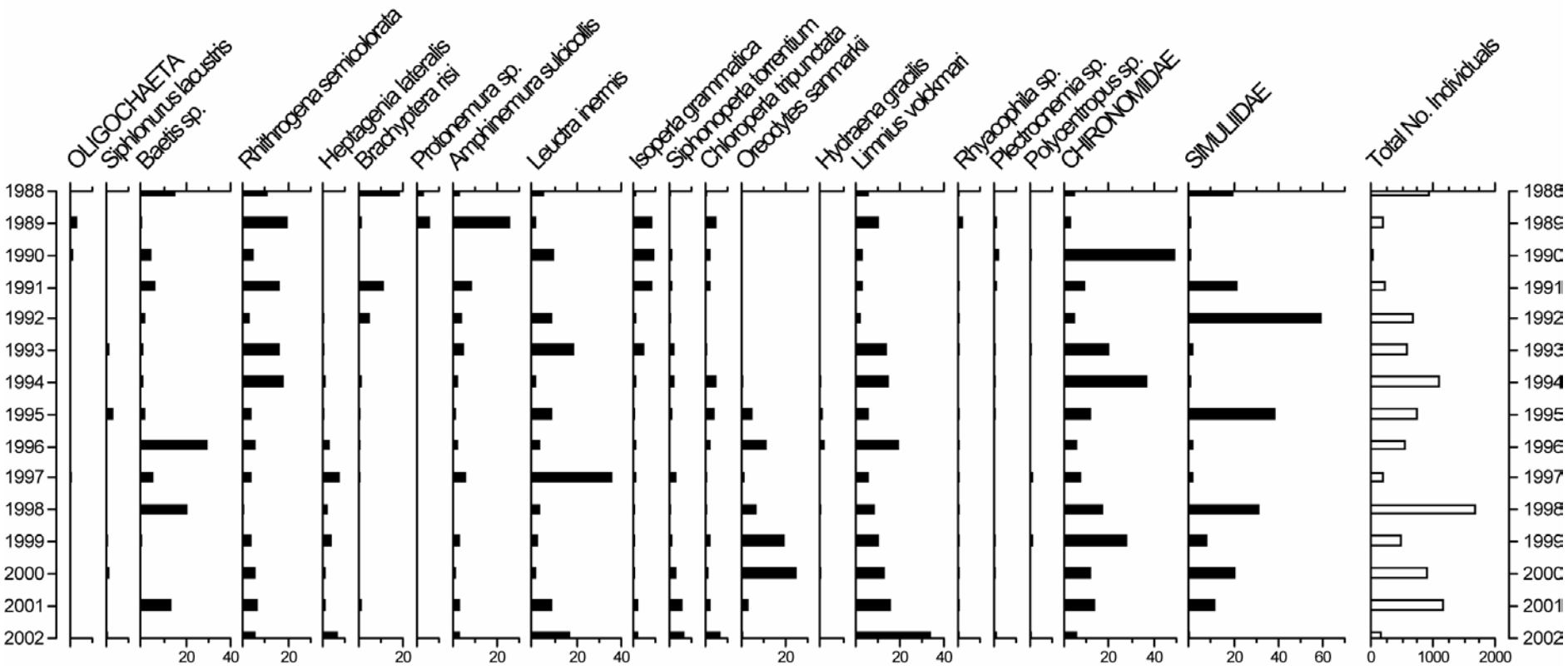
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	5.81	6.13	0.27	0.00	0.33
ANC	32.67	57.22	21.83	**1.32**	**0.02**
Ca	58.97	65.21	16.62	0.00	0.85
Mg	70.89	75.00	19.05	0.00	0.96
Na	272.0	270.3	60.53	-0.02	0.68
K	9.14	7.76	2.73	**-0.01**	**0.05**
Sol.Al	2.40	2.02	1.00	-0.05	0.88

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	0.80	0.34	0.35	-0.37	0.10
Cl	321.5	322.3	91.19	-0.05	0.73
SO_4	61.95	55.56	14.03	**-0.04**	**0.01**
XSO_4	28.19	21.71	13.36	-0.02	0.22
NO_3	4.91	2.92	1.67	0.00	0.29
Si	65.54	99.9	29.14	**0.02**	**0.03**
DOC	266.7	483.3	239.0	**0.20**	**0.00**

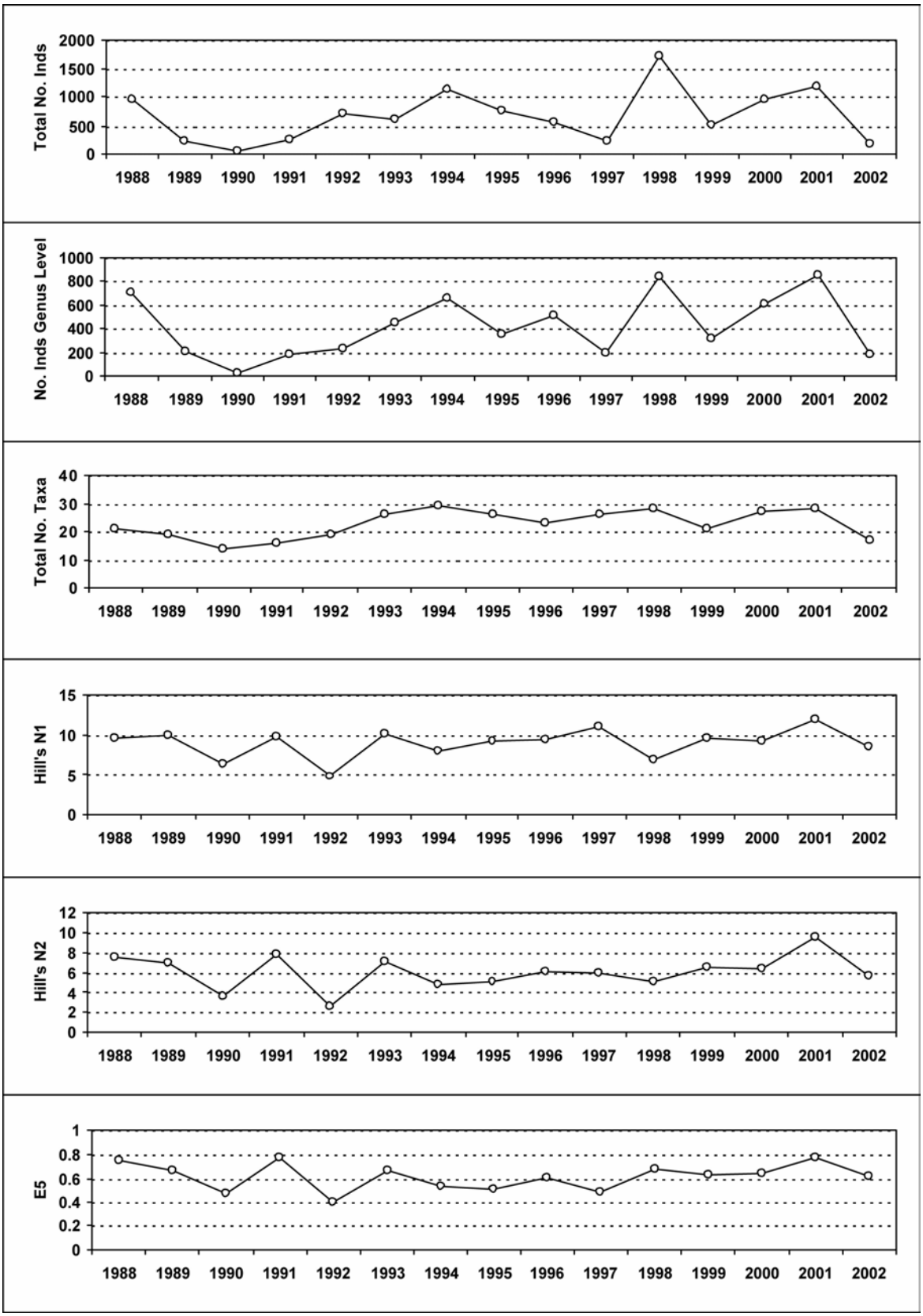
* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq\,l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol\,l^{-1}$)

3.2. Macroinvertebrate data

3.2.1. Percentage abundance summary, Allt na Coire nan Con

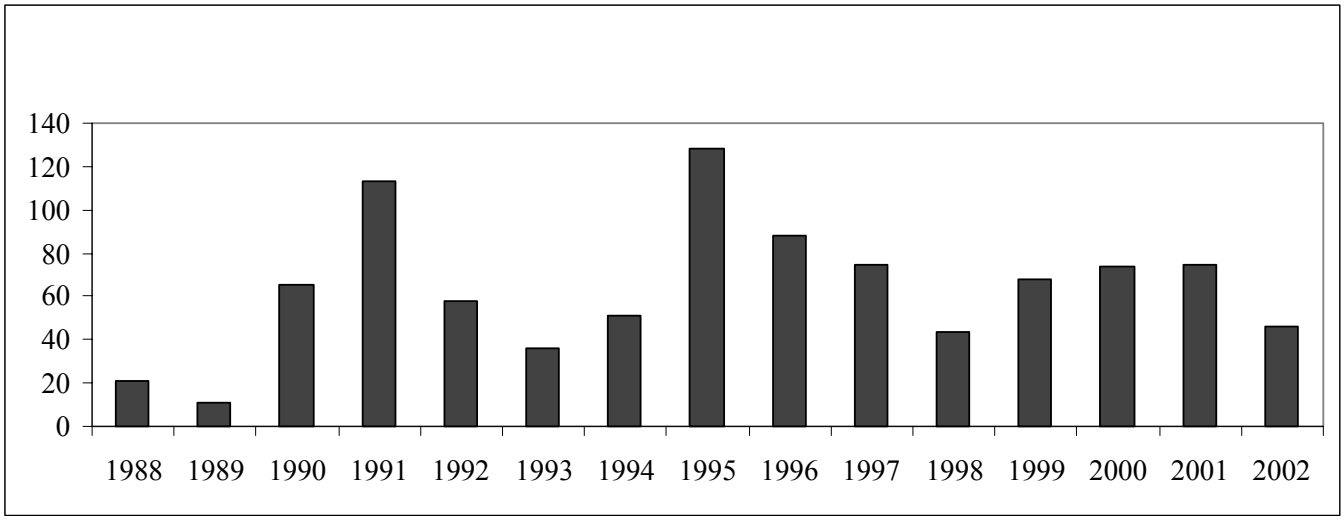


3.2.2. Summary statistics, Allt na Coire nan Con

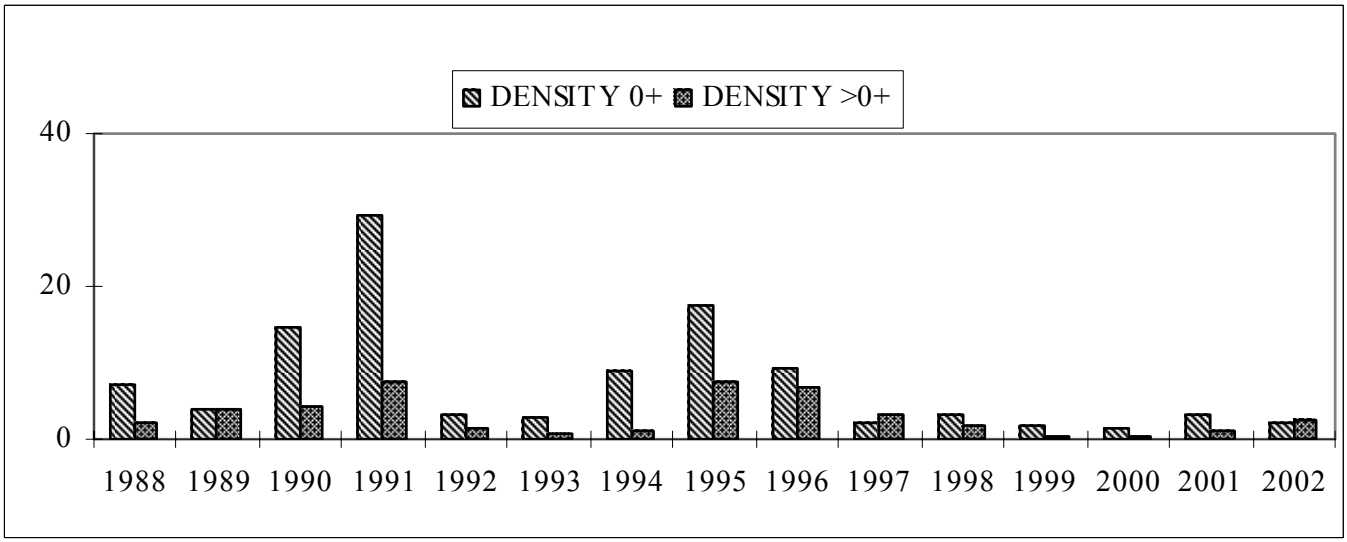


3.3. Fish data

3.3.1. Summary of mean Salmon density (total numbers 100m^{-2}), Allt na Coire nan Con

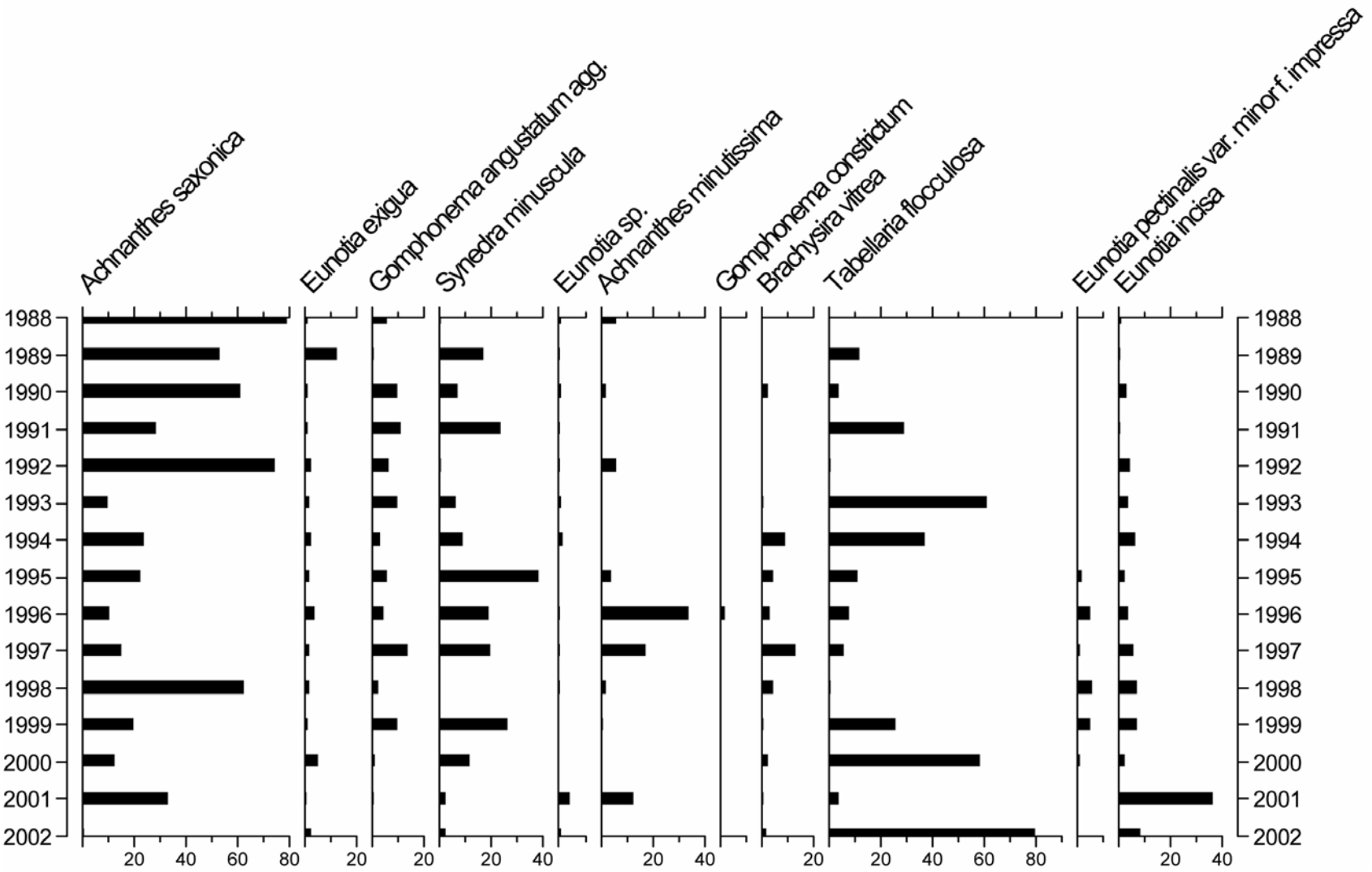


3.3.2. Summary of mean Trout density (numbers 100m^{-2}), Allt na Coire nan Con

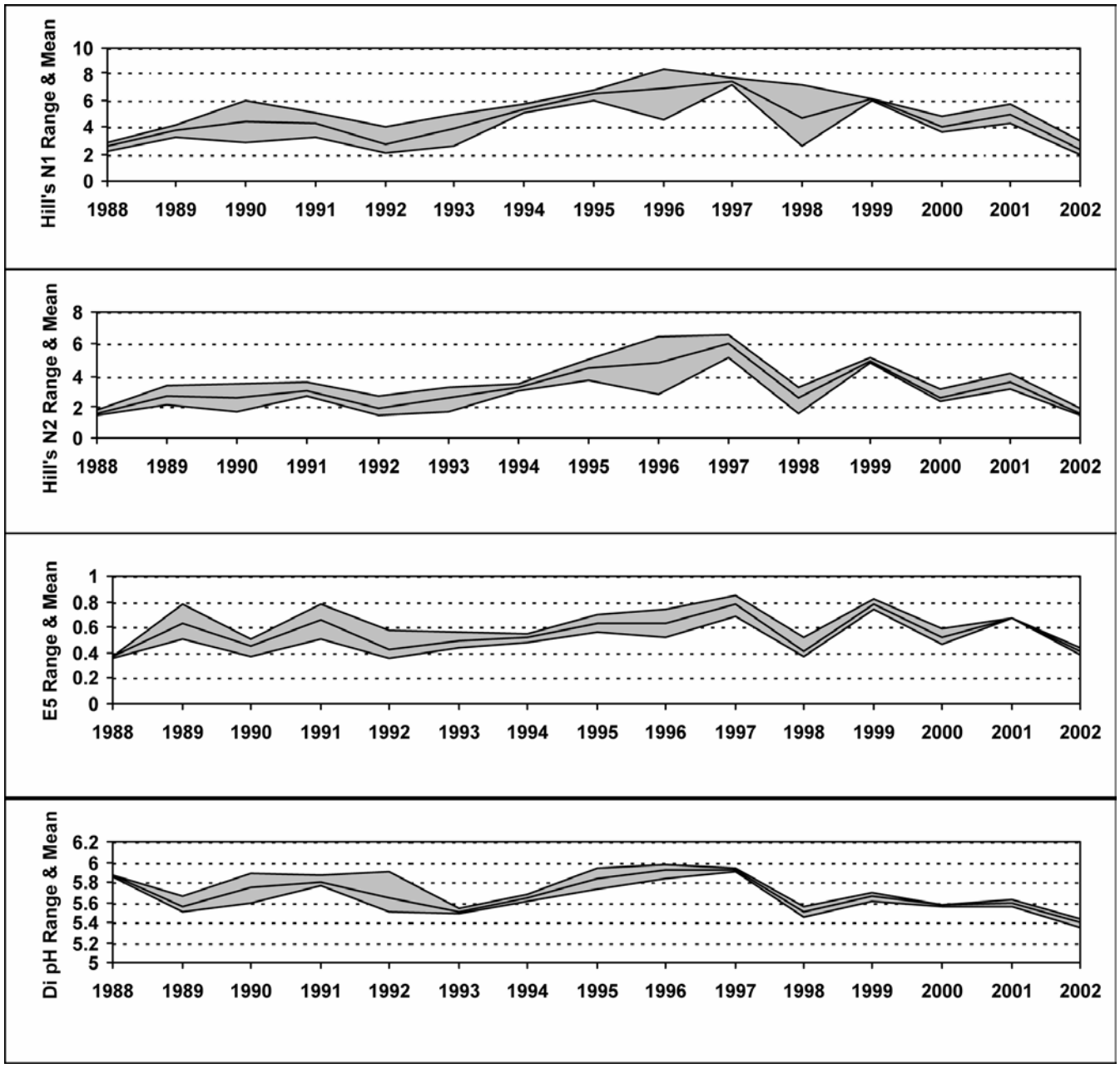


3.4. Epilithic diatom data

3.4.1. Percentage abundance summary, Allt na Coire nan Con

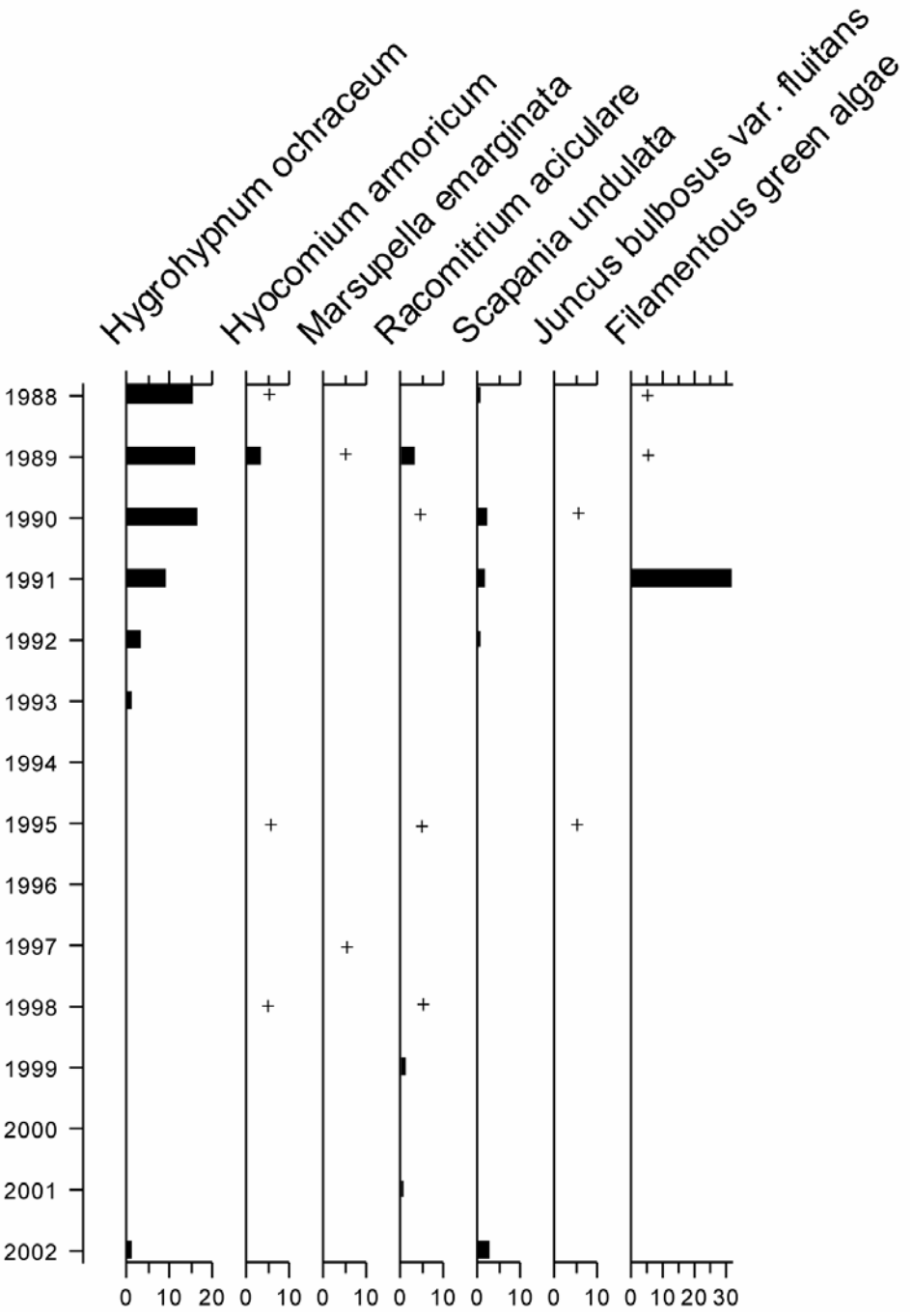


3.4.2. Summary statistics, Allt na Coire nan Con



3.5. Aquatic macrophyte data, Allt na Coire nan Con

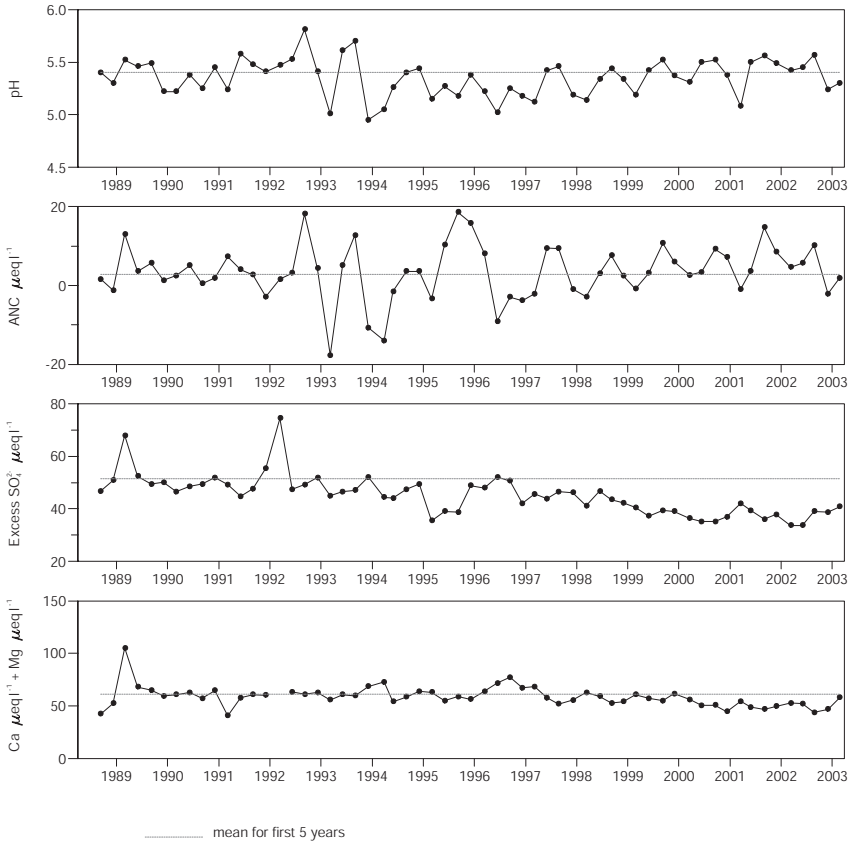
Percentage Species Cover

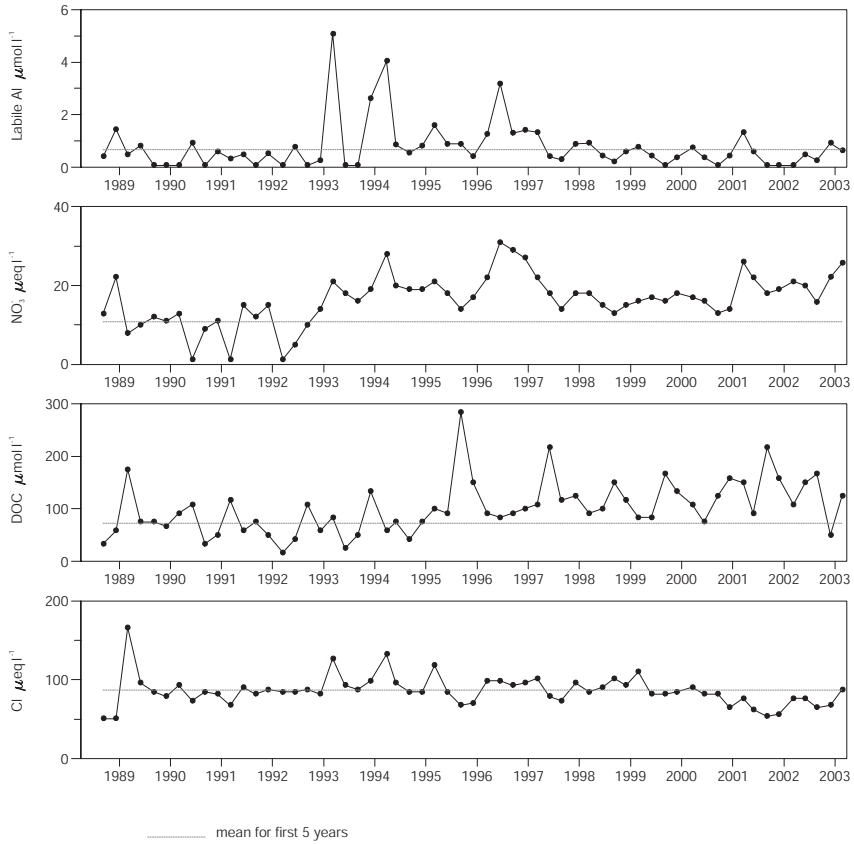


+ Represents <0.1% abundance

4. Lochnagar

4.1. Spot sampled chemistry data





Determinand statistics

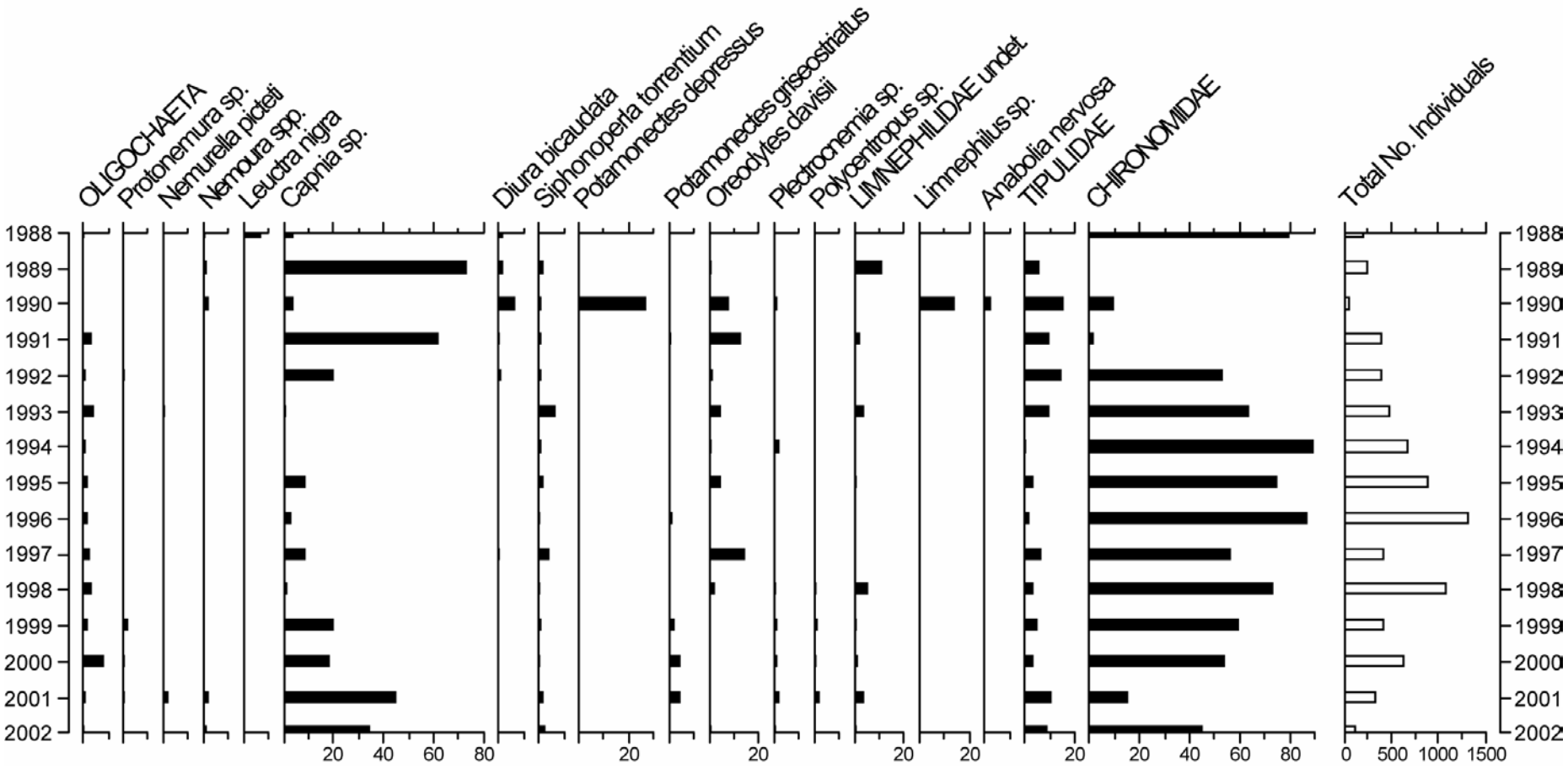
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	5.40	5.39	0.15	0.00	0.64
ANC	2.89	3.92	5.26	0.29	0.12
Ca	29.06	22.25	2.60	**-0.01**	**0.01**
Mg	30.57	27.92	3.70	**-0.01**	**0.03**
Na	92.22	69.57	13.75	-0.02	0.08
K	7.54	4.74	0.44	**-0.01**	**0.00**
Sol.Al	1.19	0.99	0.22	-0.38	0.54

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	0.66	0.57	0.28	-0.25	0.55
Cl	86.88	73.94	10.12	-0.03	0.19
SO_4	60.64	45.83	3.40	**-0.06**	**0.00**
XSO_4	51.51	38.07	3.06	**-0.05**	**0.00**
NO_3	10.77	20.89	4.18	0.01	0.06
Si	74.21	81.43	3.50	0.00	0.86
DOC	72.37	122.9	51.54	**0.07**	**0.00**

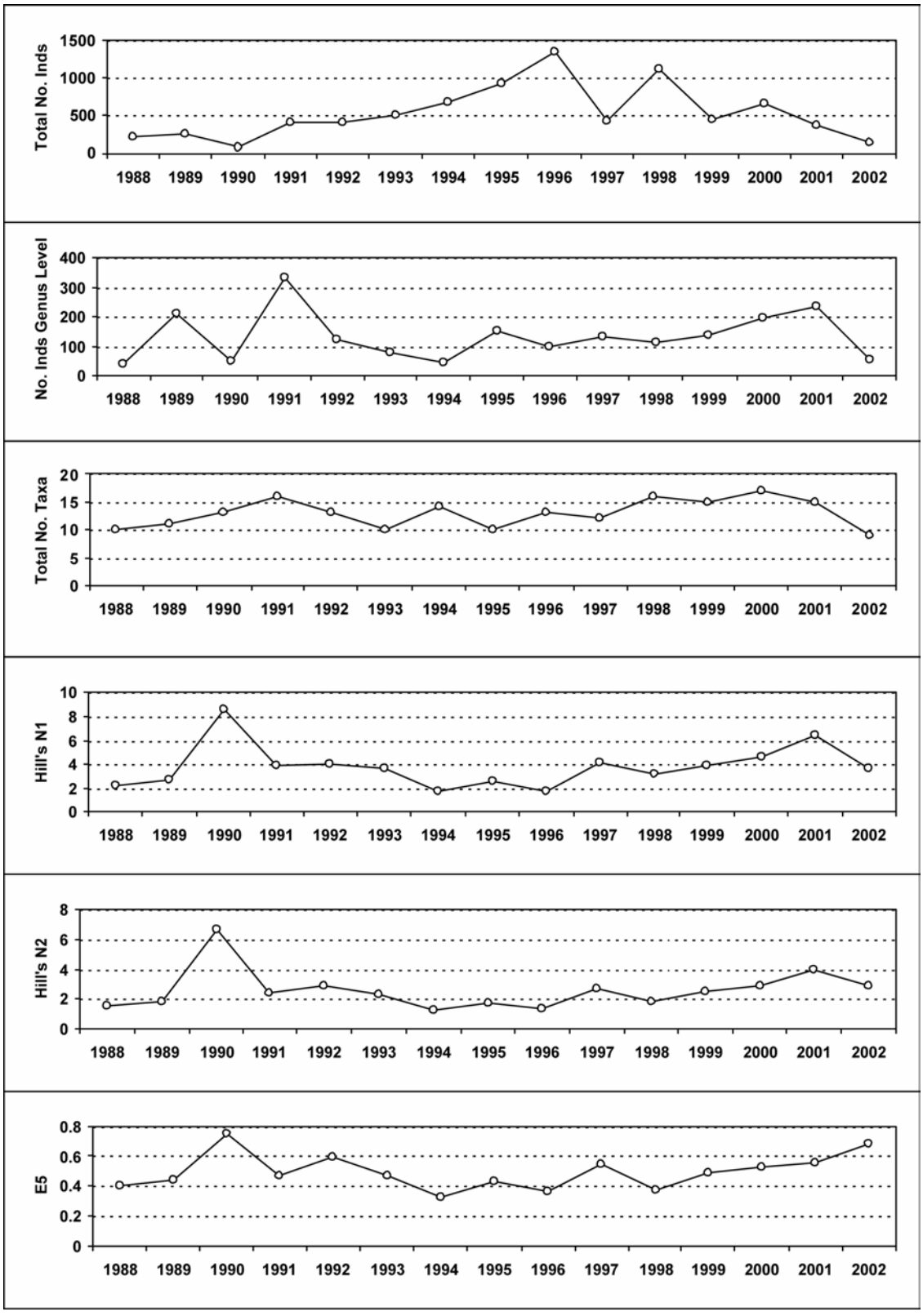
* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq\,l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol\,l^{-1}$)

4.2. Macroinvertebrate data

4.2.1. Percentage abundance summary, Lochnagar

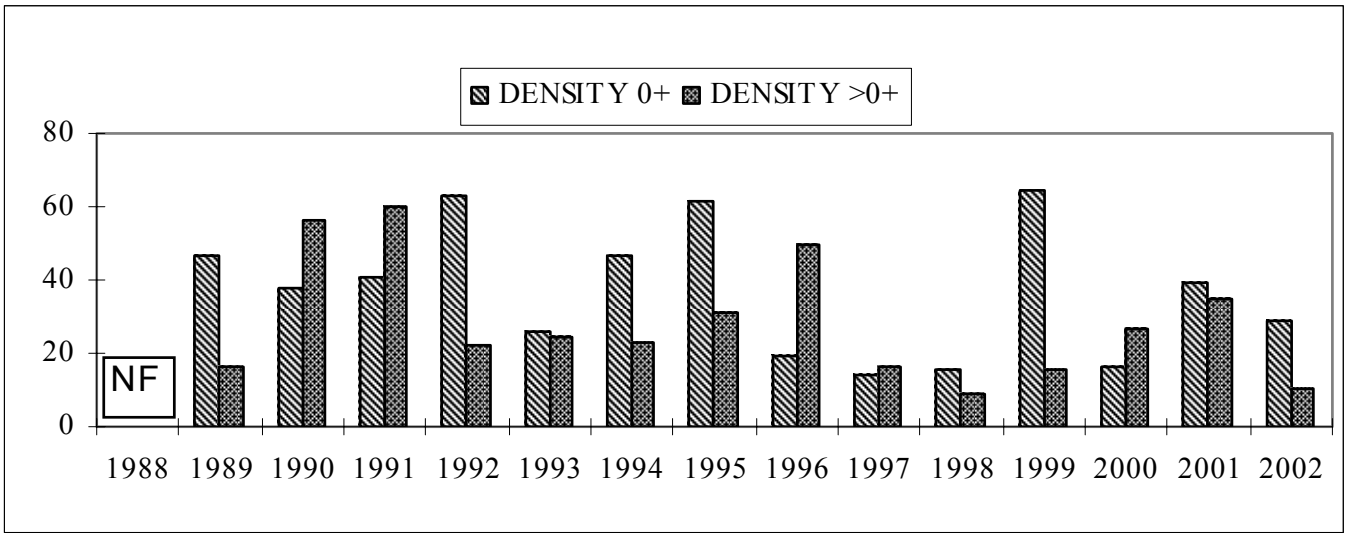


4.2.2. Summary statistics, Lochnagar



4.3. Fish data (for outflow stream)

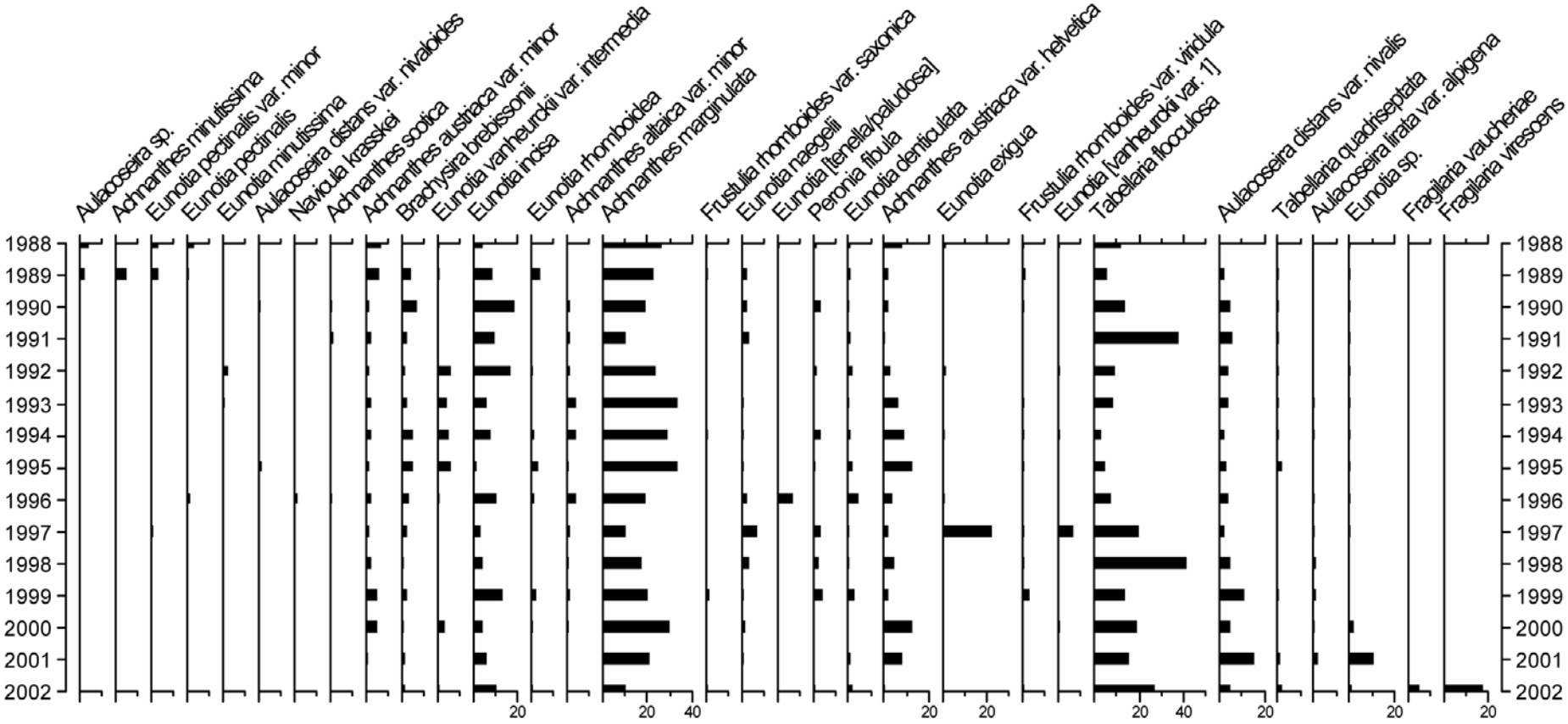
4.3.1. Summary of mean Trout density (numbers $100m^{-2}$), Lochnagar



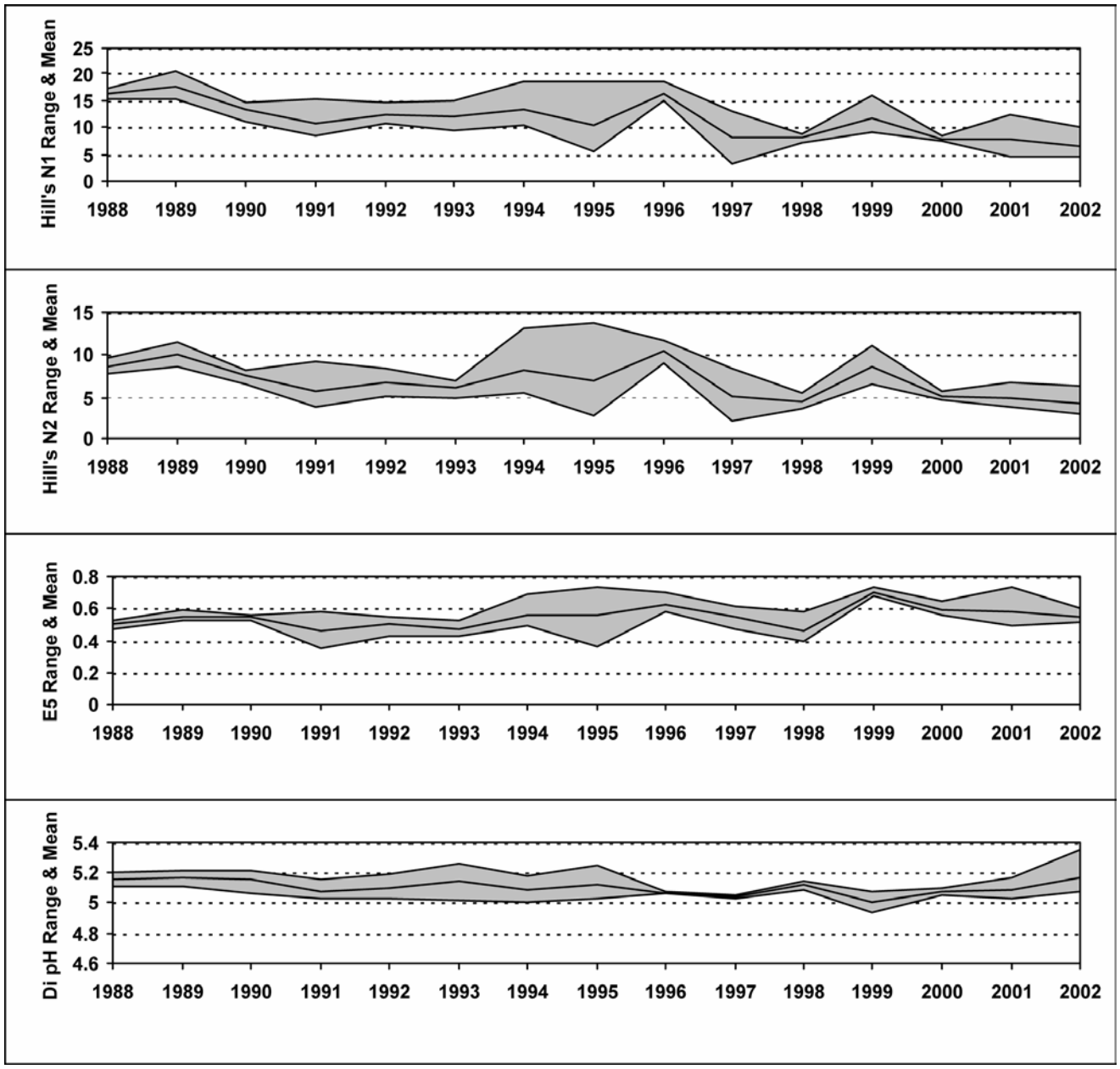
NF = Not fished

4.4. Epilithic diatom data

4.4.1. Percentage abundance summary, Lochnagar

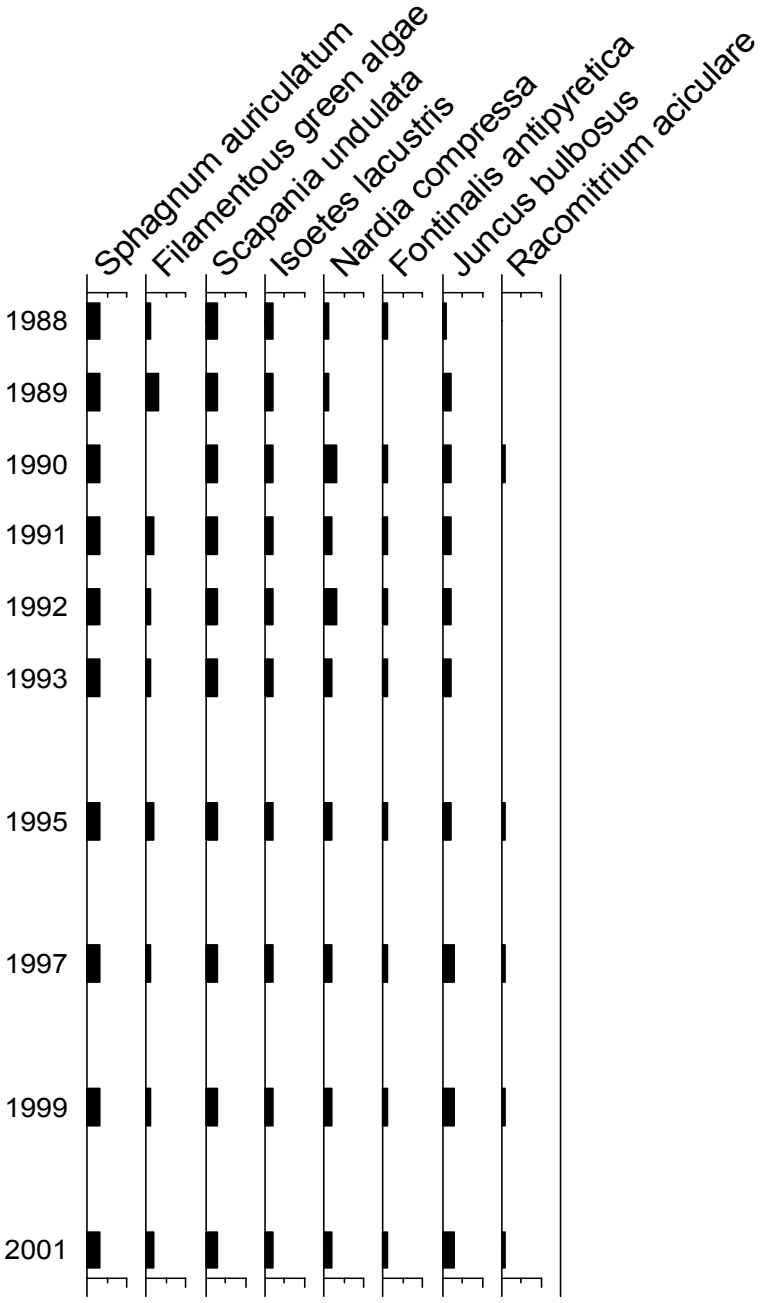


4.4.2. Summary statistics, Lochnagar



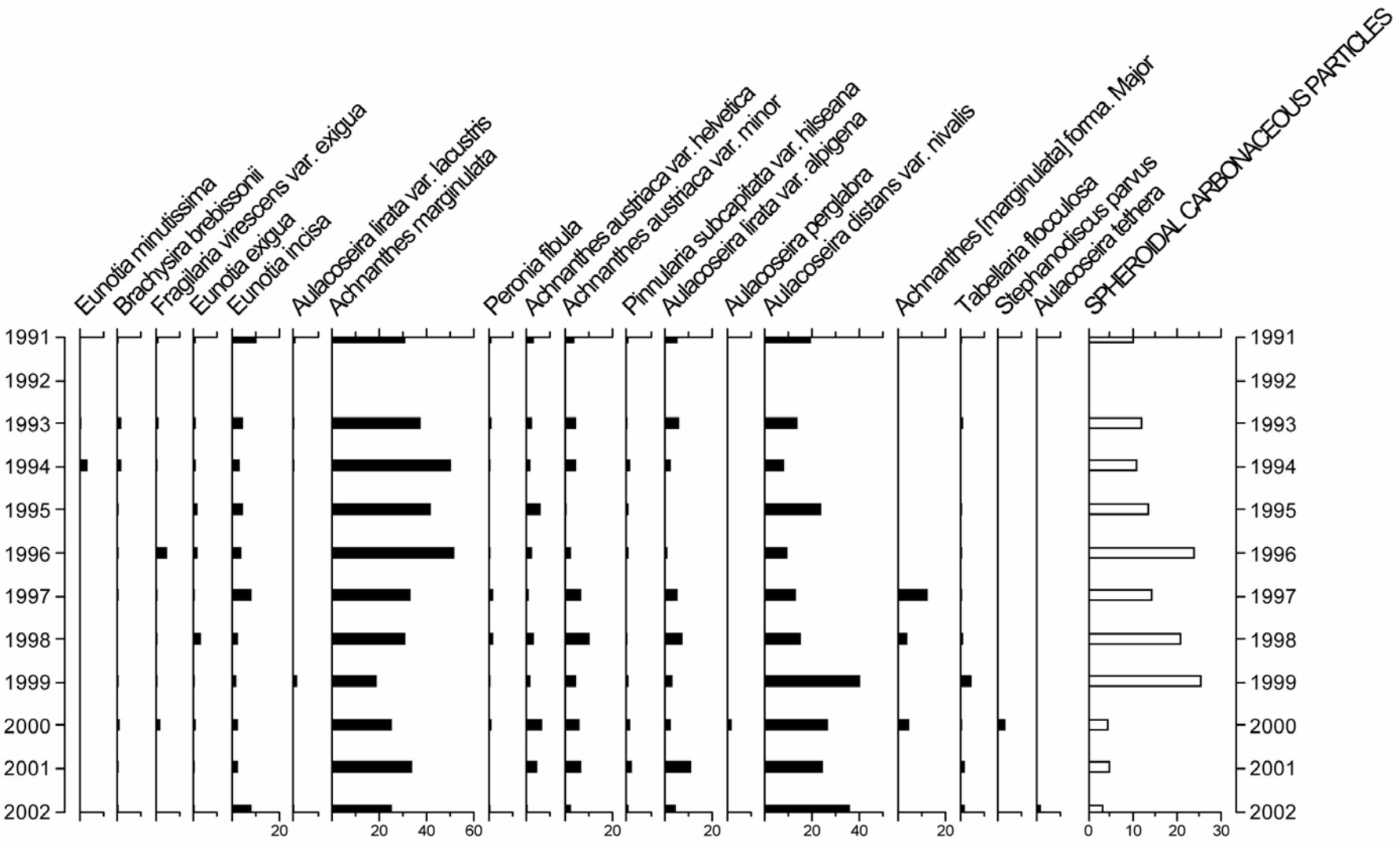
4.5. Aquatic macrophyte data, Lochnagar

Species Scores (1-5)



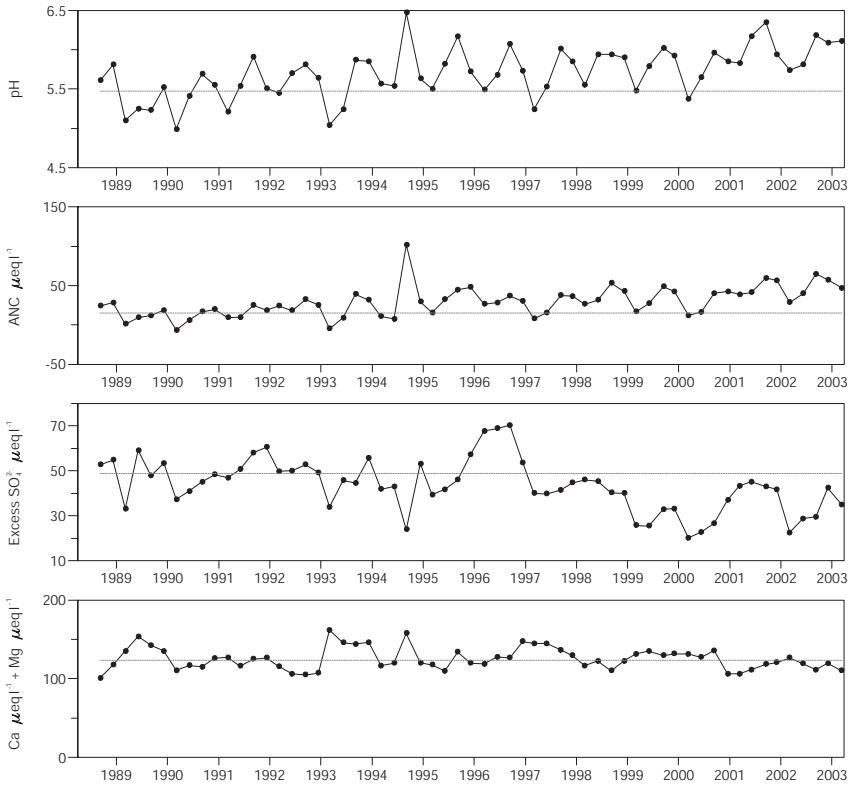
4.6. Sediment trap data, Lochnagar

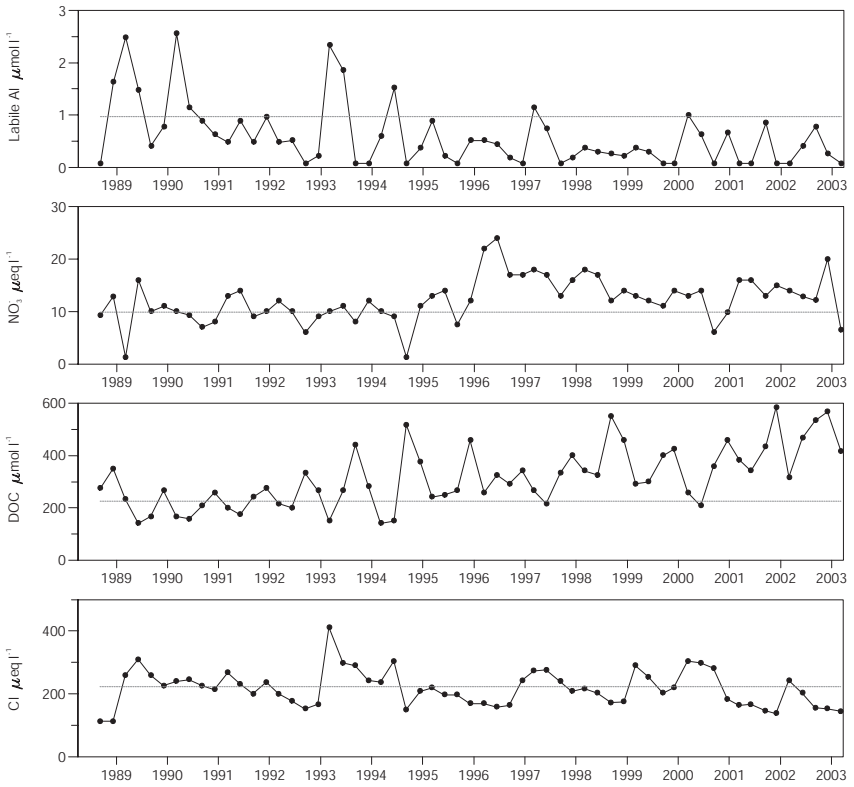
Relative percentage frequency of diatom taxa and carbonaceous particle flux (no. trap^{-1} day^{-1}).



5. Loch Chon

5.1. Spot sampled chemistry data





Determinand statistics

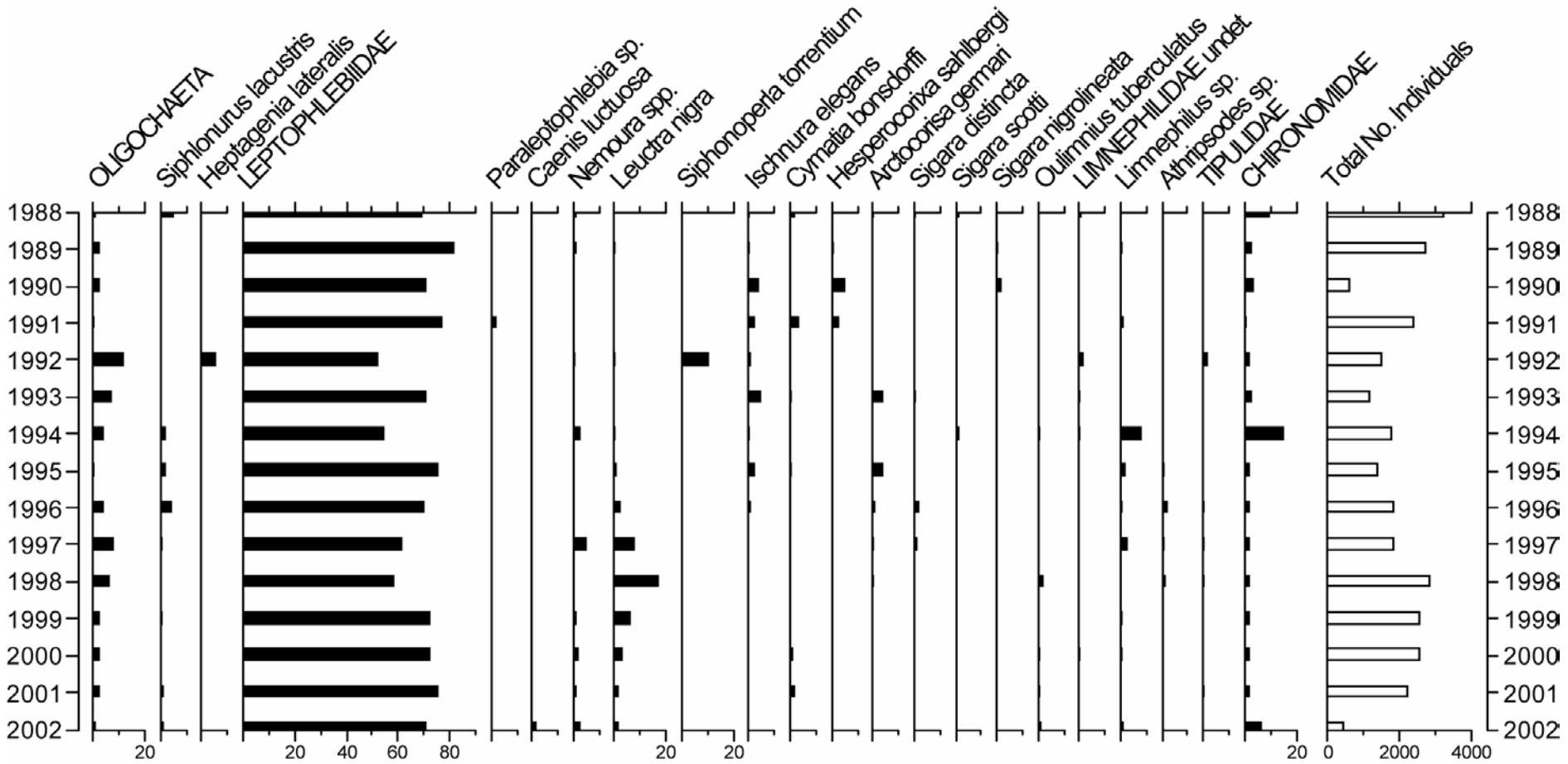
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	5.47	6.05	0.16	**0.04**	**0.00**
ANC	15.14	52.11	11.02	**2.70**	**0.00**
Ca	75.74	70.88	1.80	-0.01	0.43
Mg	47.50	43.96	3.81	0.00	0.54
Na	186.3	130.4	29.06	-0.05	0.24
K	5.65	6.54	0.61	0.00	0.96
Sol.Al	2.43	1.84	0.86	**-1.17**	**0.00**

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	0.97	0.38	0.30	**-1.33**	**0.00**
Cl	223.4	163.4	26.72	-0.12	0.34
SO_4	72.15	51.04	5.24	**-0.08**	**0.01**
XSO_4	48.69	33.89	6.28	**-0.07**	**0.02**
NO_3	9.88	12.86	5.56	0.00	0.11
Si	31.58	38.21	8.44	0.00	0.47
DOC	225.4	495.8	67.19	**0.22**	**0.00**

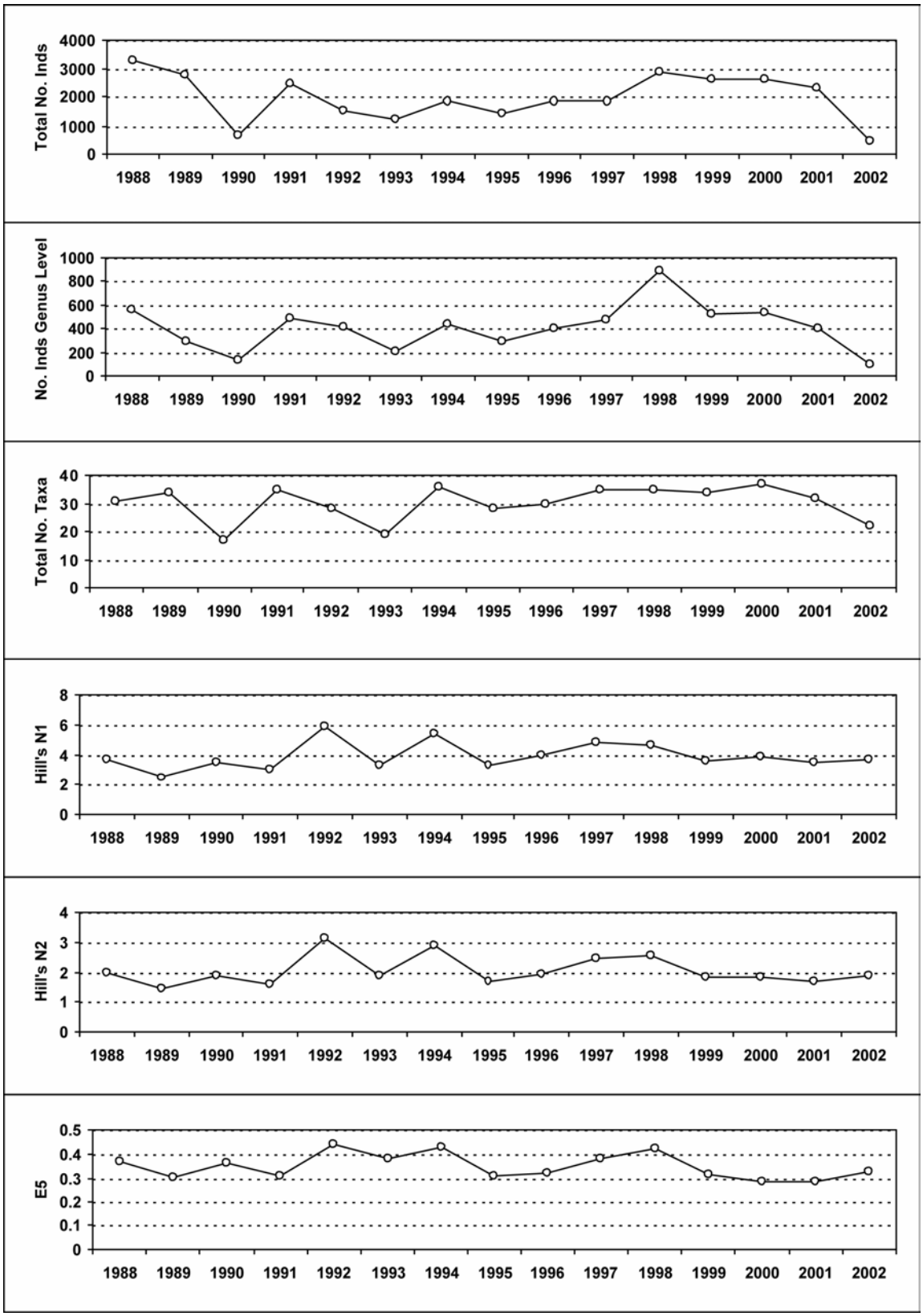
* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq\,l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol\,l^{-1}$)

5.2. Macroinvertebrate data

5.2.1. Percentage abundance summary, Loch Chon

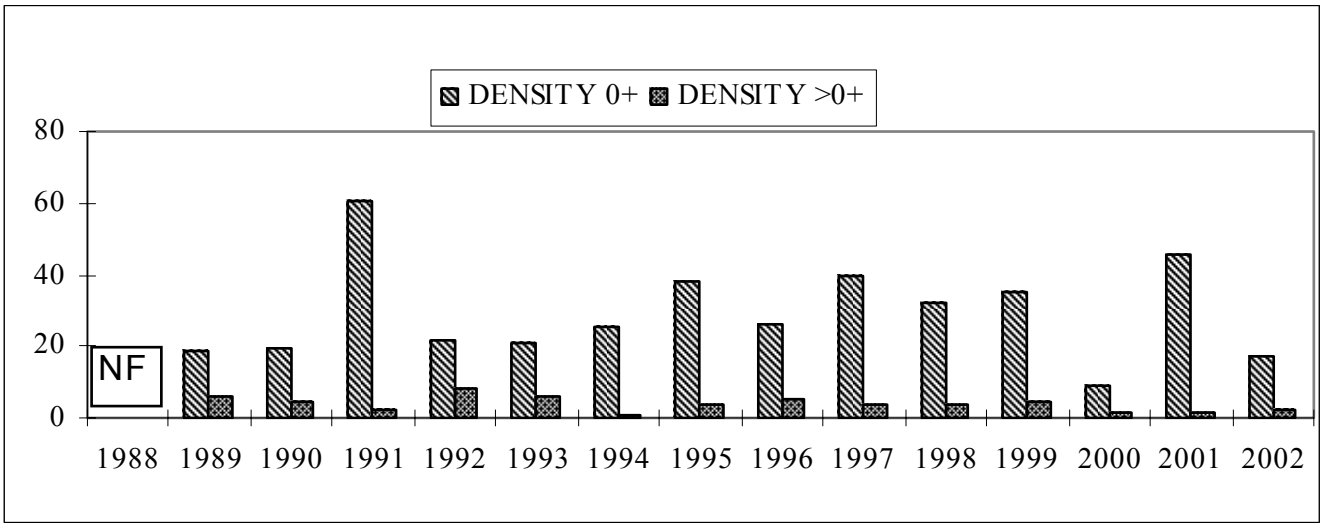


5.2.2. Summary statistics, Loch Chon



5.3. Fish data (for outflow stream)

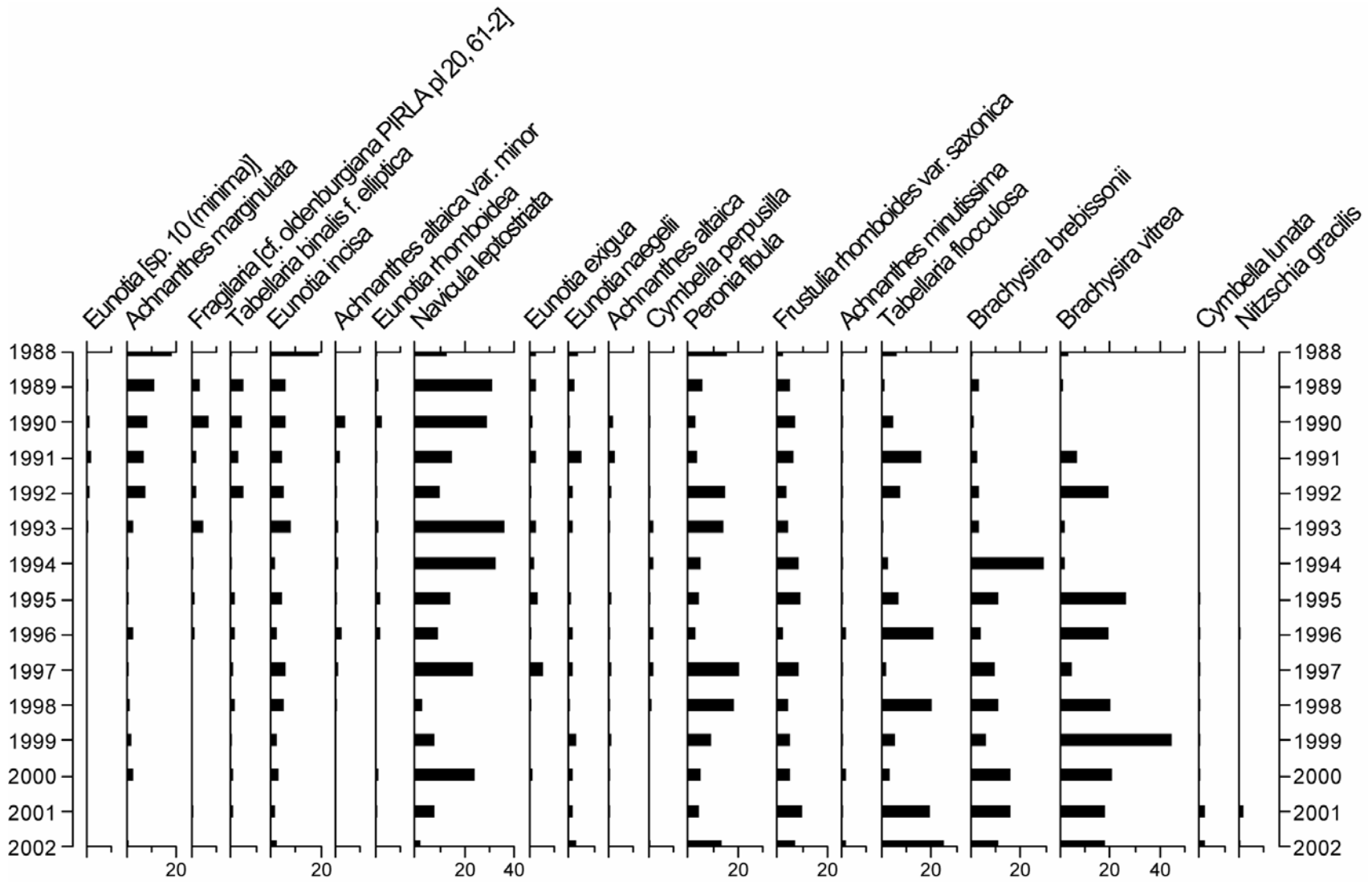
5.3.1. Summary of mean Trout density (numbers 100m^{-2}), Loch Chon



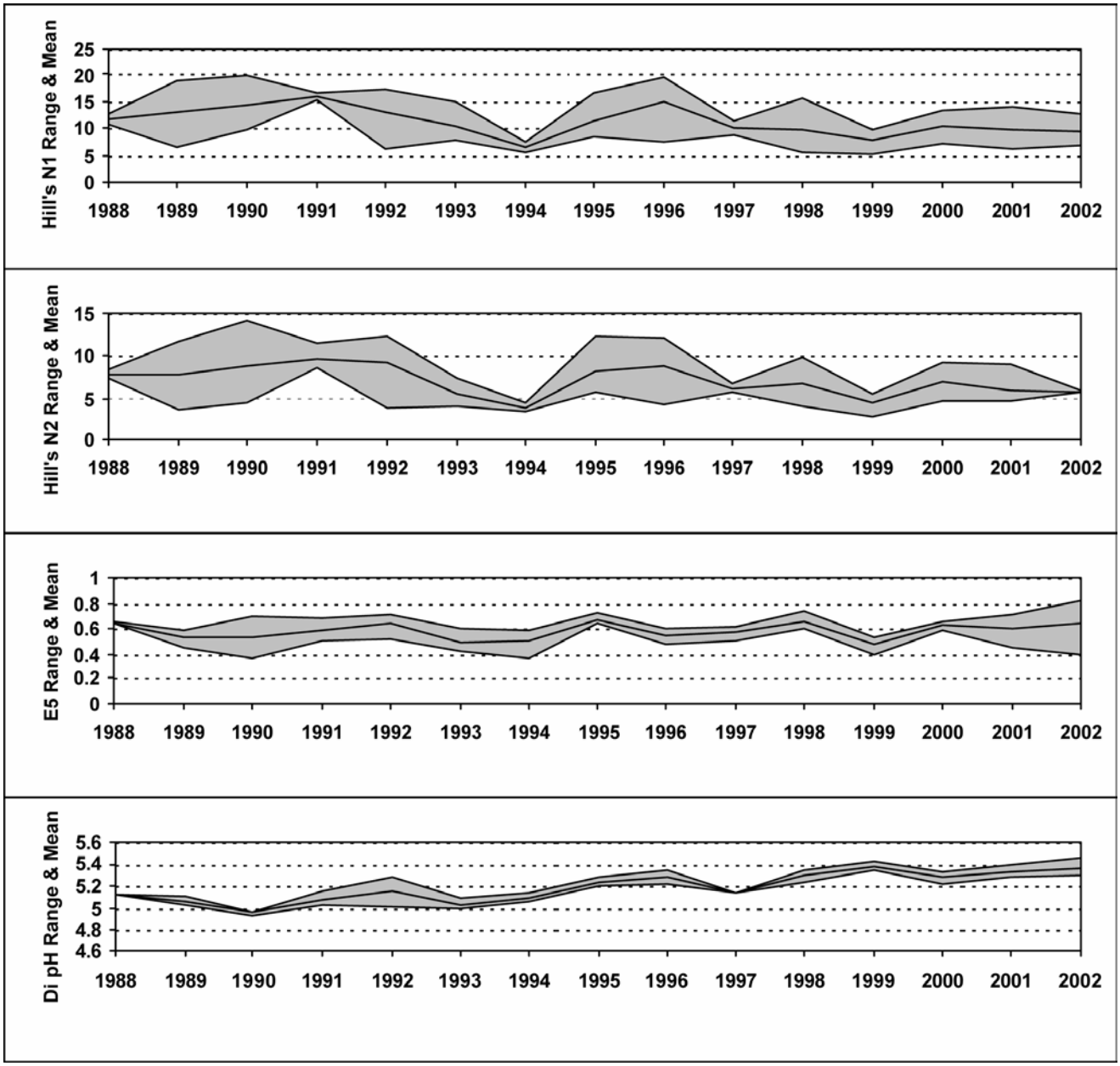
NF = Not fished

5.4. Epilithic diatom data

5.4.1. Percentage abundance summary, Loch Chon

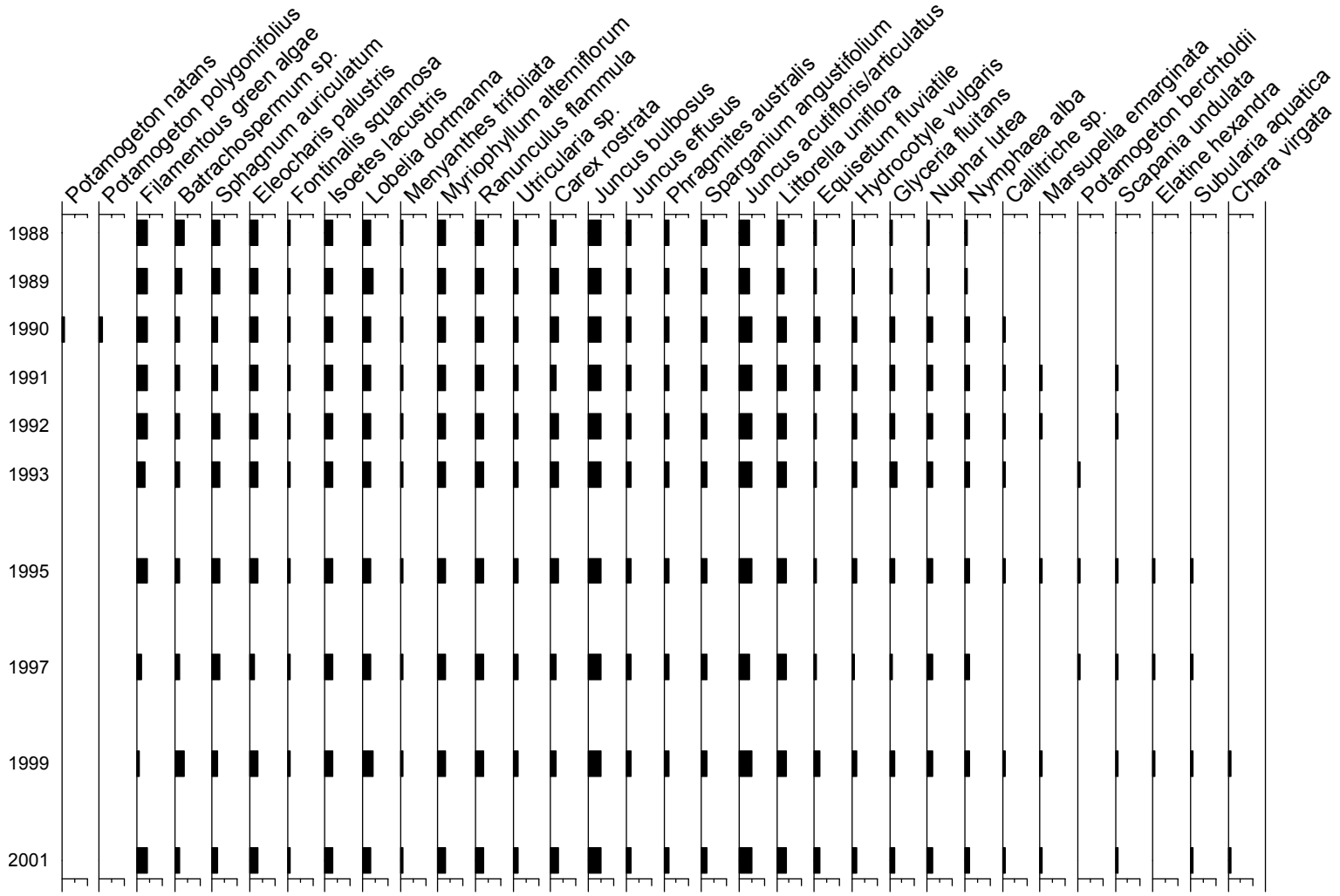


5.4.2. Summary statistics, Loch Chon



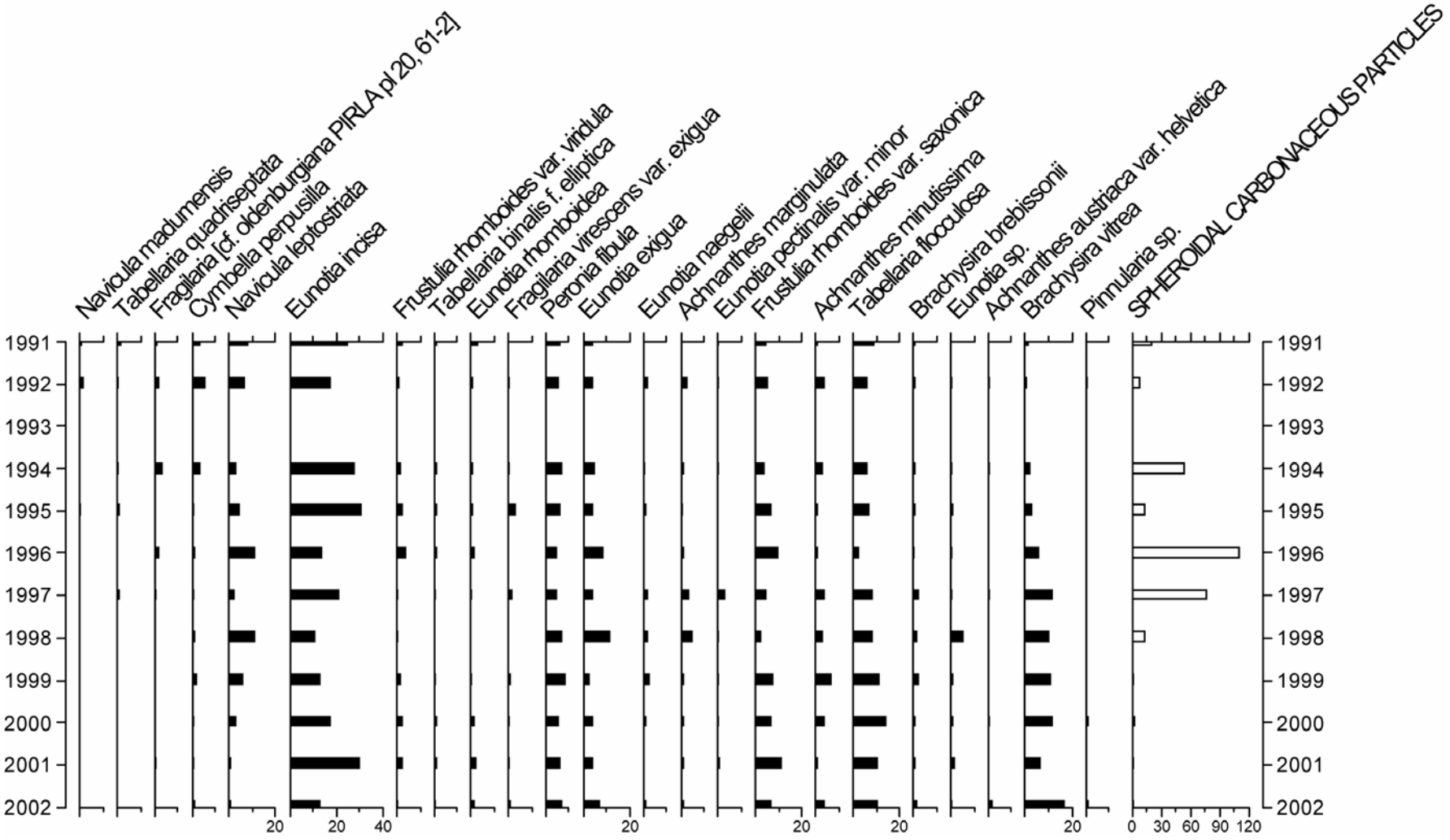
5.5. Aquatic macrophyte data, Loch Chon

Species Scores (1-5)



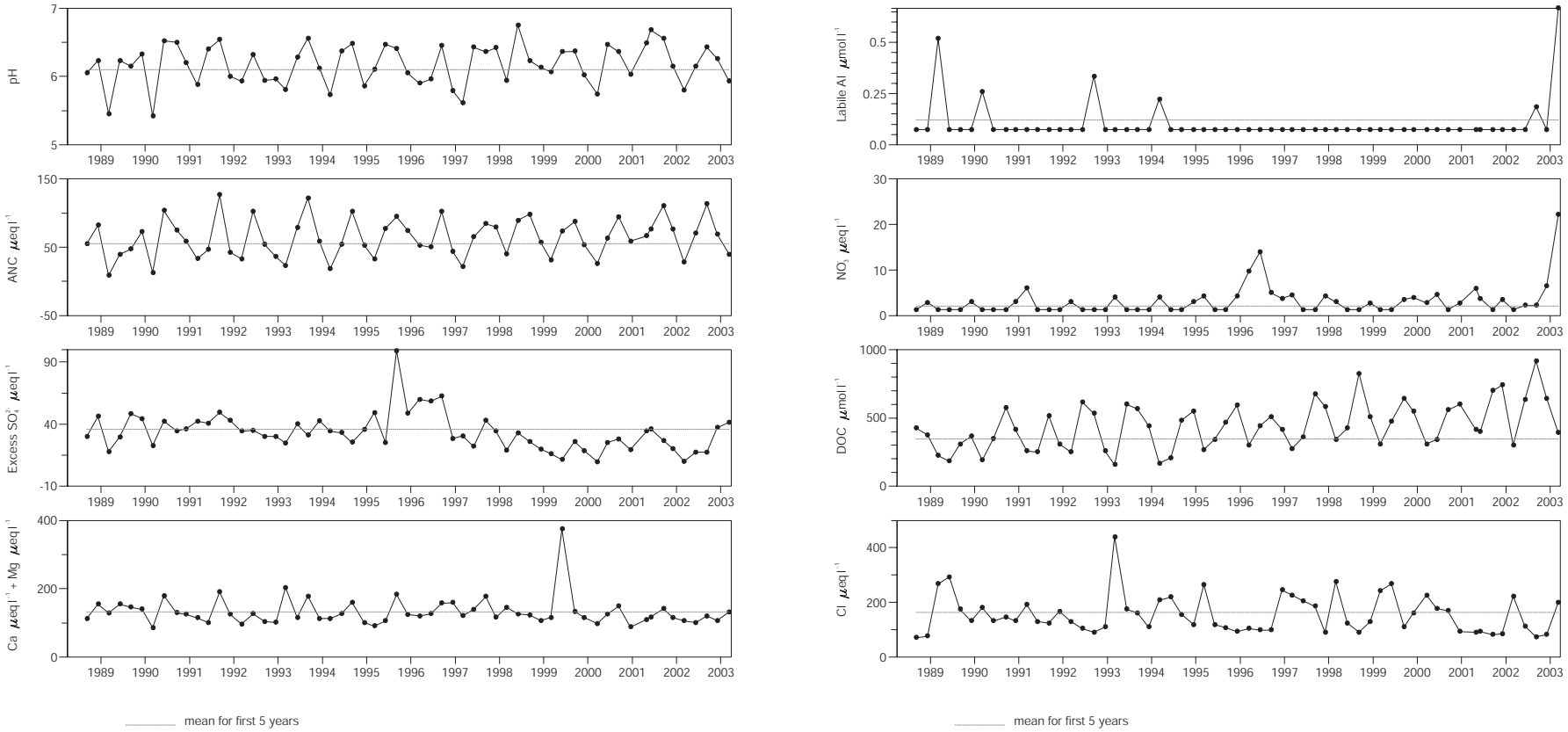
5.6. Sediment trap data, Loch Chon

Relative percentage frequency of diatom taxa and carbonaceous particle flux (no. trap^{-1} day^{-1}).



6. Loch Tinker

6.1. Spot sampled chemistry data



Determinand statistics

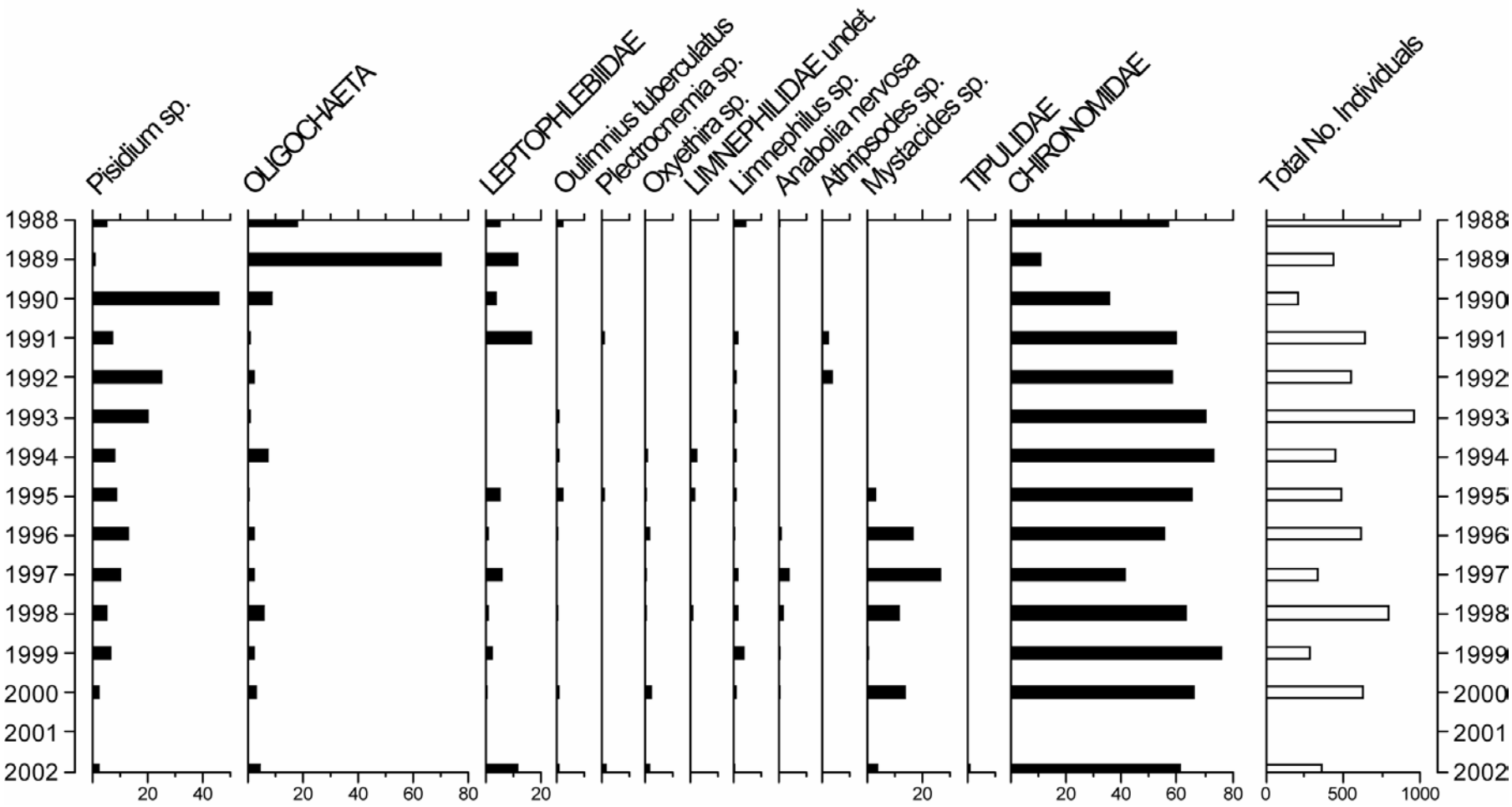
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	6.10	6.19	0.21	0.01	0.19
ANC	55.44	73.25	30.42	1.40	0.07
Ca	86.00	74.00	6.96	-0.01	0.18
Mg	46.45	40.62	8.72	-0.01	0.21
Na	140.0	100.0	41.25	-0.05	0.15
K	7.22	5.58	1.60	0.00	0.19
Sol.Al	0.72	1.35	0.84	0.05	0.71

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	0.12	0.25	0.28	0.00	0.37
Cl	162.6	116.9	57.94	-0.10	0.21
SO_4	52.96	40.62	17.14	**-0.07**	**0.02**
XSO_4	35.88	28.35	12.85	**-0.06**	**0.02**
NO_3	2.03	8.25	9.47	**0.00**	**0.02**
Si	24.06	35.36	4.68	0.00	0.90
DOC	345.6	645.8	214.6	**0.22**	**0.00**

* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq\,l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol\,l^{-1}$)

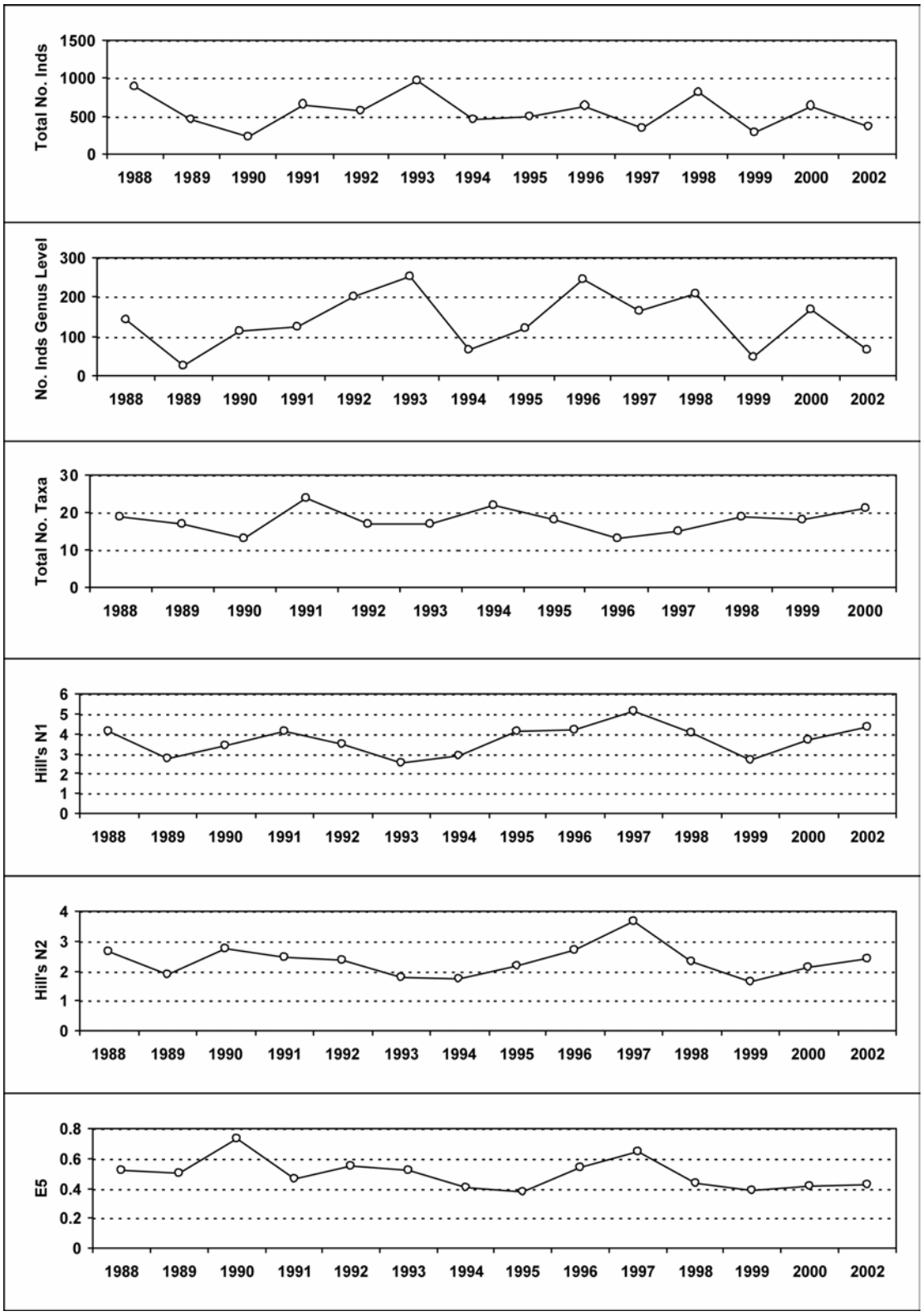
6.2. Macroinvertebrate data

6.2.1. Percentage abundance summary, Loch Tinker



No sampling in 2001 due to Foot and Mouth restrictions.

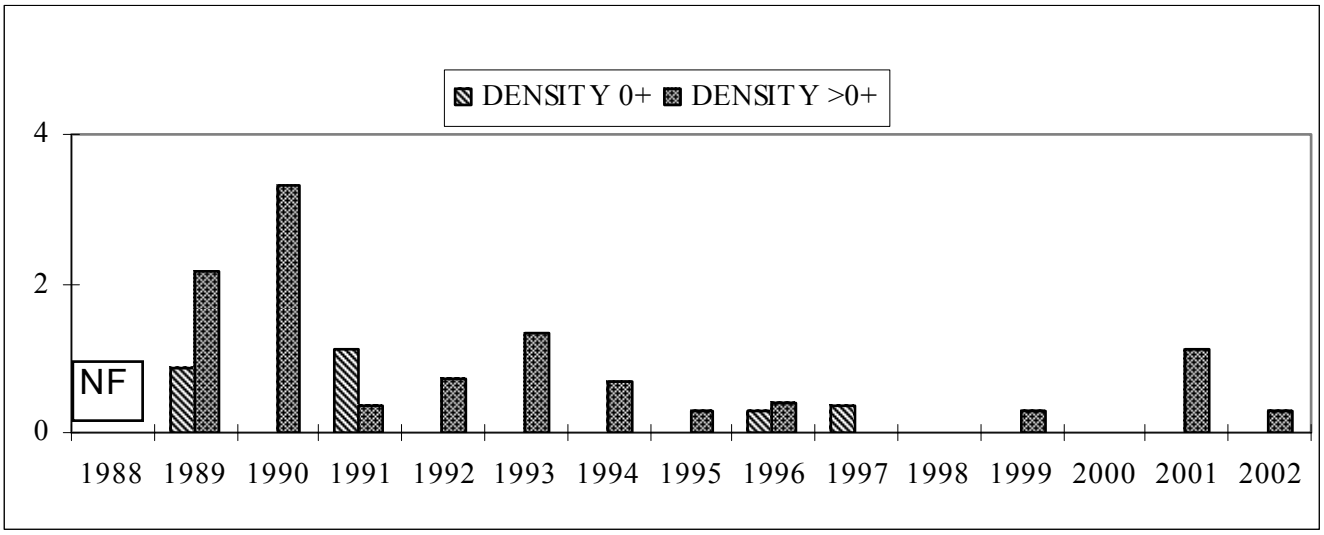
6.2.2. Summary statistics, Loch Tinker



No sampling in 2001 due to Foot and Mouth restrictions.

6.3. Fish data (for outflow stream)

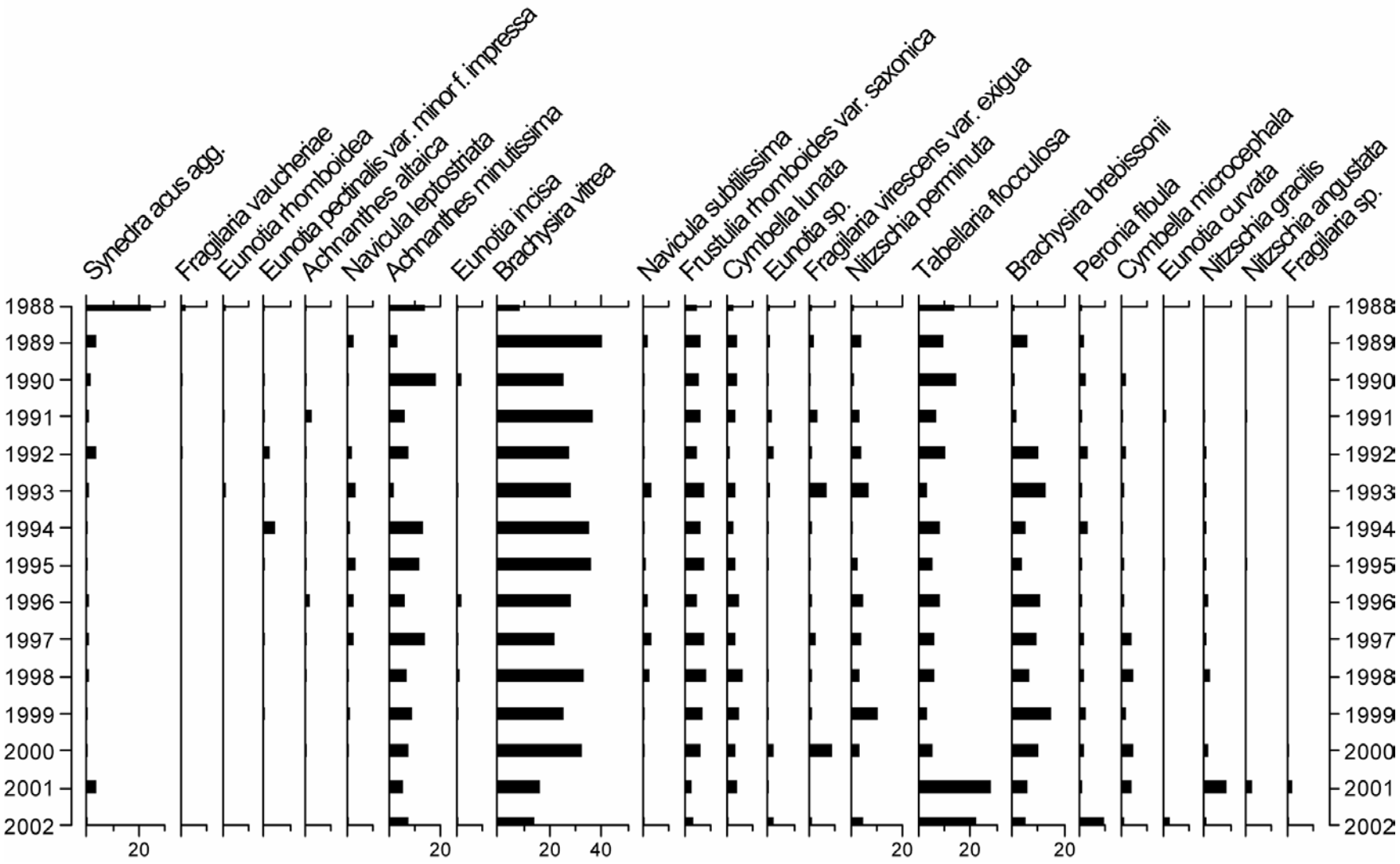
6.3.1. Summary of mean Trout density (numbers $100m^{-2}$), Loch Tinker



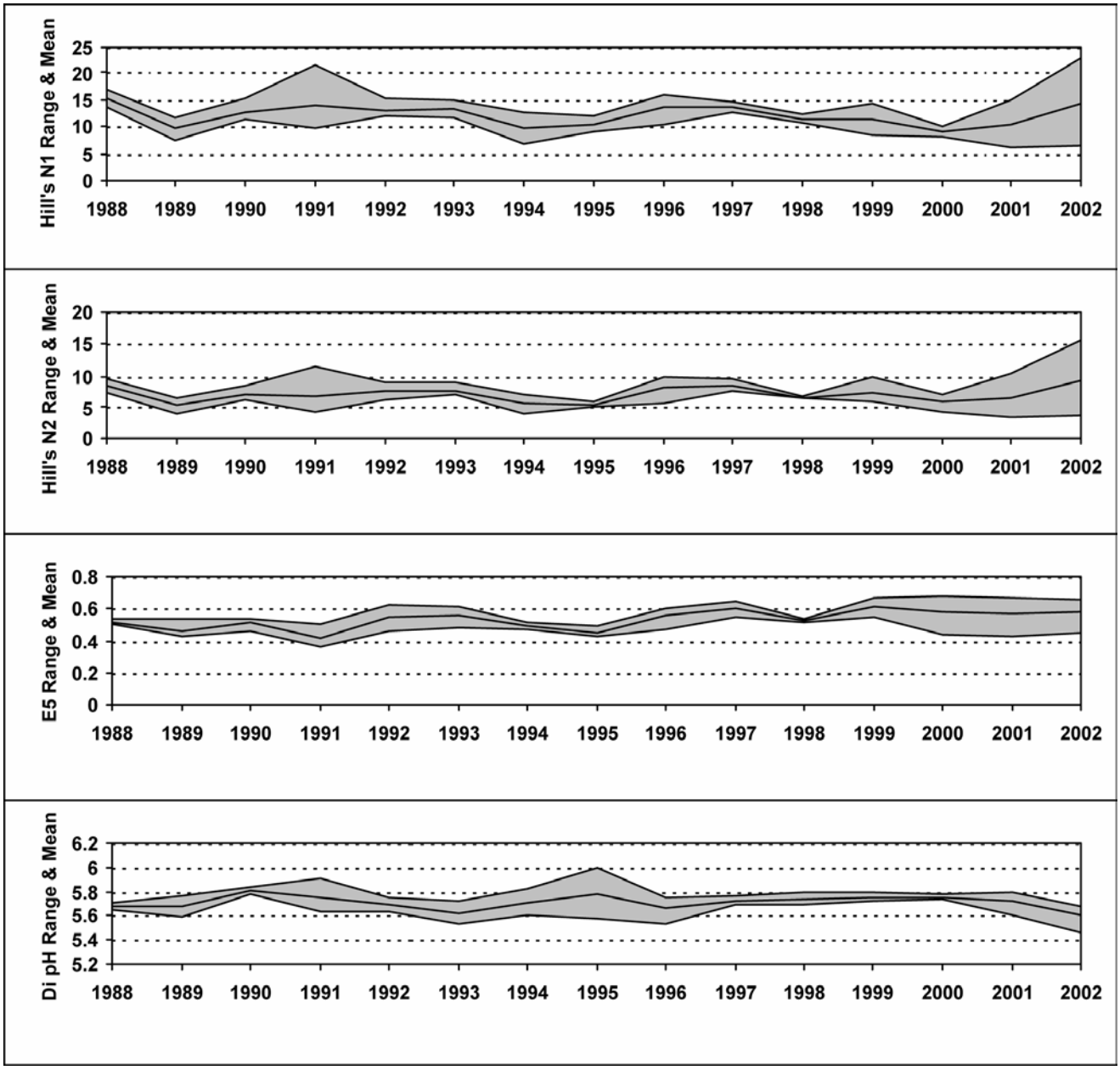
NF = Not fished

6.4. Epilithic diatom data

6.4.1. Percentage abundance summary, Loch Tinker

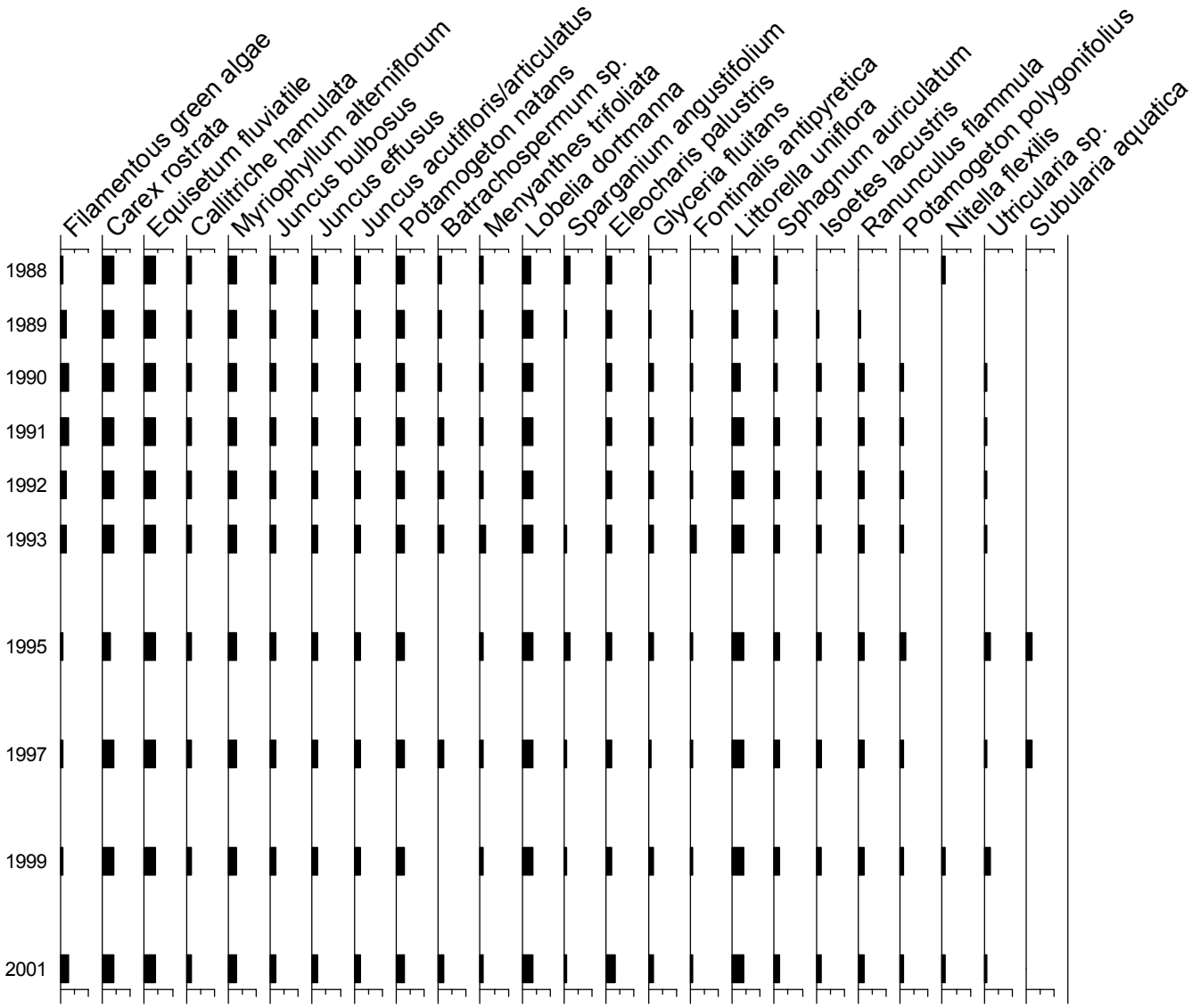


6.4.2. Summary statistics, Loch Tinker



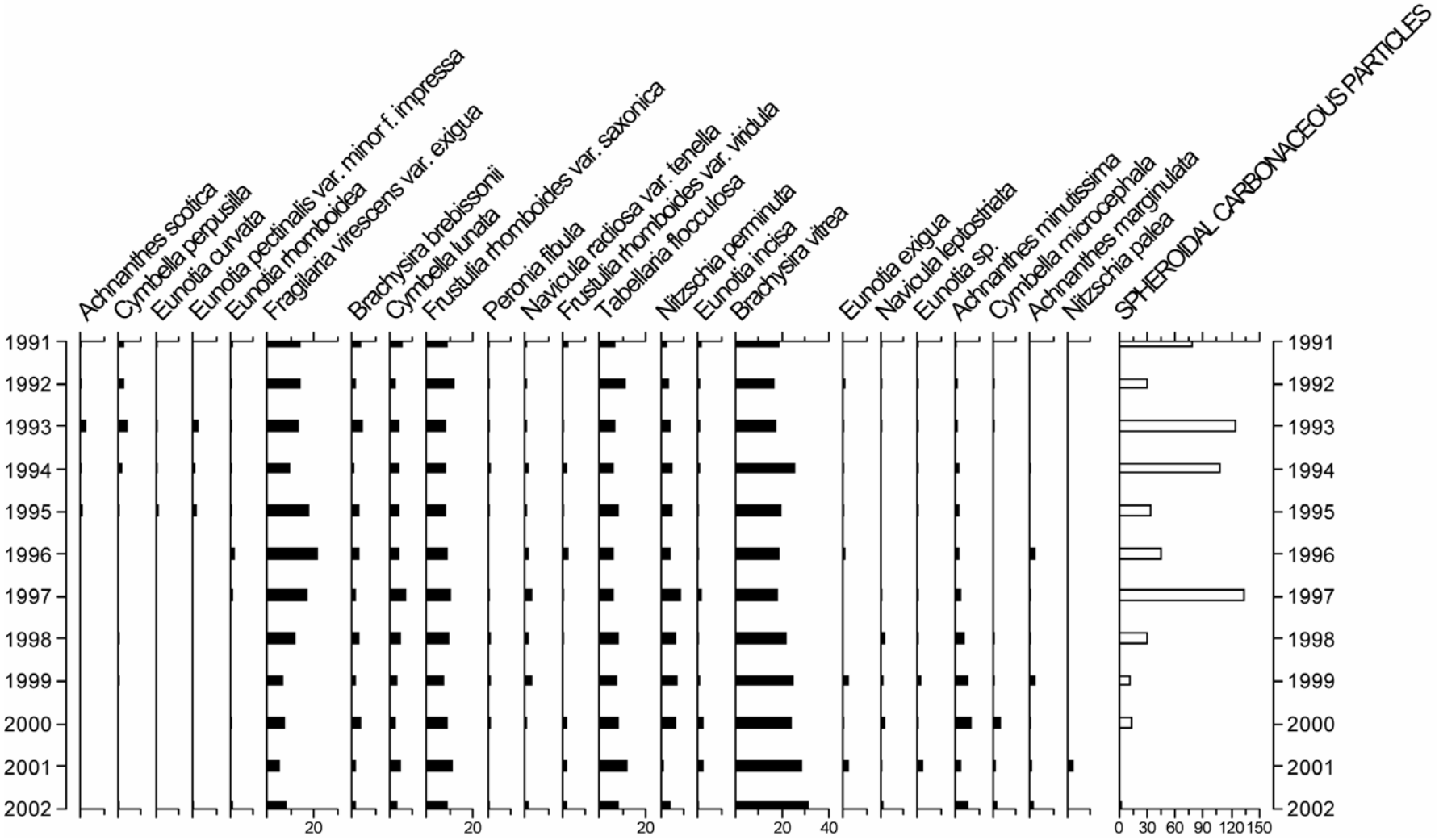
6.5. Aquatic macrophyte data, Loch Tinker

Species Scores (1-5)



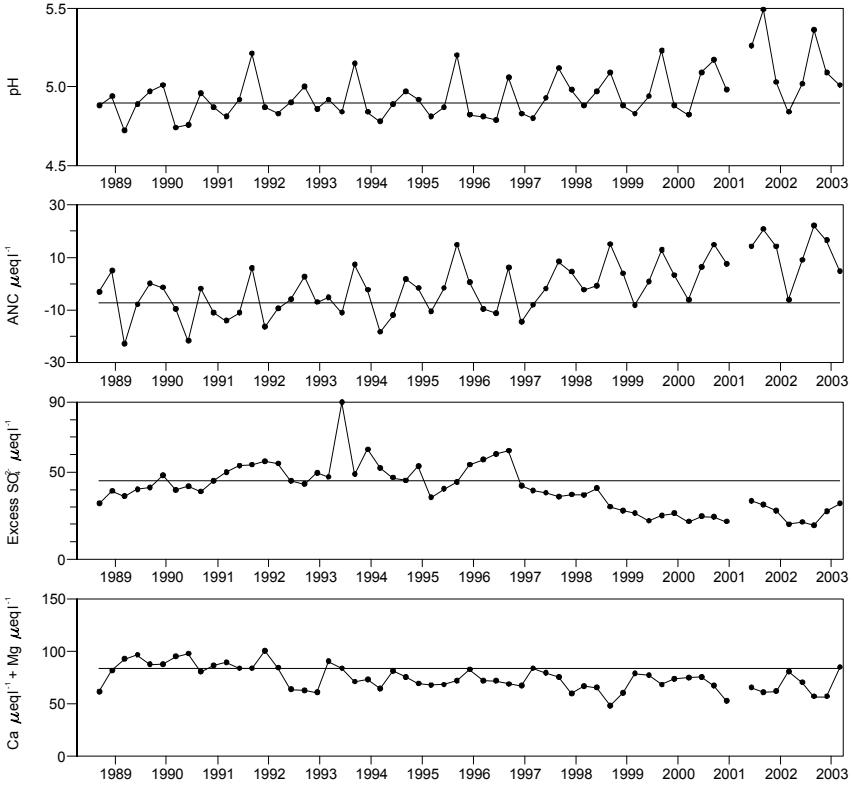
6.6. Sediment trap data, Loch Tinker

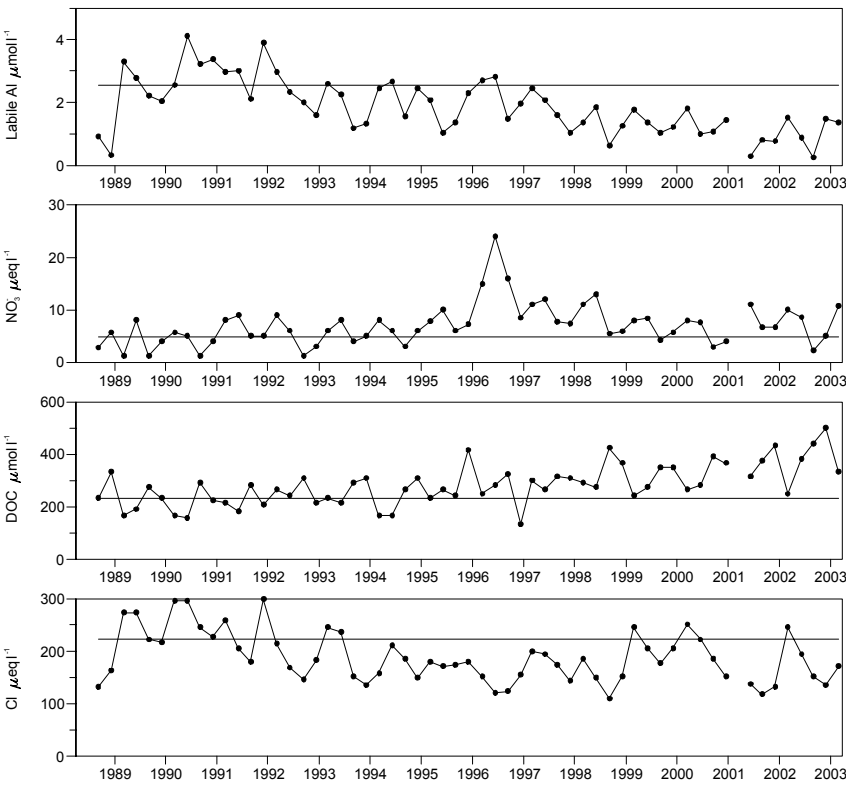
Relative percentage frequency of diatom taxa and carbonaceous particle flux (no. trap^{-1} day^{-1}).



7. Round Loch of Glenhead

7.1. Spot sampled chemistry data





Determinand statistics

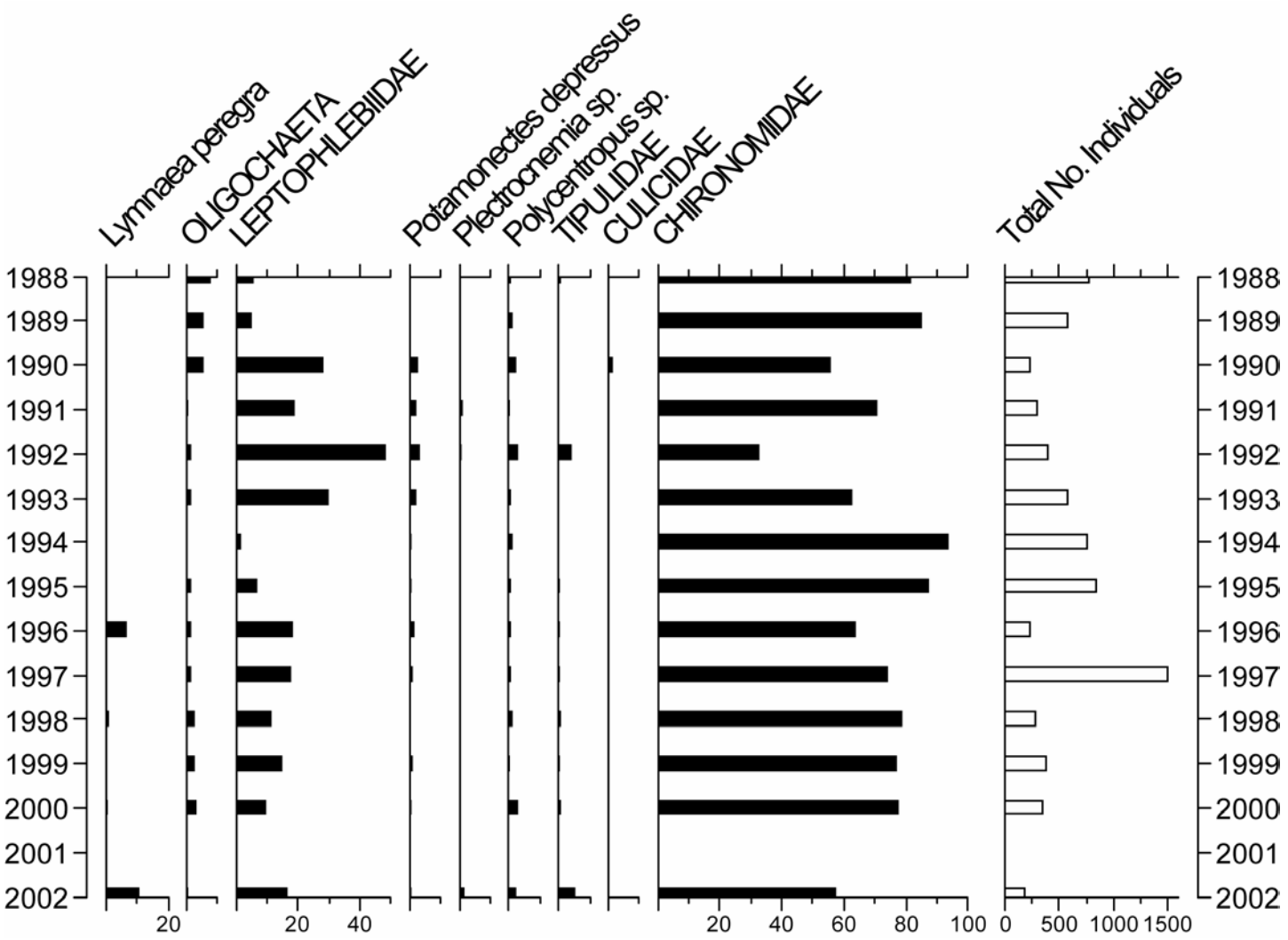
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	SK* 4/1988-3/2003	p* 4/1988-3/2003
pH	4.90	5.12	0.16	0.01	0.00
ANC	-7.13	13.14	7.67	1.54	0.00
Ca	34.92	28.50	5.66	-0.01	0.01
Mg	48.55	38.75	7.71	-0.01	0.02
Na	193.8	130.4	29.06	-0.09	0.01
K	9.00	8.01	2.42	-0.01	0.06
Sol.Al	3.65	2.67	0.56	-2.00	0.01

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	SK* 4/19883/2003	p* 4/1988-3/2003
Sol.lab.Al	2.54	1.00	0.56	-3.65	0.00
Cl	223.6	163.4	25.51	-0.15	0.05
SO_4	68.42	42.19	5.98	-0.12	0.00
XSO_4	44.94	25.03	5.76	-0.09	0.02
NO_3	4.81	6.62	3.77	0.00	0.10
Si	26.32	36.79	12.43	0.00	0.83
DOC	233.3	414.6	72.13	0.14	0.00

* Seasonal Kendall trend analysisslope estimate (SK) and significance level (p)
Most units μeq l^{-1}, except Sol.Al, Sol.lab.Al and DOC(μmol l^{-1})

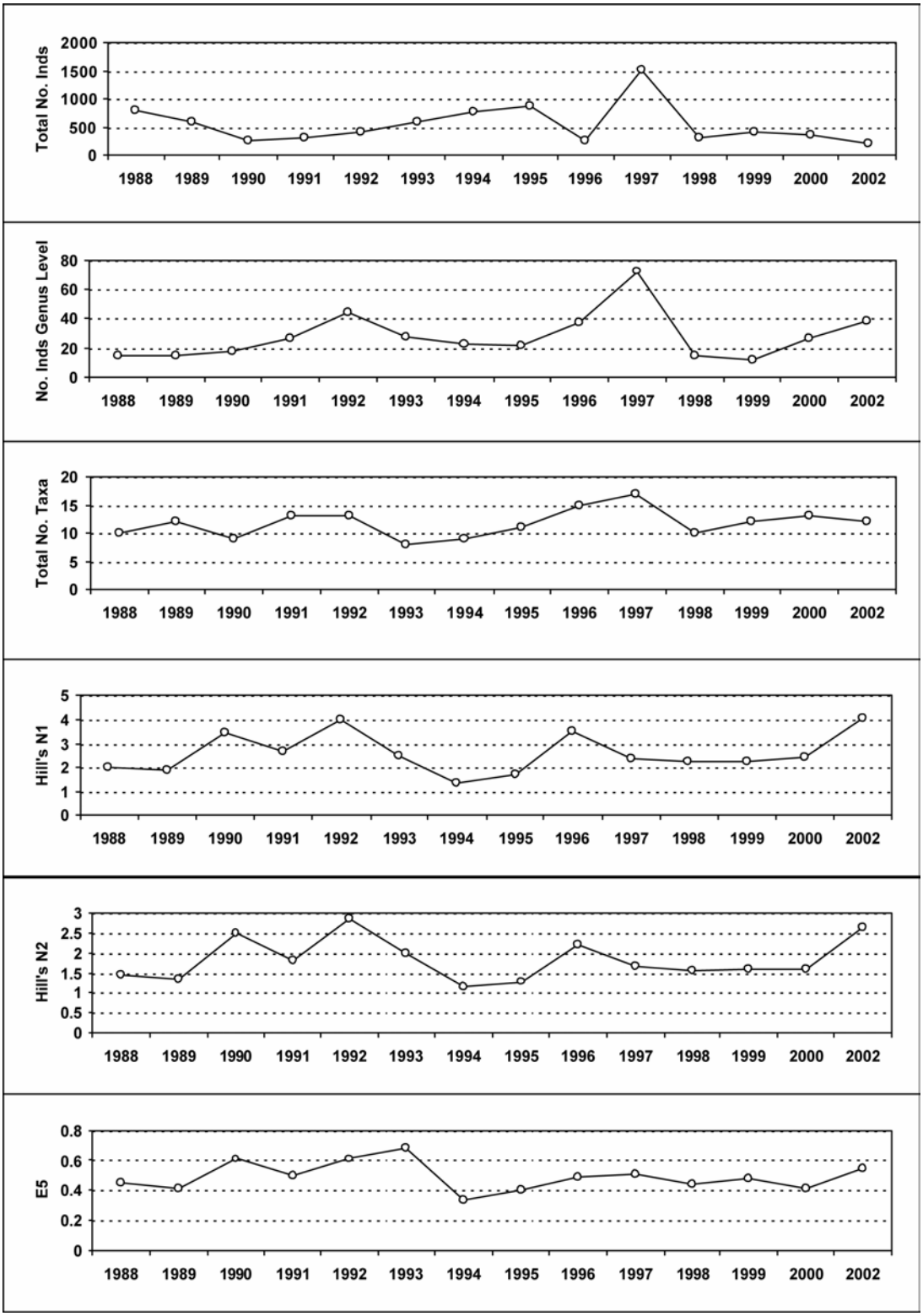
7.2. Macroinvertebrate data

7.2.1. Percentage abundance summary, Round Loch of Glenhead



No sampling in 2001 due to Foot and Mouth restrictions.

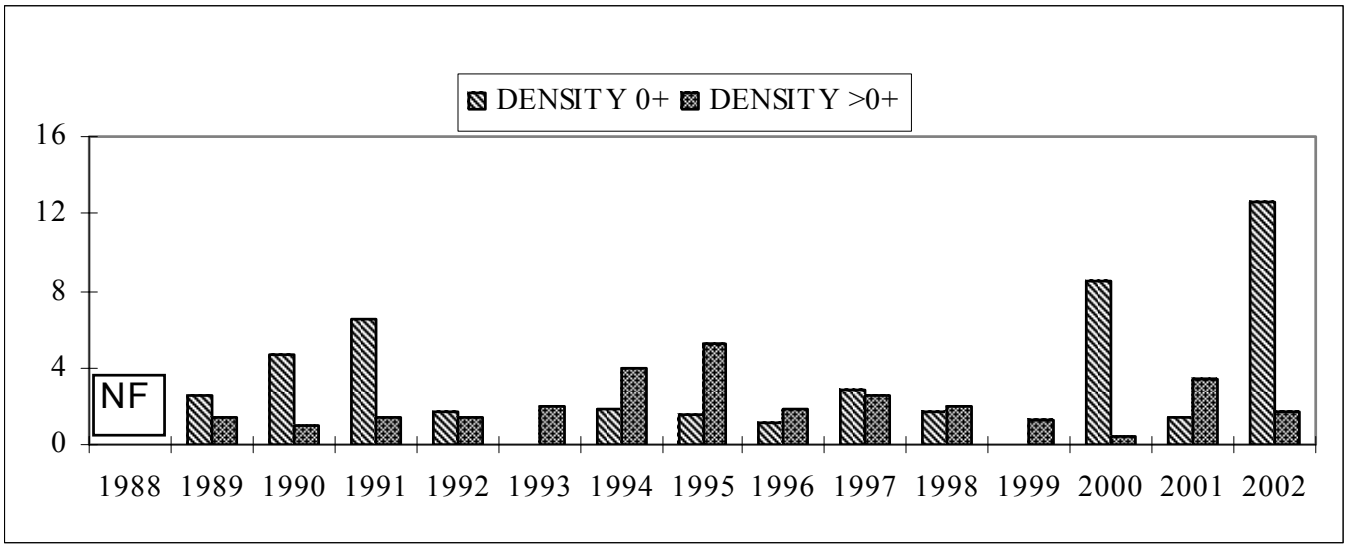
7.2.2. Summary statistics, Round Loch of Glenhead



No sampling in 2001 due to Foot and Mouth restrictions.

7.3. Fish data (for outflow stream)

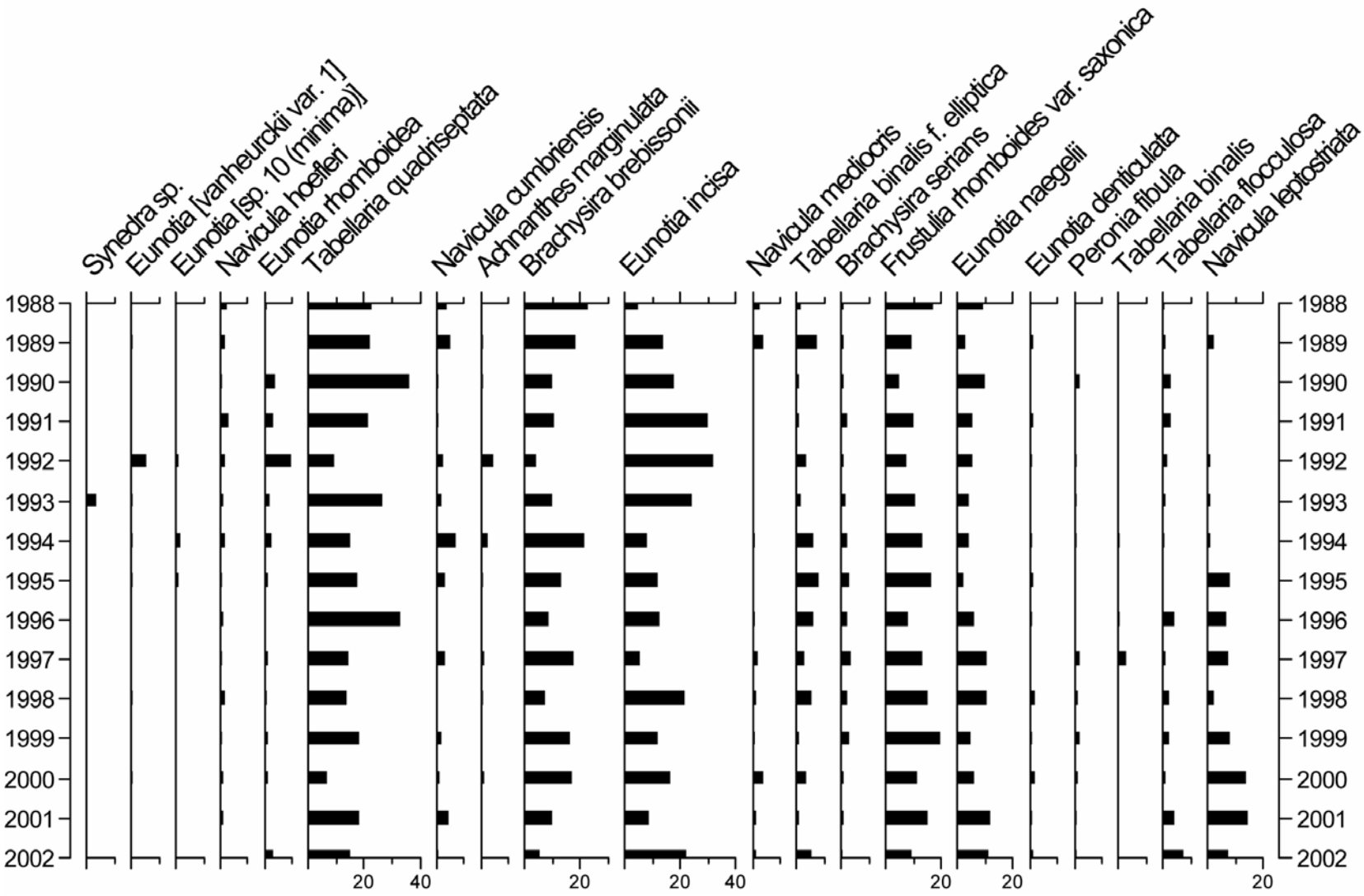
7.3.1. Summary of mean Trout density (numbers 100m^{-2}), Round Loch of Glenhead



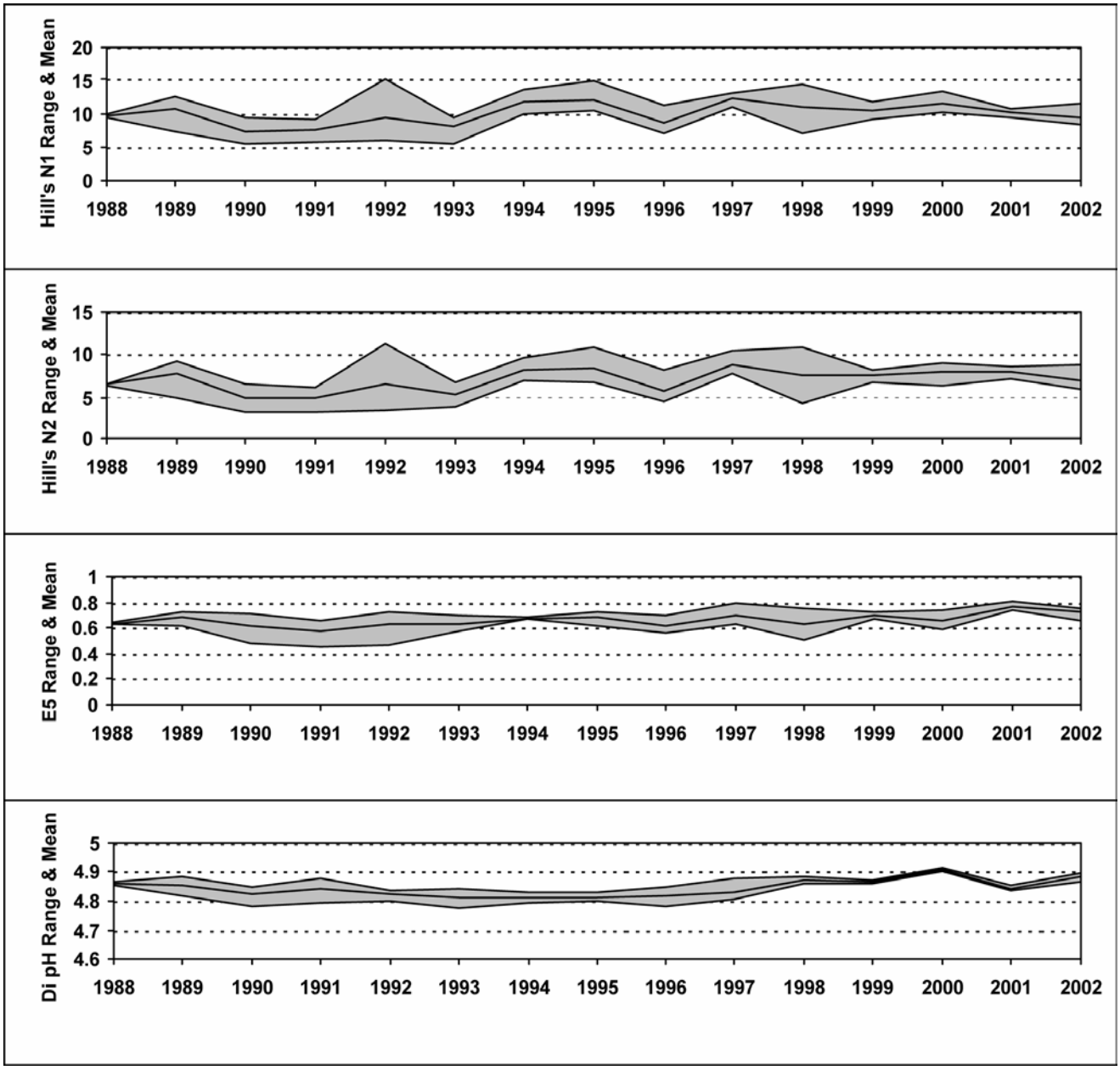
NF = Not fished

7.4. Epilithic diatom data

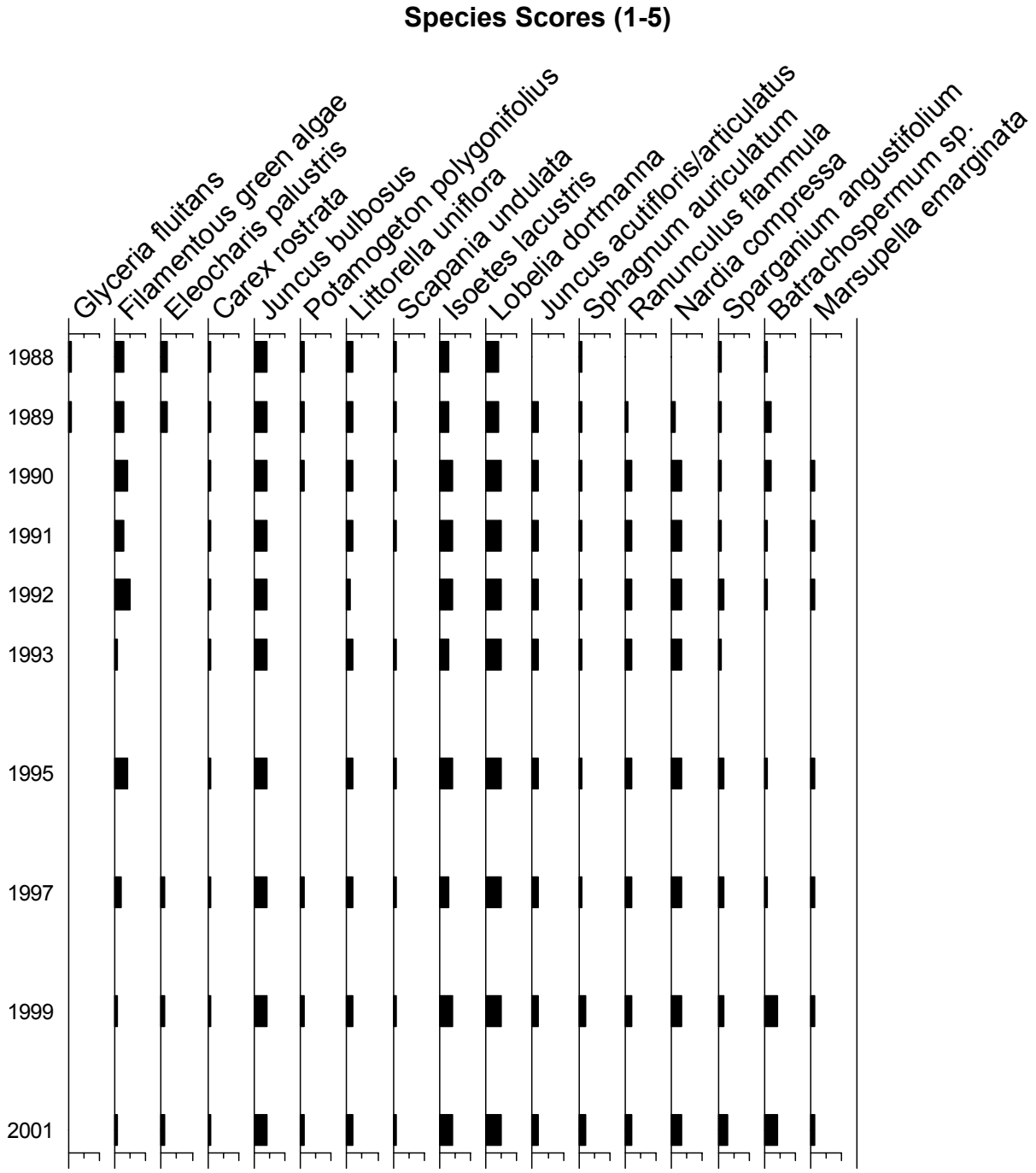
7.4.1. Percentage abundance summary, Round Loch of Glenhead



7.4.2. Summary statistics, Round Loch of Glenhead

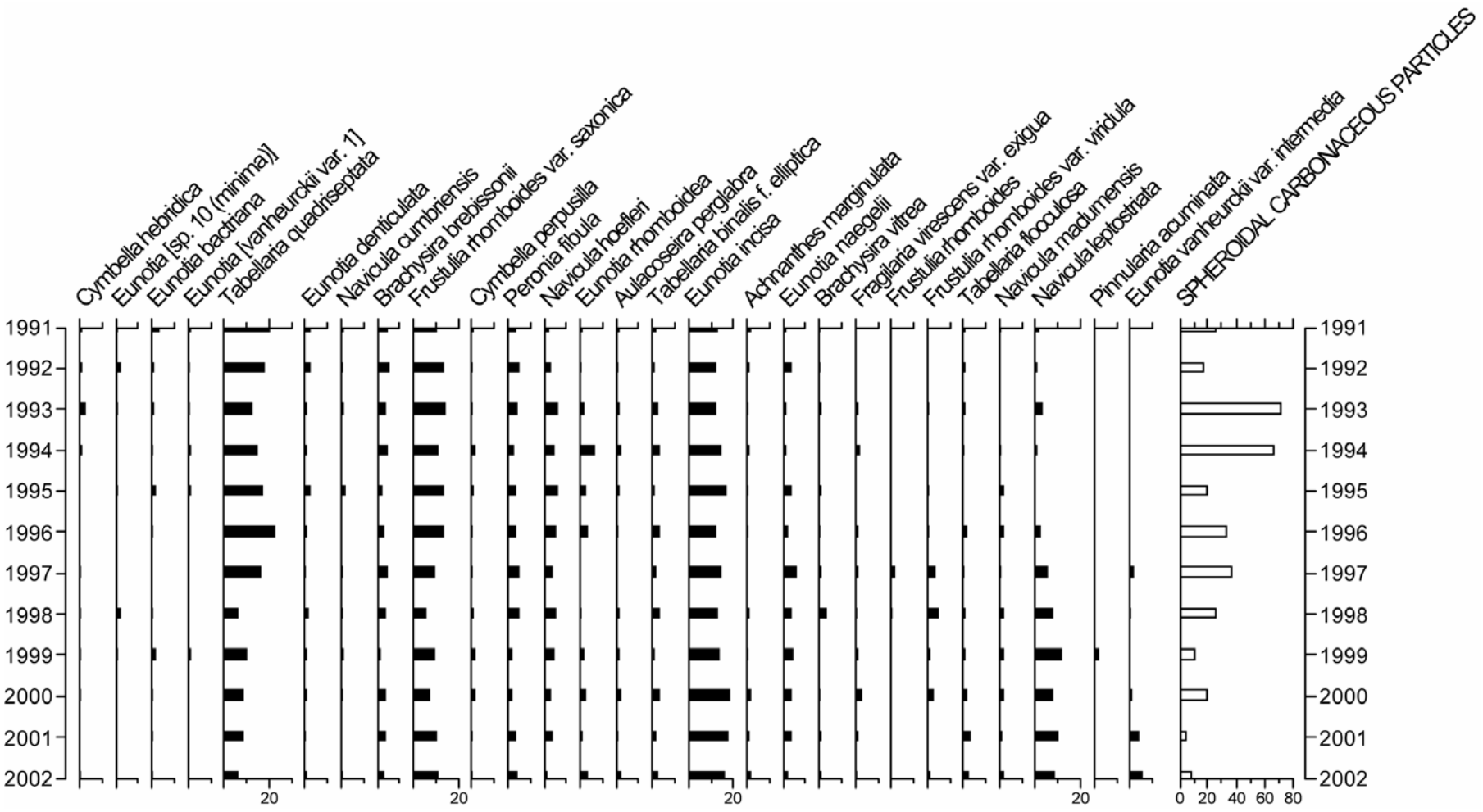


7.5. Aquatic macrophyte data, Round Loch of Glenhead



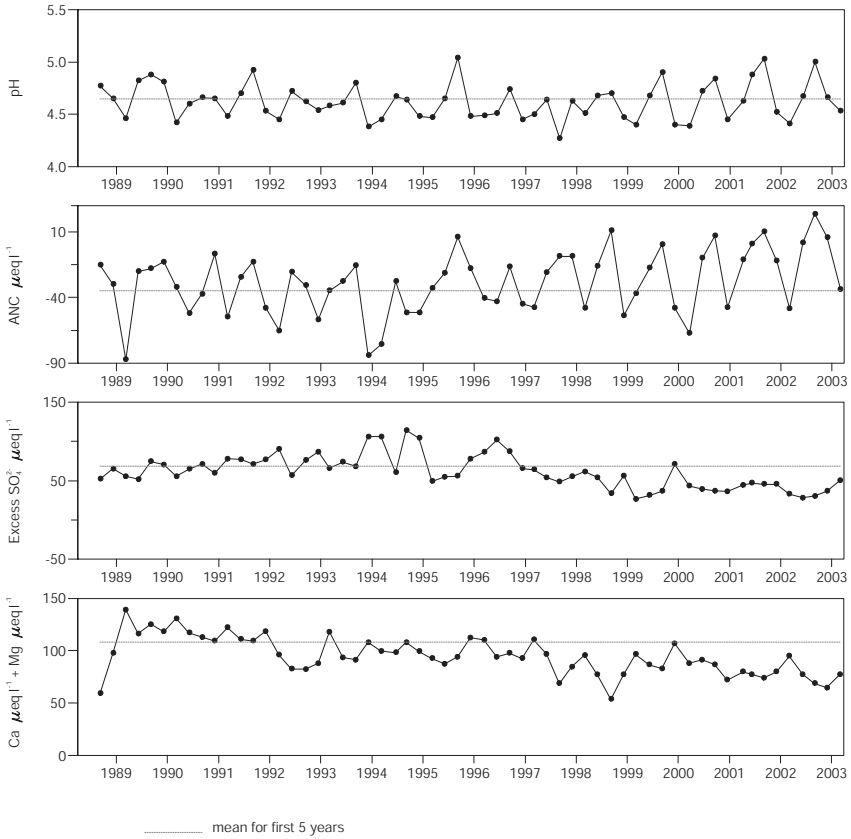
7.6. Sediment trap data, Round Loch of Glenhead

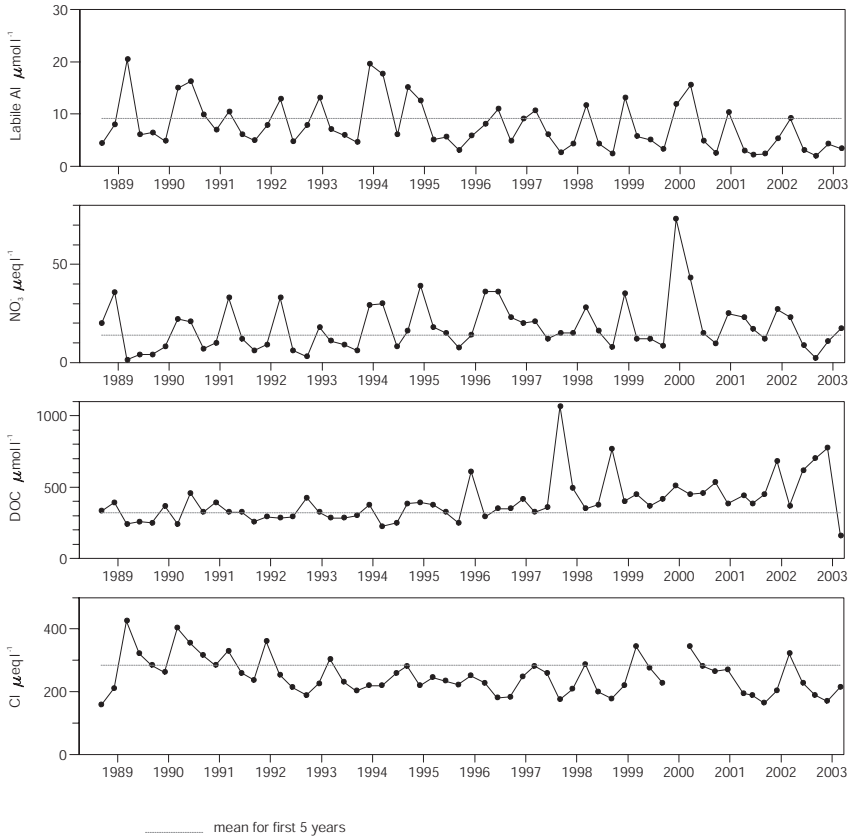
Relative percentage frequency of diatom taxa and carbonaceous particle flux (no. trap^{-1} day^{-1}).



8. Loch Grannoch

8.1. Spot sampled chemistry data





Determinand statistics

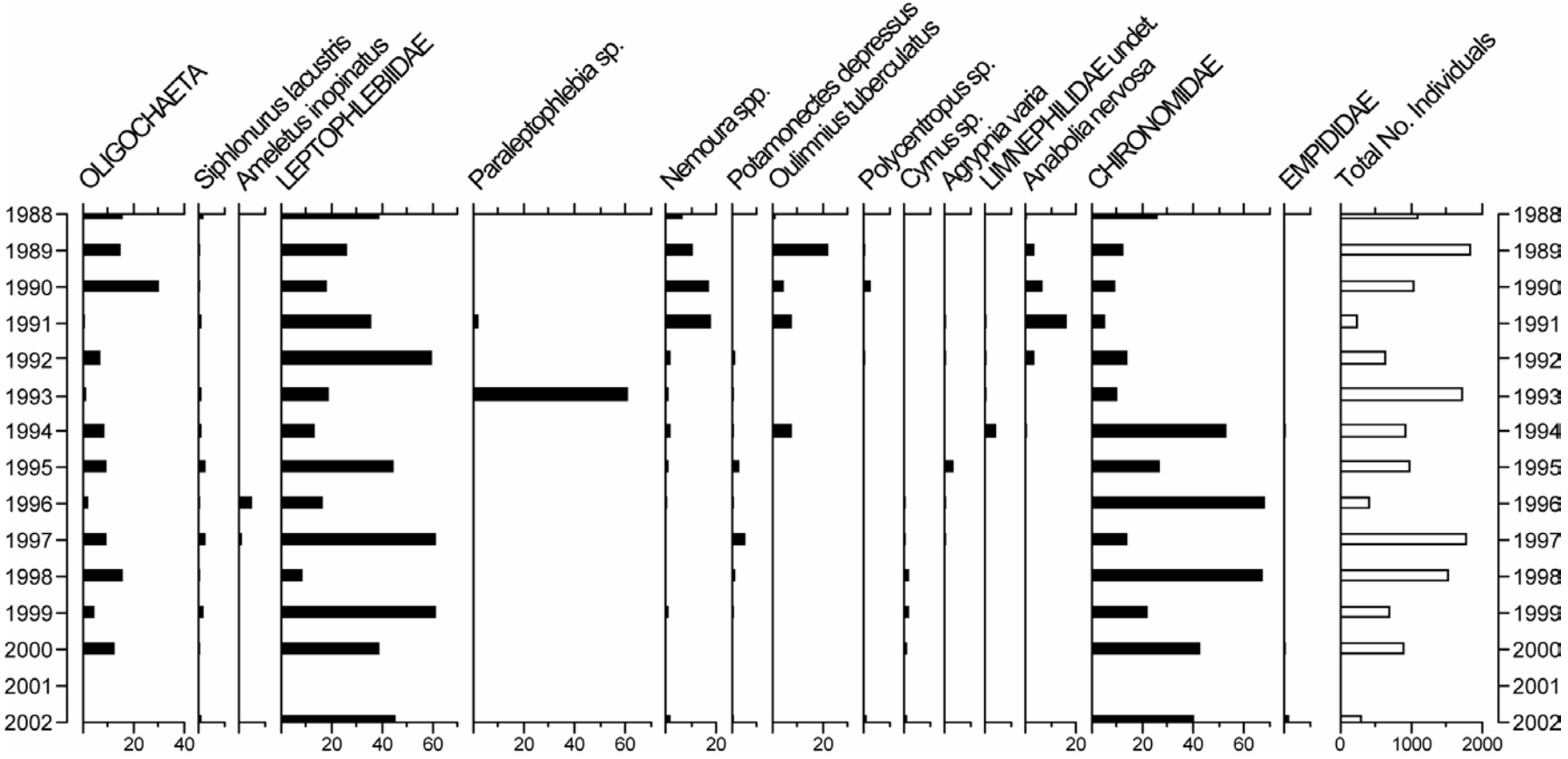
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	4.65	4.72	0.20	0.00	0.73
ANC	-34.68	-0.40	24.07	**2.27**	**0.01**
Ca	51.47	31.50	1.47	**-0.03**	**0.00**
Mg	56.54	40.42	5.38	**-0.02**	**0.01**
Na	239.1	165.2	32.15	**-0.10**	**0.05**
K	4.73	5.45	0.53	0.00	0.20
Sol.Al	11.72	6.81	0.74	**-5.00**	**0.05**

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	9.12	3.18	0.95	**-8.63**	**0.00**
Cl	283.8	200.0	26.32	-0.17	0.10
SO_4	98.14	57.29	10.55	**-0.17**	**0.00**
XSO_4	68.34	36.29	10.07	**-0.13**	**0.01**
NO_3	13.89	9.66	6.16	0.01	0.27
Si	59.02	43.21	11.67	-0.02	0.06
DOC	319.3	562.5	277.1	**0.17**	**0.00**

* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units μeq l^{-1}, except Sol.Al, Sol.lab.Al and DOC (μmol l^{-1})

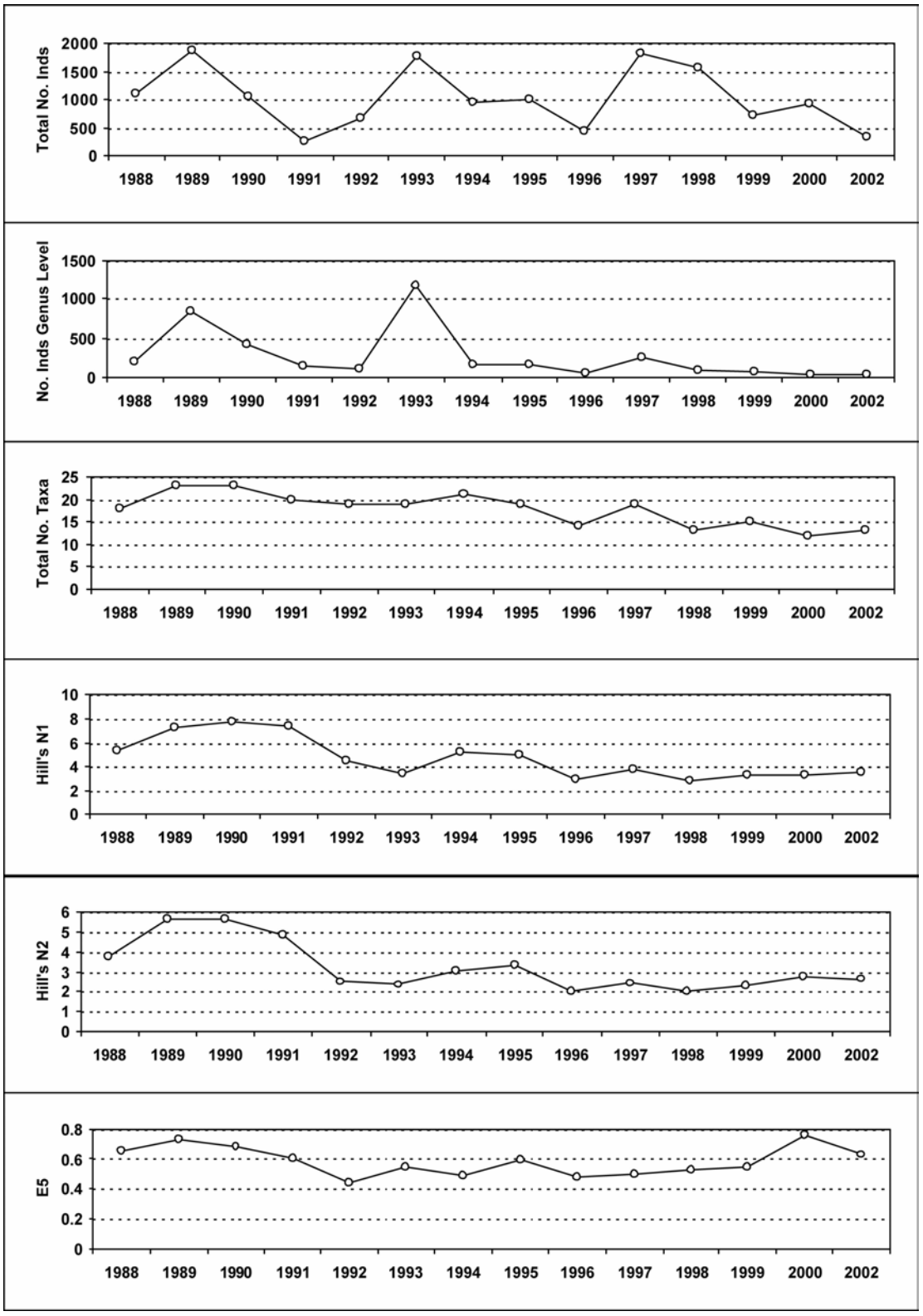
8.2. Macroinvertebrate data

8.2.1. Percentage abundance summary, Loch Grannoch



No sampling in 2001 due to Foot and Mouth restrictions.

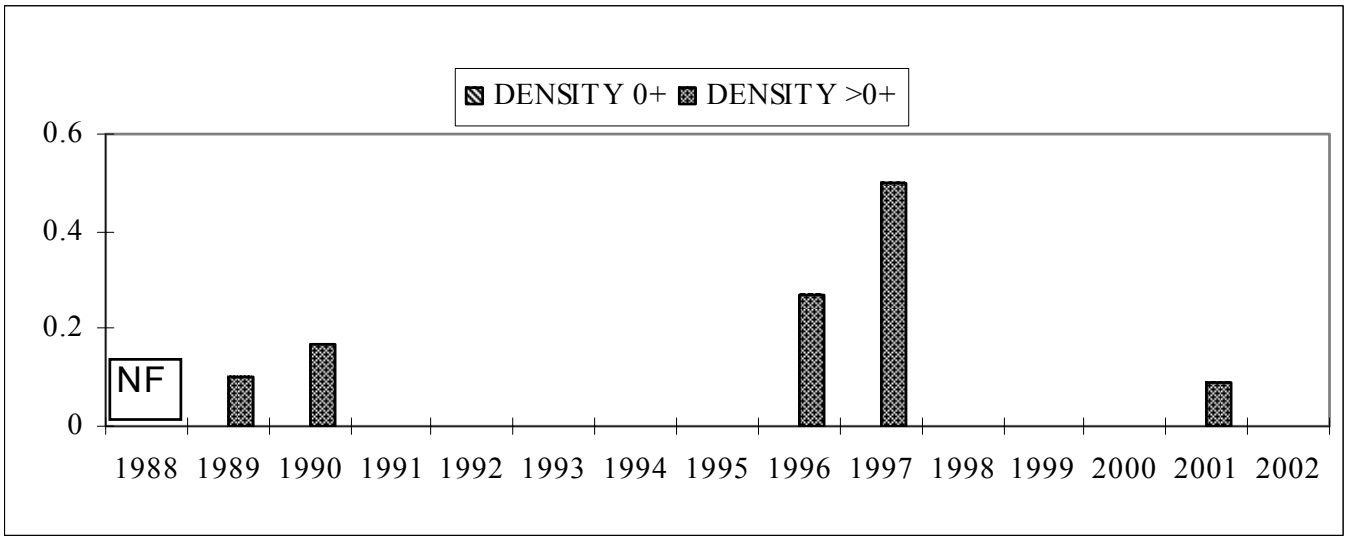
8.2.2. Summary statistics, Loch Grannoch



No sampling in 2001 due to Foot and Mouth restrictions.

8.3. Fish data (for outflow stream)

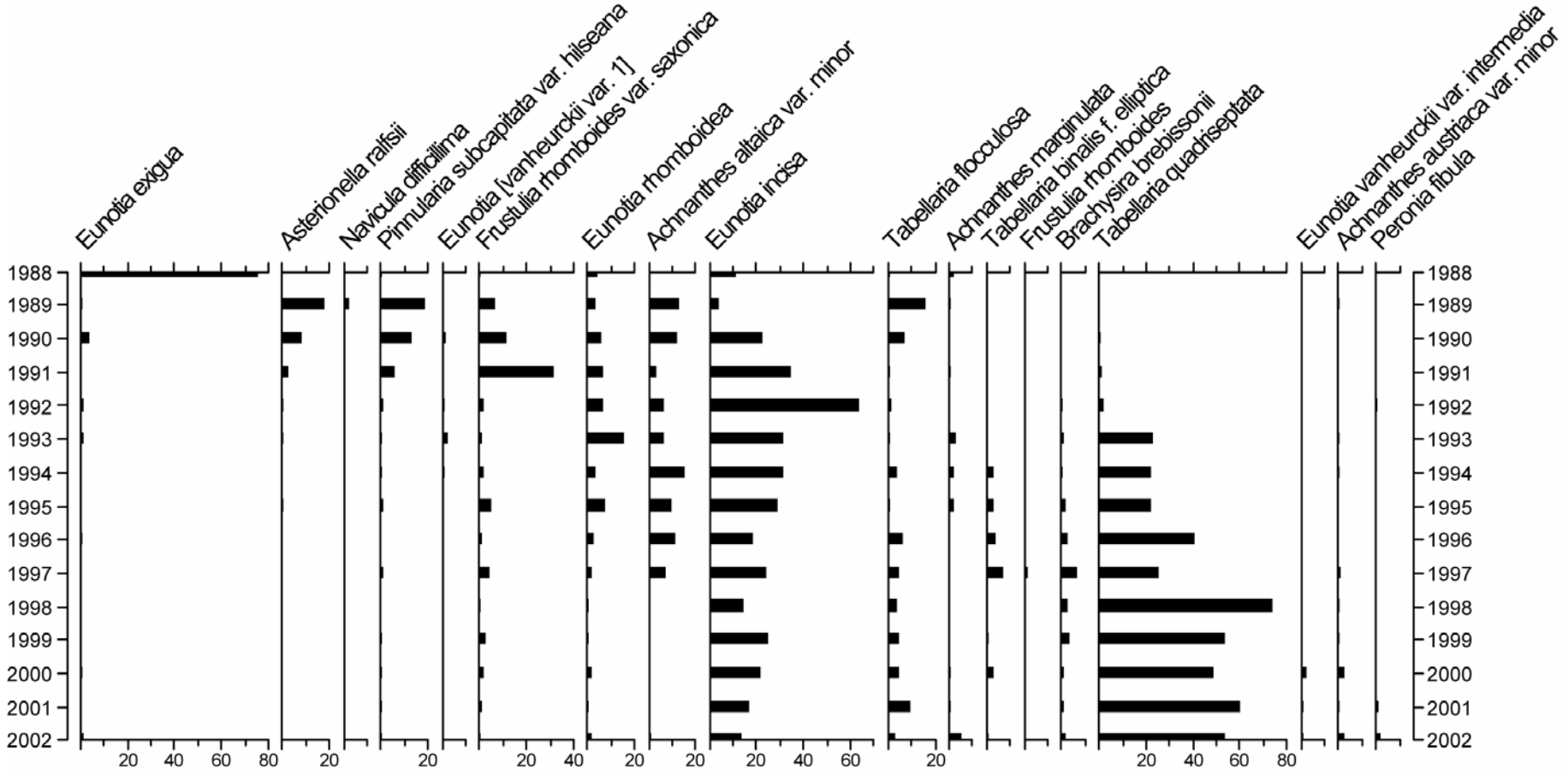
8.3.1. Summary of mean Trout density (numbers $100m^{-2}$), Loch Grannoch



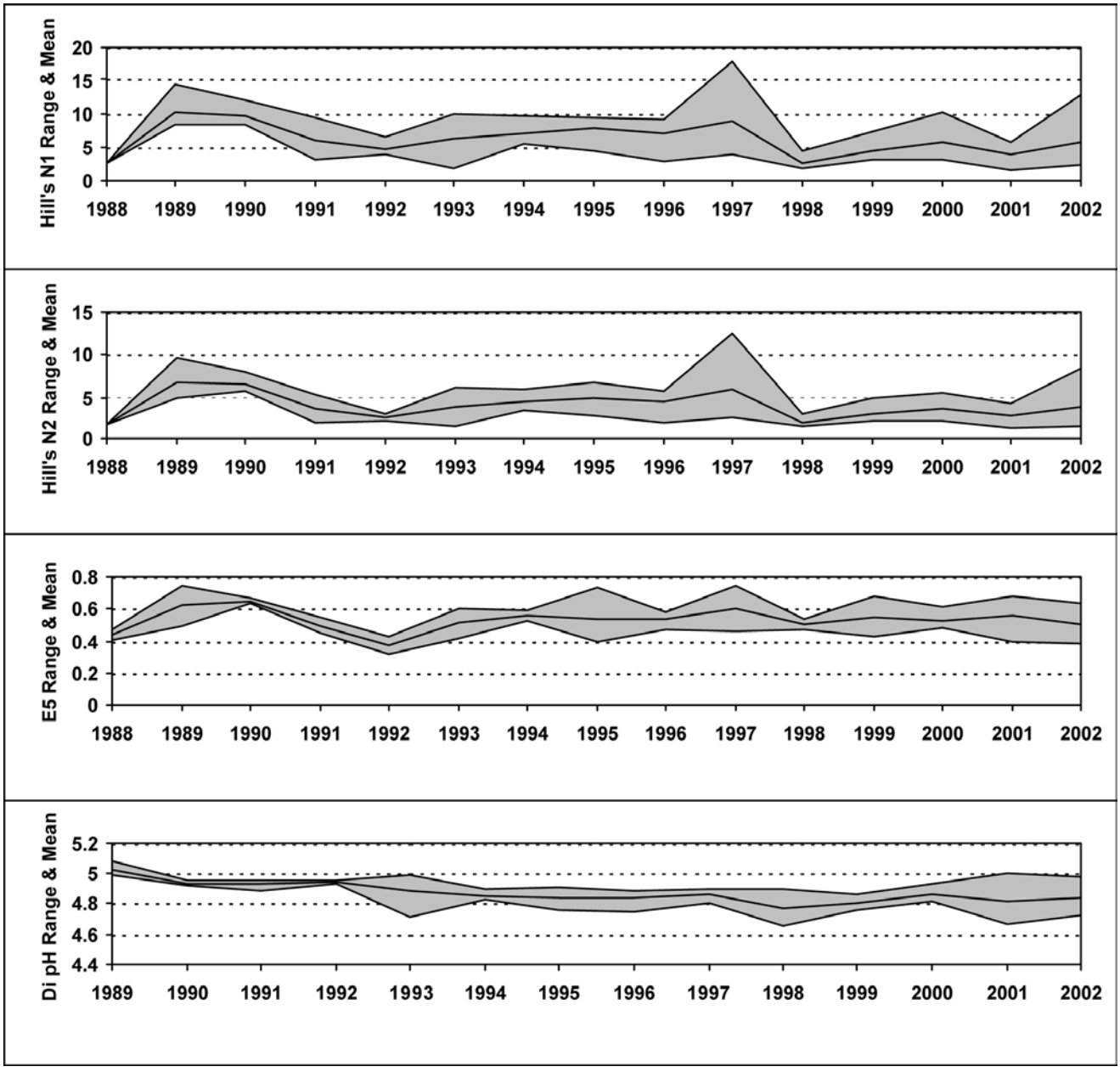
NF = Not fished

8.4. Epilithic diatom data

8.4.1. Percentage abundance summary, Loch Grannoch

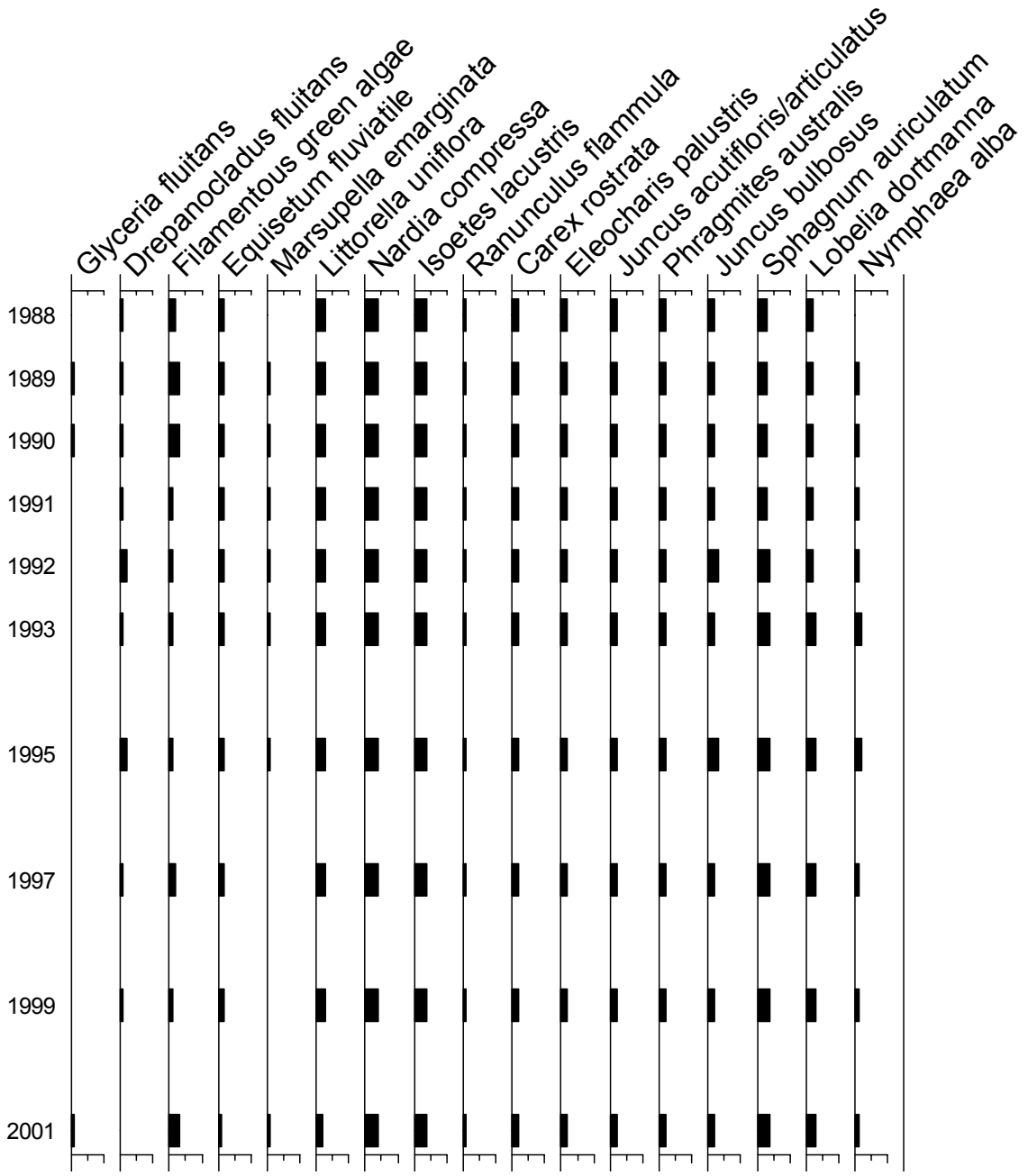


8.4.2. Summary statistics, Loch Grannoch



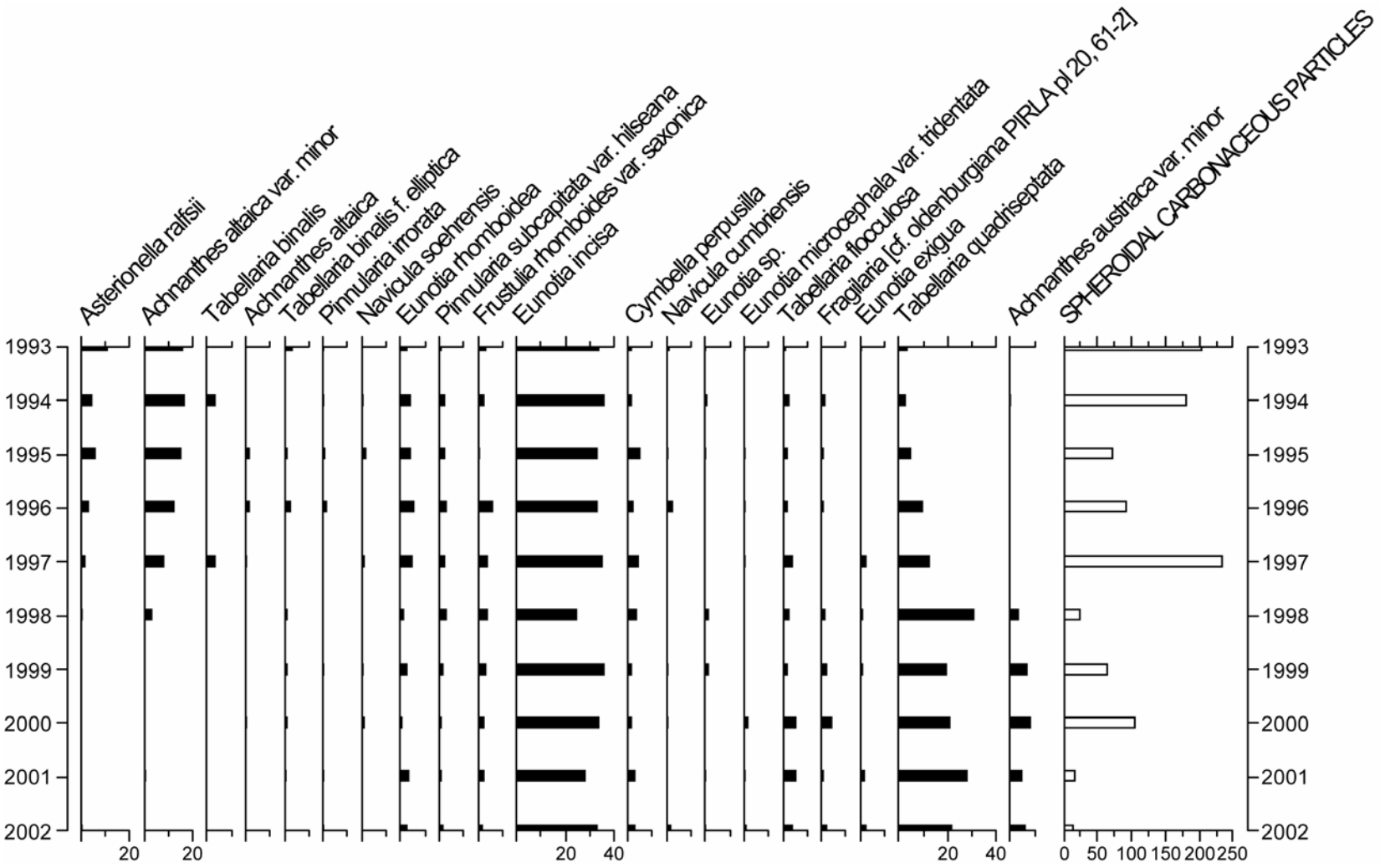
8.5. Aquatic macrophyte data, Loch Grannoch

Species Scores (1-5)



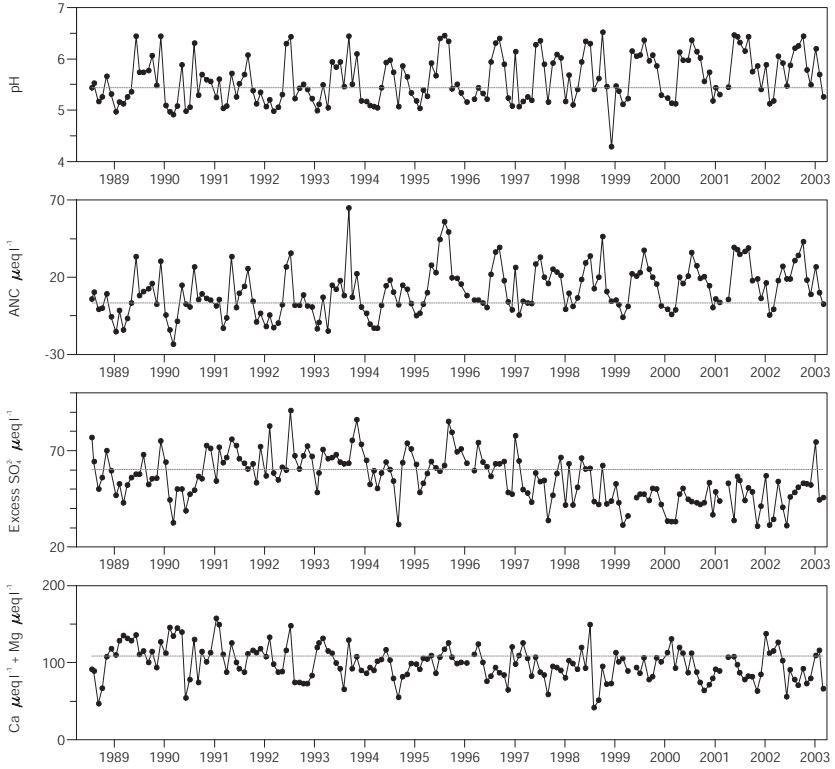
8.6. Sediment trap data, Loch Grannoch

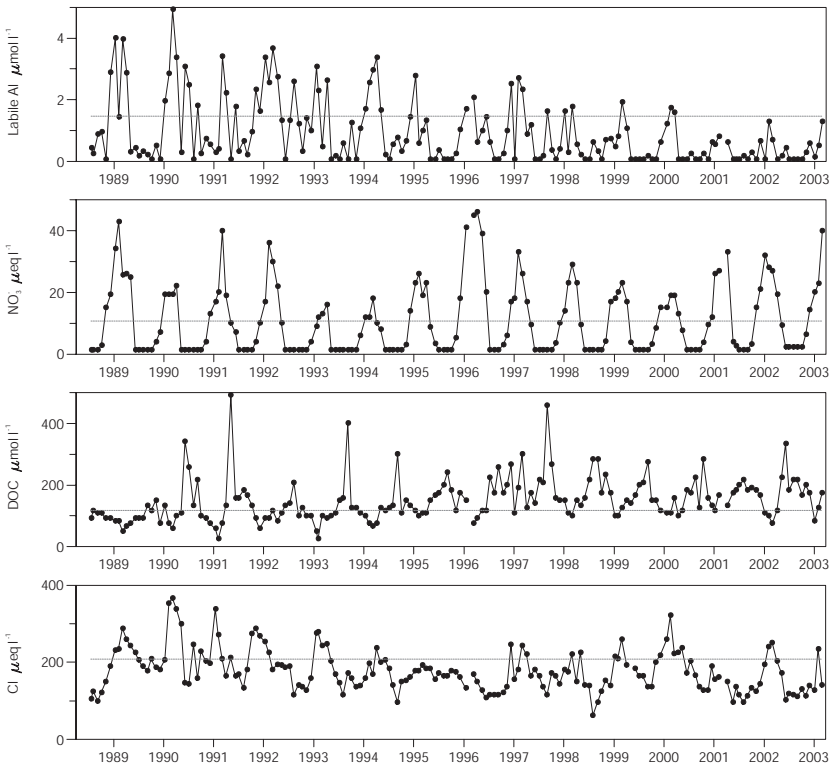
Relative percentage frequency of diatom taxa and carbonaceous particle flux (no. trap^{-1} day^{-1}).



9. Dargall Lane

9.1. Spot sampled chemistry data





Determinand statistics

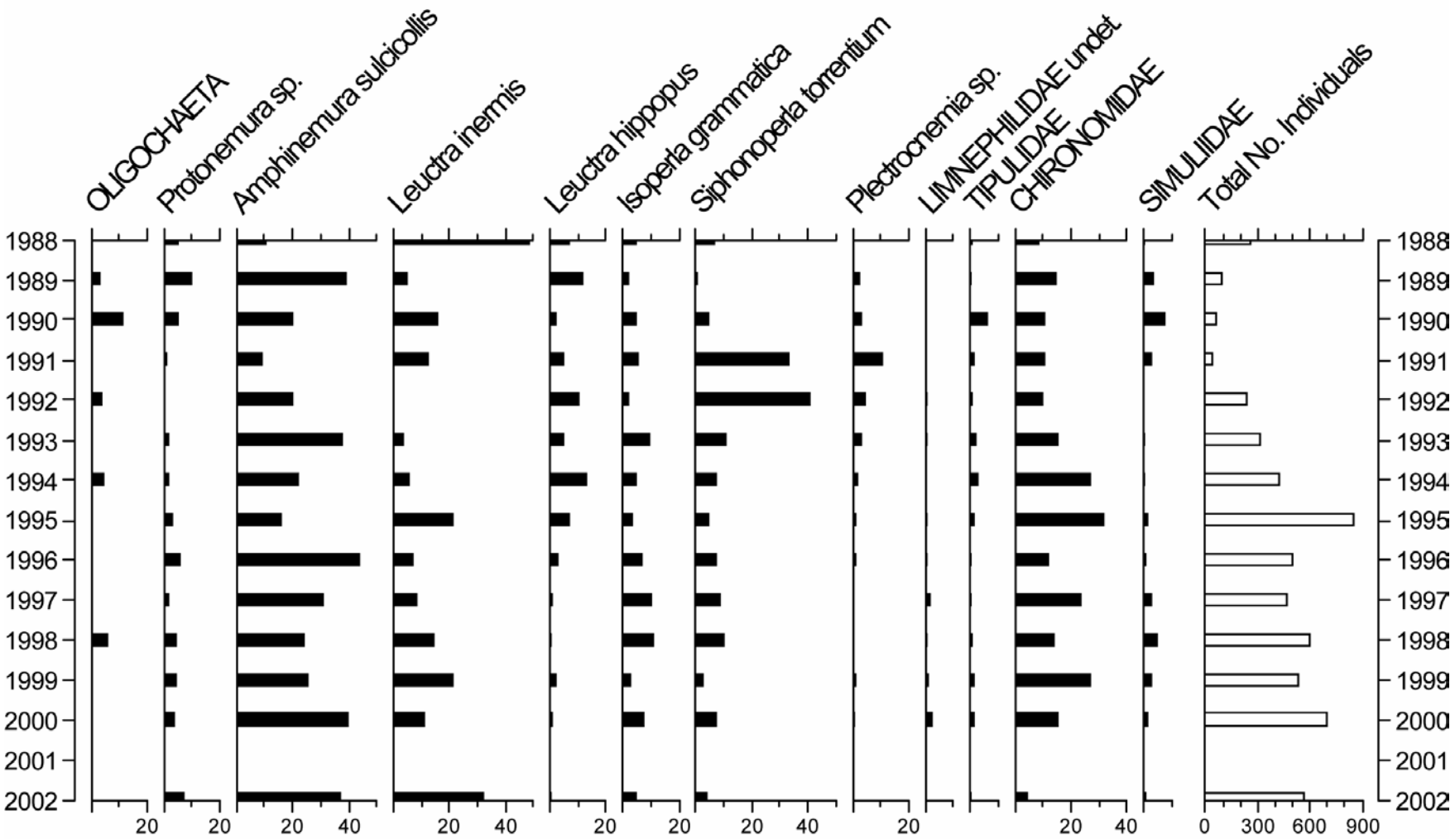
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	5.44	5.88	0.36	**0.03**	**0.00**
ANC	3.44	21.28	11.45	**1.39**	**0.00**
Ca	51.58	42.42	11.28	**-0.01**	**0.01**
Mg	56.62	45.42	11.52	**-0.01**	**0.01**
Na	182.2	130.8	25.38	**-0.07**	**0.01**
K	9.06	7.33	3.27	0.00	0.06
Sol.Al	2.06	0.96	0.71	**-1.67**	**0.00**

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	1.48	0.32	0.36	**-1.50**	**0.00**
Cl	207.9	141.8	40.70	**-0.14**	**0.03**
SO_4	82.02	64.24	10.87	**-0.08**	**0.00**
XSO_4	60.18	49.35	10.19	**-0.06**	**0.01**
NO_3	10.70	11.93	11.84	0.00	0.22
Si	70.68	69.05	25.06	-0.01	0.08
DOC	117.8	184.7	63.94	**0.07**	**0.00**

* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq\,l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol\,l^{-1}$)

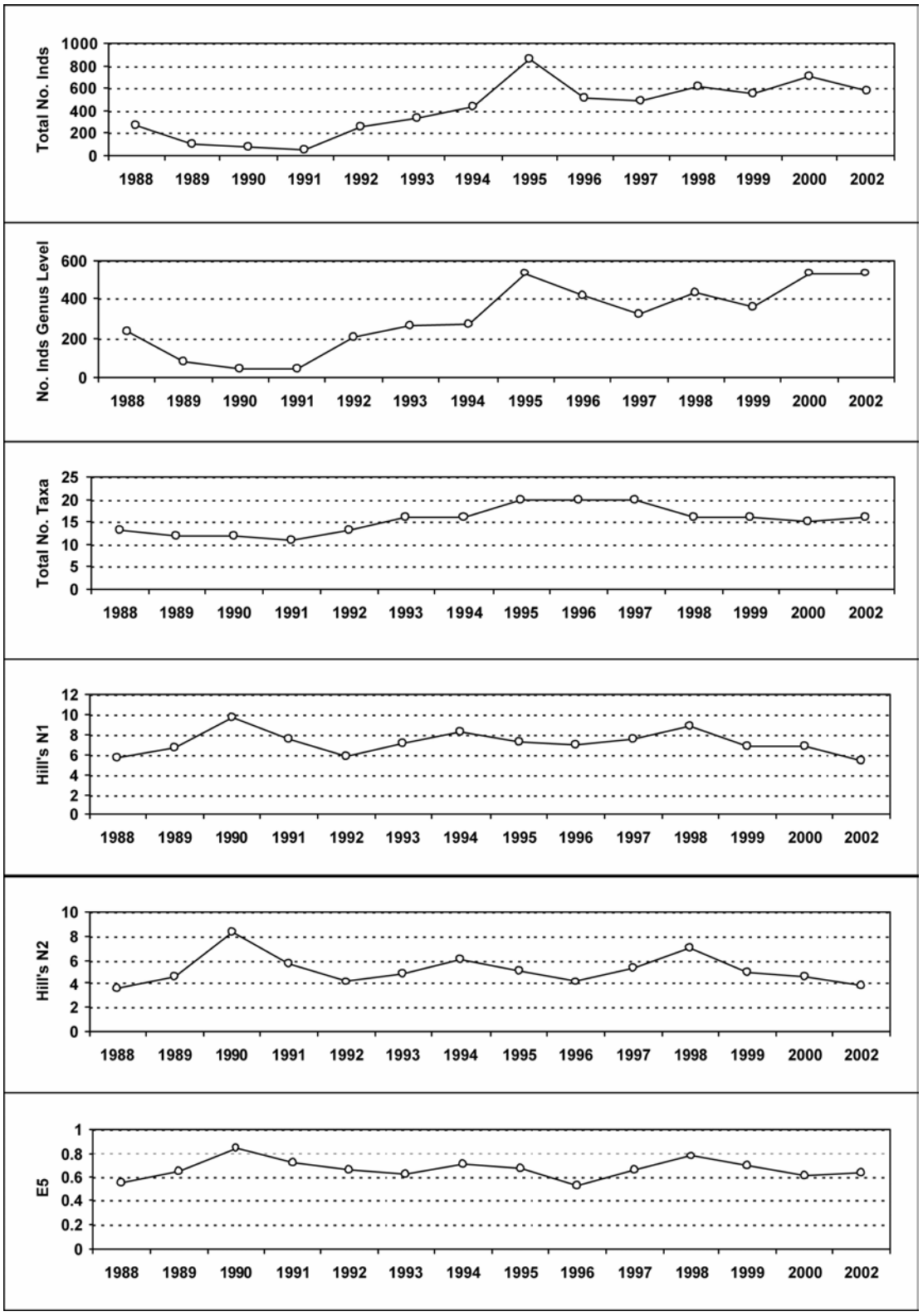
9.2. Macroinvertebrate data

9.2.1. Percentage abundance summary, Dargall Lane



No sampling in 2001 due to Foot and Mouth restrictions.

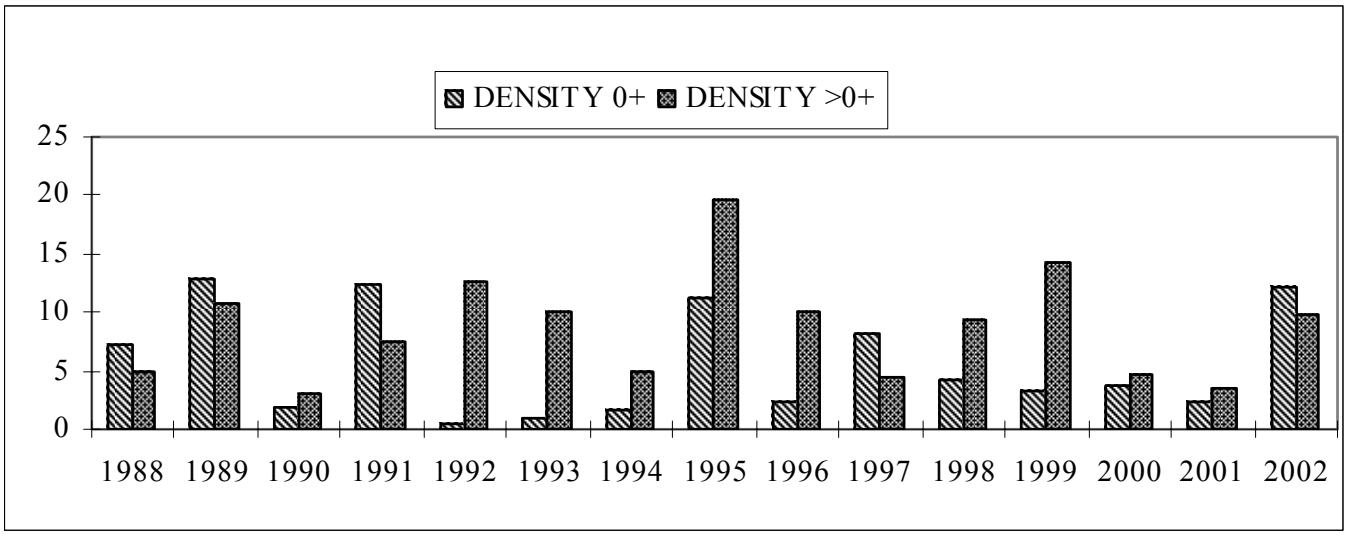
9.2.2. Summary statistics, Dargall Lane



No sampling in 2001 due to Foot and Mouth restrictions.

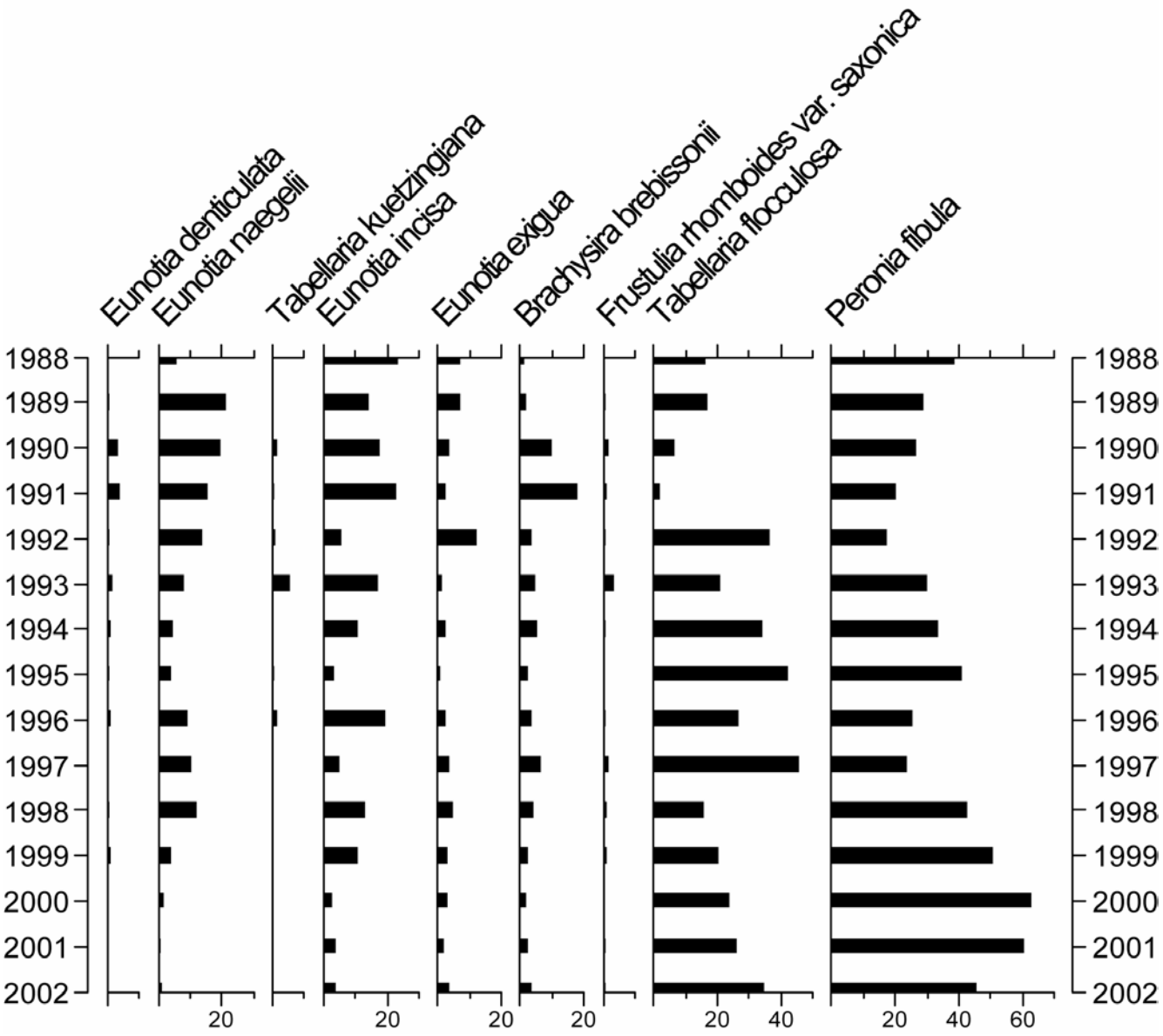
9.3. Fish data

9.3.1. Summary of mean Trout density (numbers 100m^{-2}), Dargall Lane

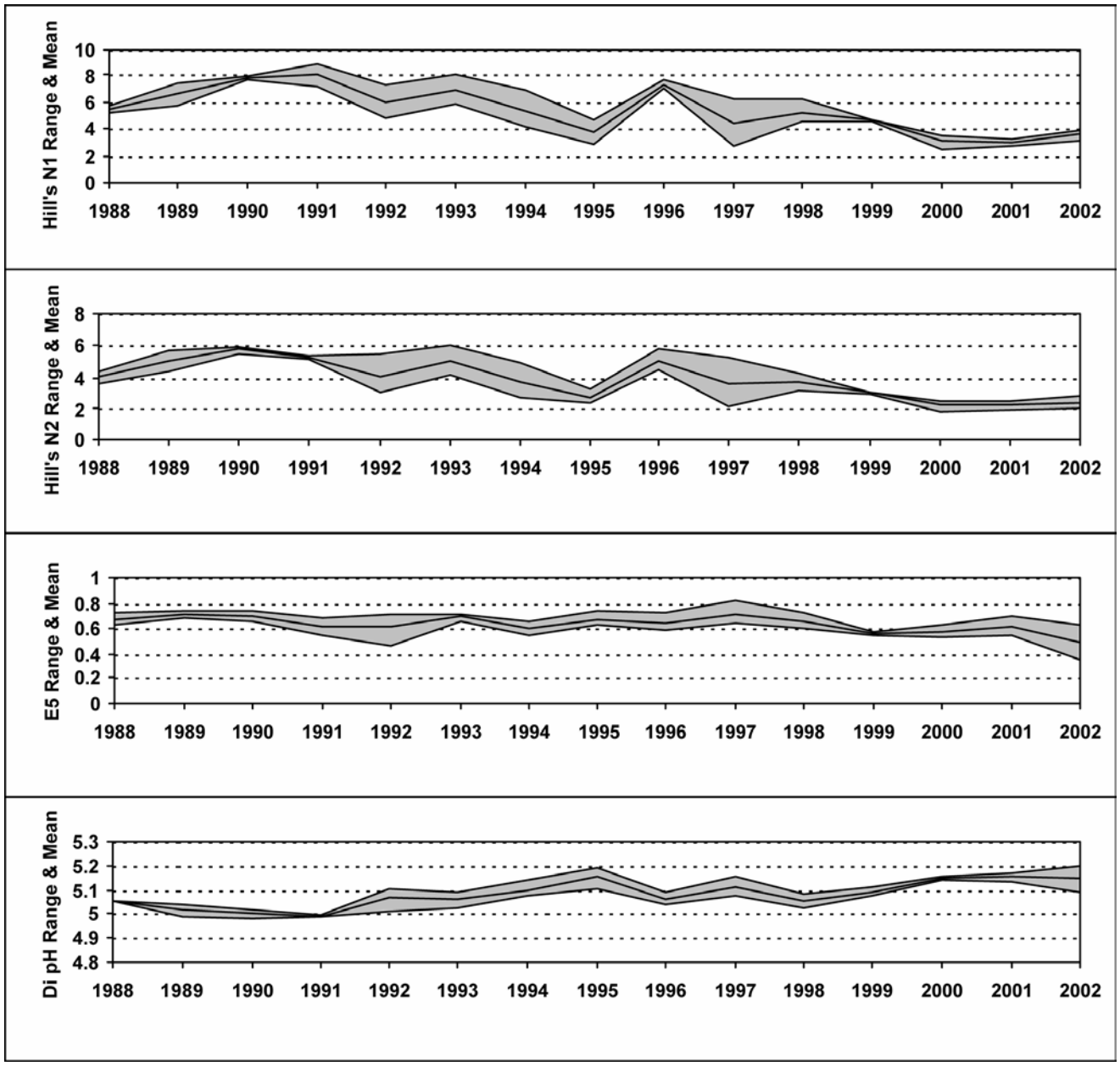


9.4. Epilithic diatom data

9.4.1. Percentage abundance summary, Dargall Lane

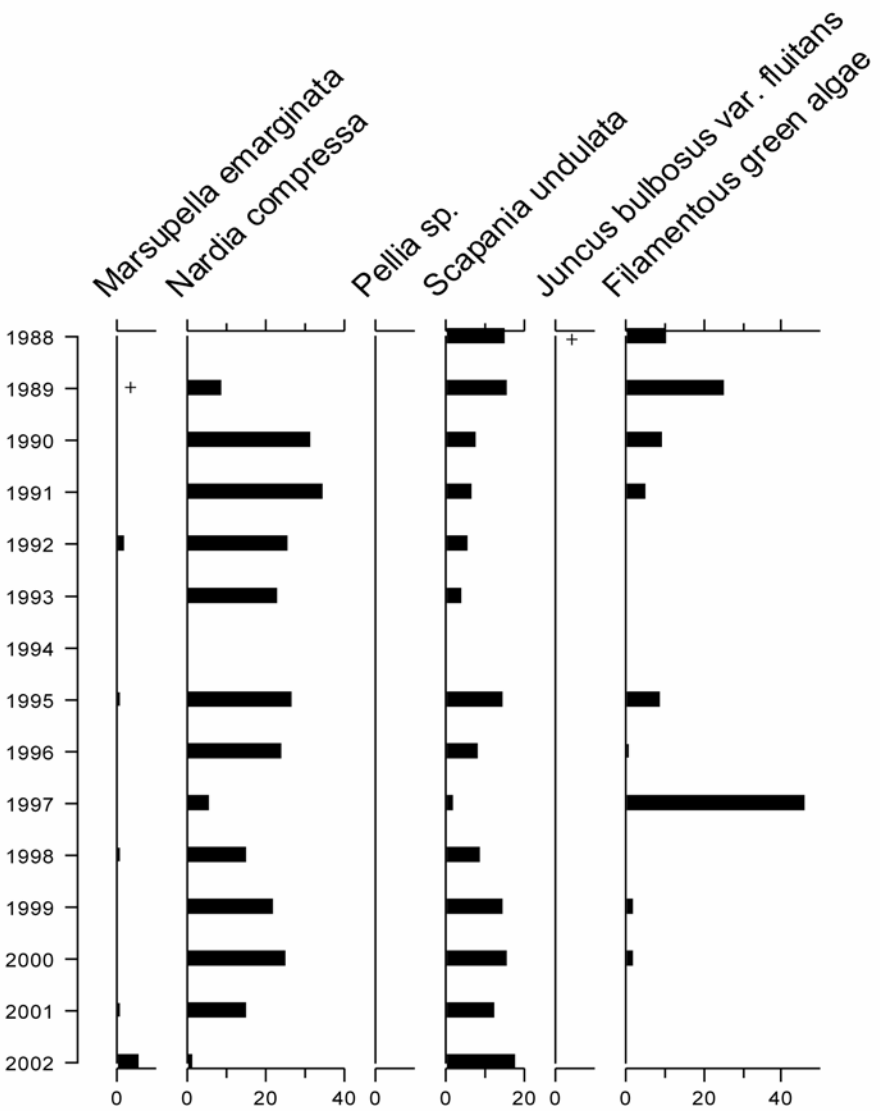


9.4.2. Summary statistics, Dargall Lane



9.5. Aquatic macrophyte data, Dargall Lane

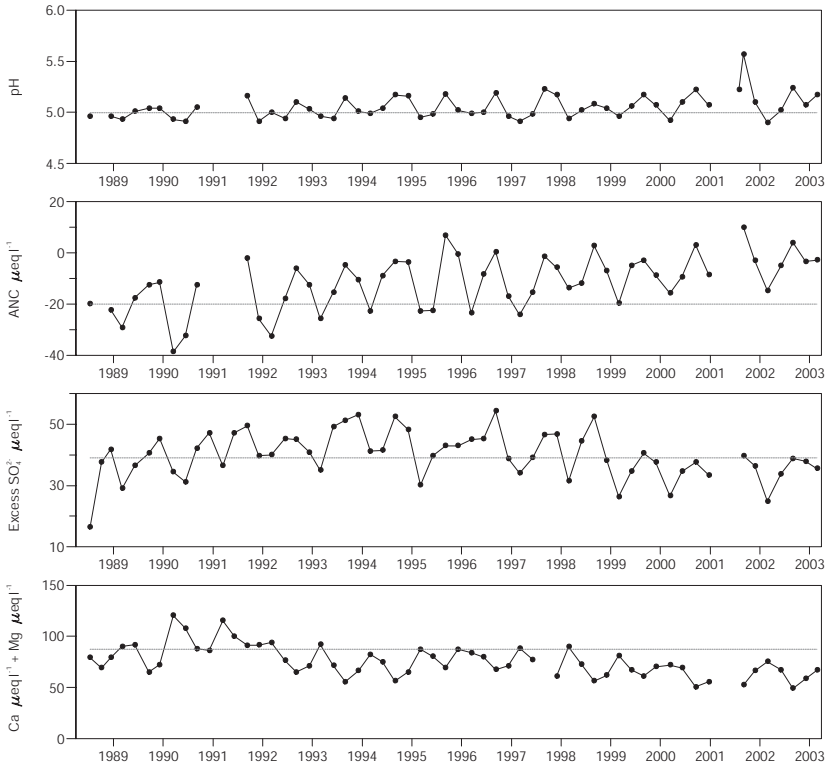
Percentage Species Cover

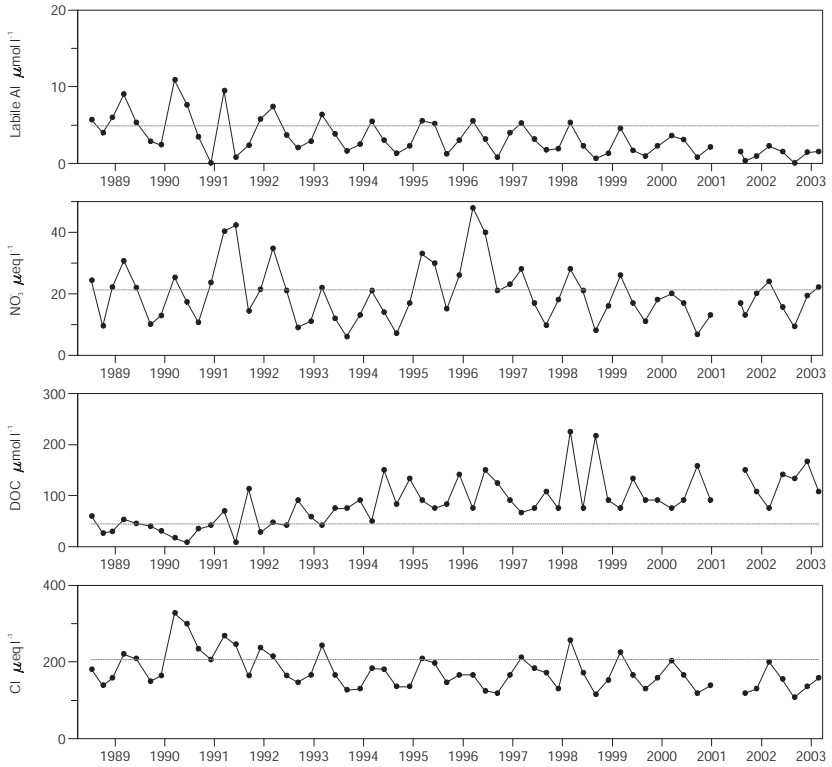


+ Represents <0.1% abundance

10. Scoat Tarn

10.1. Spot sampled chemistry data





Determinand statistics

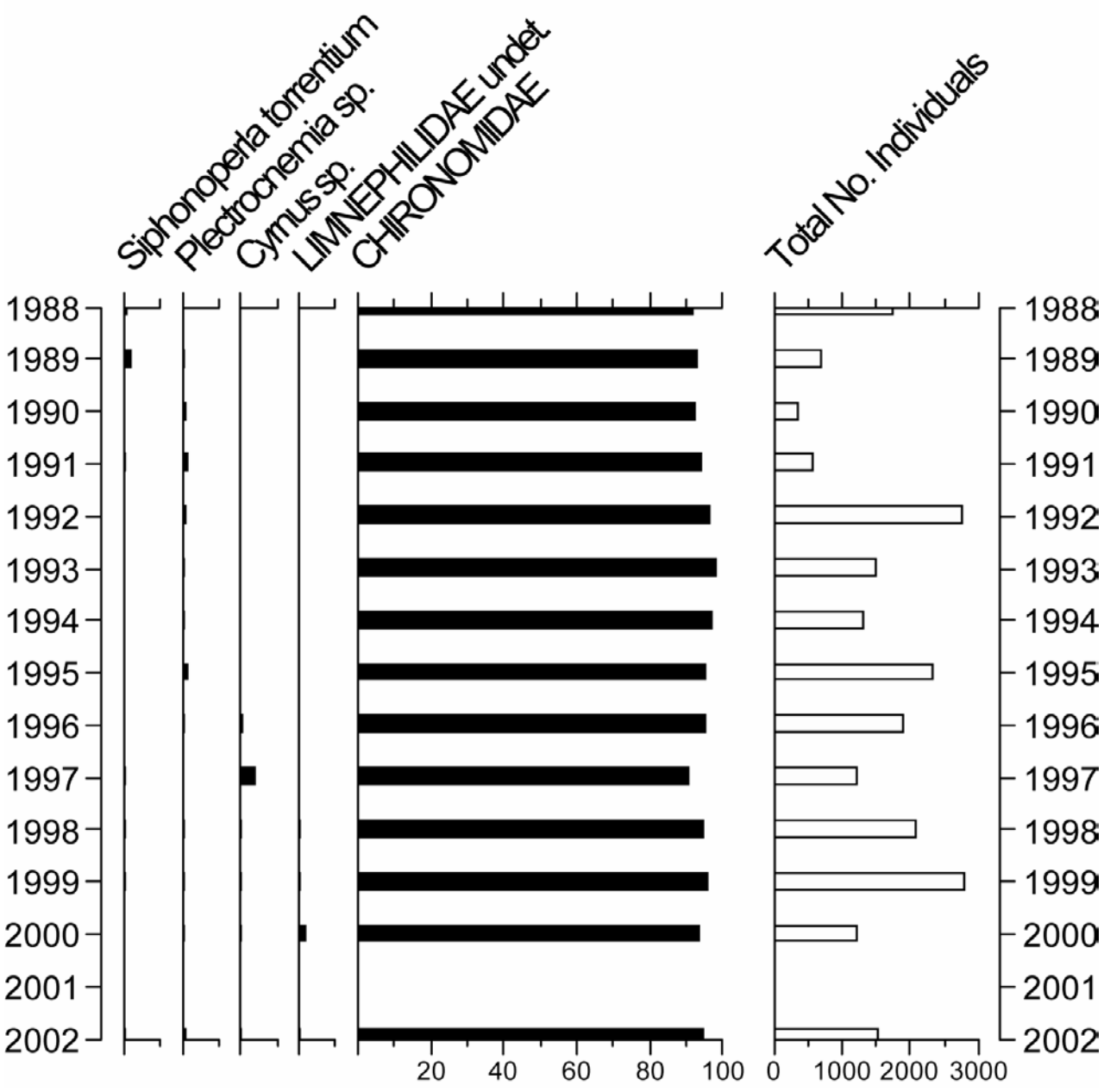
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	5.00	5.12	0.10	**0.01**	**0.00**
ANC	-19.95	-1.80	3.96	**1.32**	**0.00**
Ca	35.75	23.00	2.48	**-0.02**	**00.0**
Mg	51.50	37.50	6.12	**-0.01**	**0.00**
Na	178.3	113.00	19.77	**-0.07**	**00.0**
K	8.27	5.90	1.37	**-0.01**	**0.01**
Sol.Al	5.36	1.42	0.61	**-8.00**	**0.00**

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	4.91	1.16	0.72	**-7.69**	**0.00**
Cl	206.3	138.7	23.38	**-0.11**	**0.00**
SO_4	60.73	51.04	1.20	**-0.05**	**0.01**
XSO_4	39.06	36.47	2.28	-0.02	0.15
NO_3	21.21	16.61	5.54	0.00	0.32
Si	42.50	46.96	4.49	0.00	0.81
DOC	44.50	137.5	24.06	**0.08**	**0.00**

* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq\,l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol\,l^{-1}$)

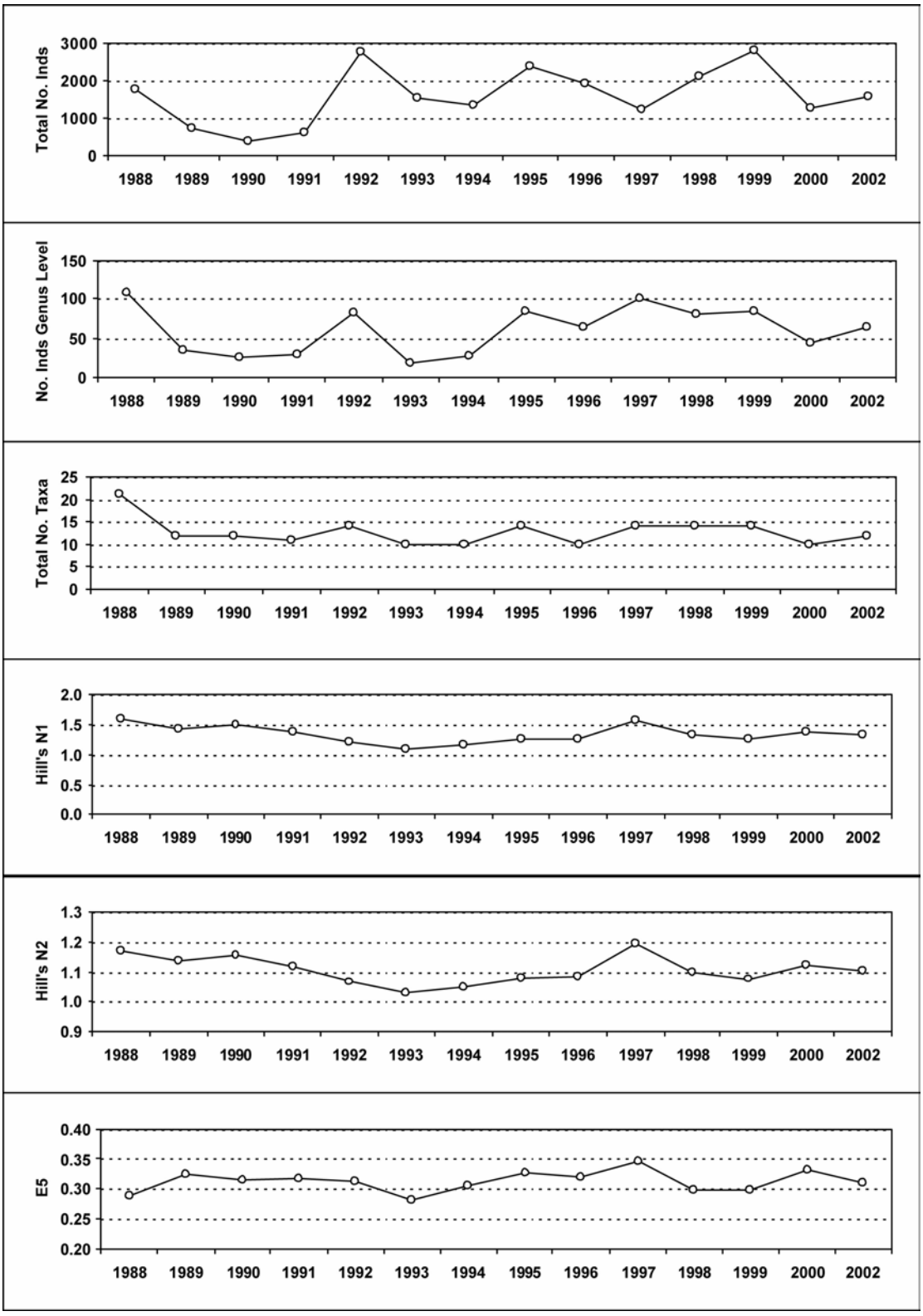
10.2. Macroinvertebrate data

10.2.1. Percentage abundance summary, Scoat Tarn



No sampling in 2001 due to Foot and Mouth restrictions.

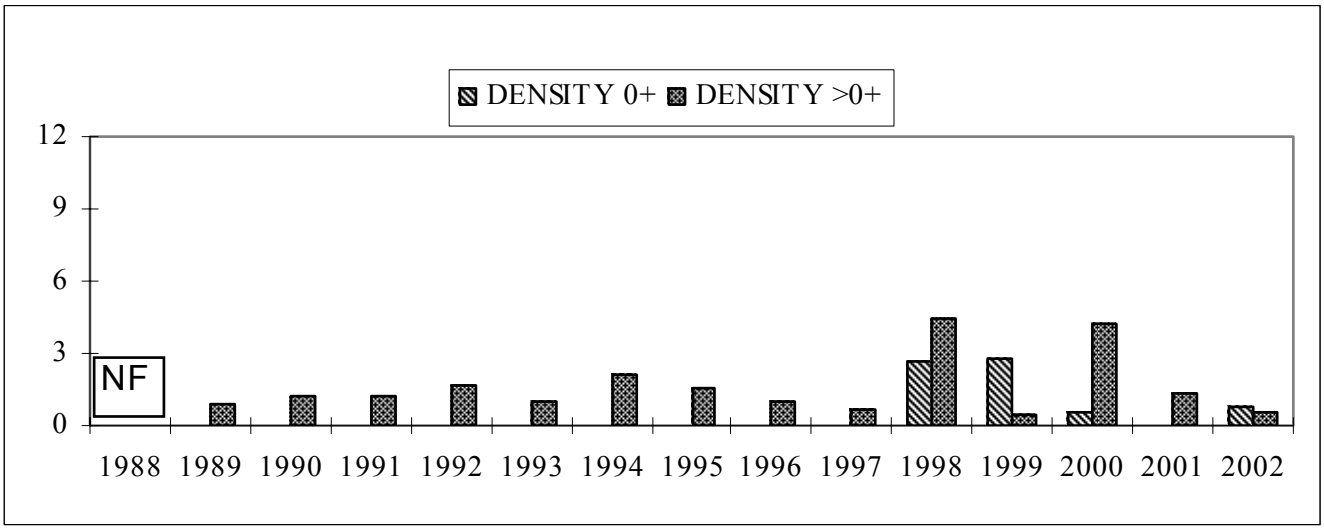
10.2.2. Summary statistics, Scoat Tarn



No sampling in 2001 due to Foot and Mouth restrictions.

10.3. Fish data (for outflow stream)

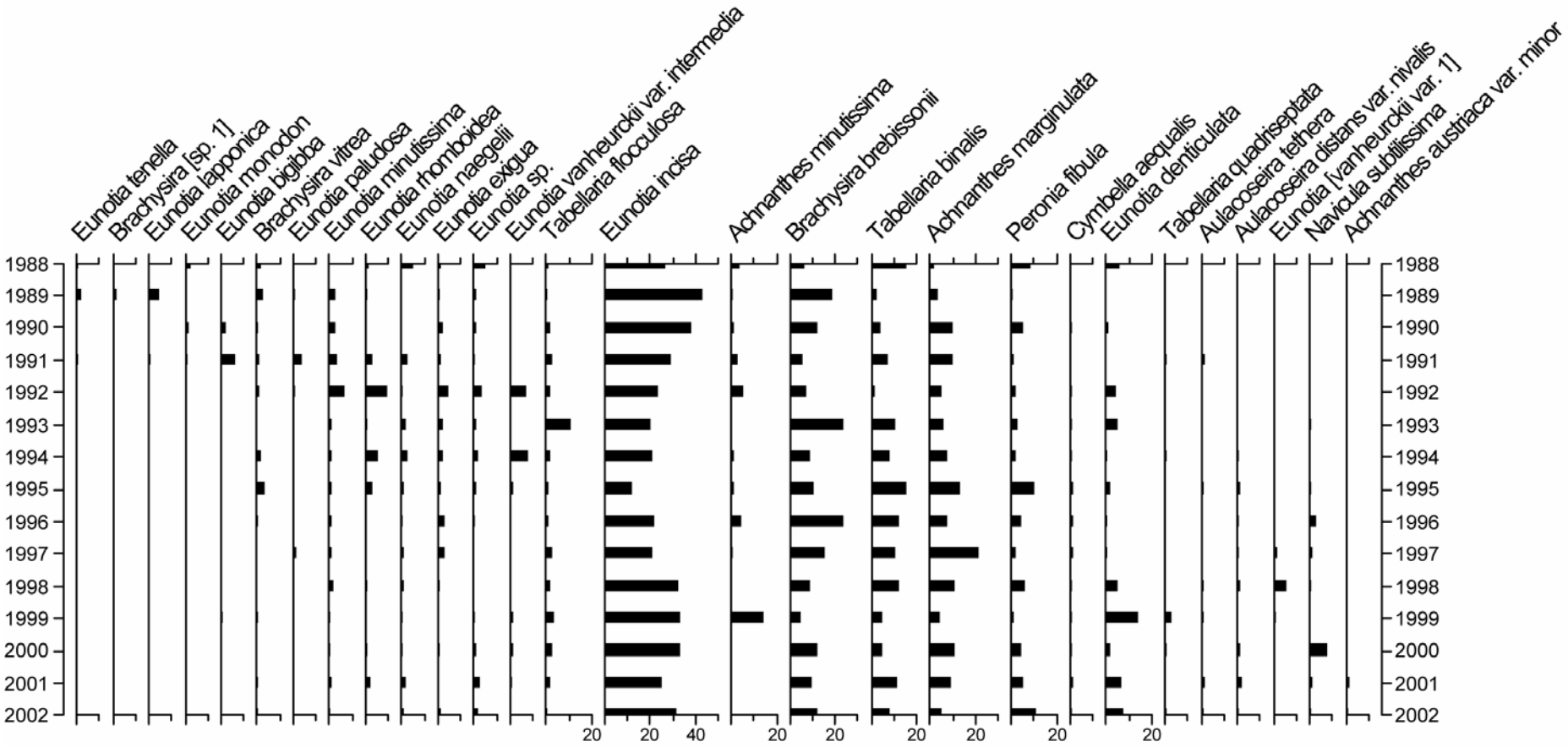
10.3.1. Summary of mean Trout density (numbers 100m^{-2}), Scoat Tarn



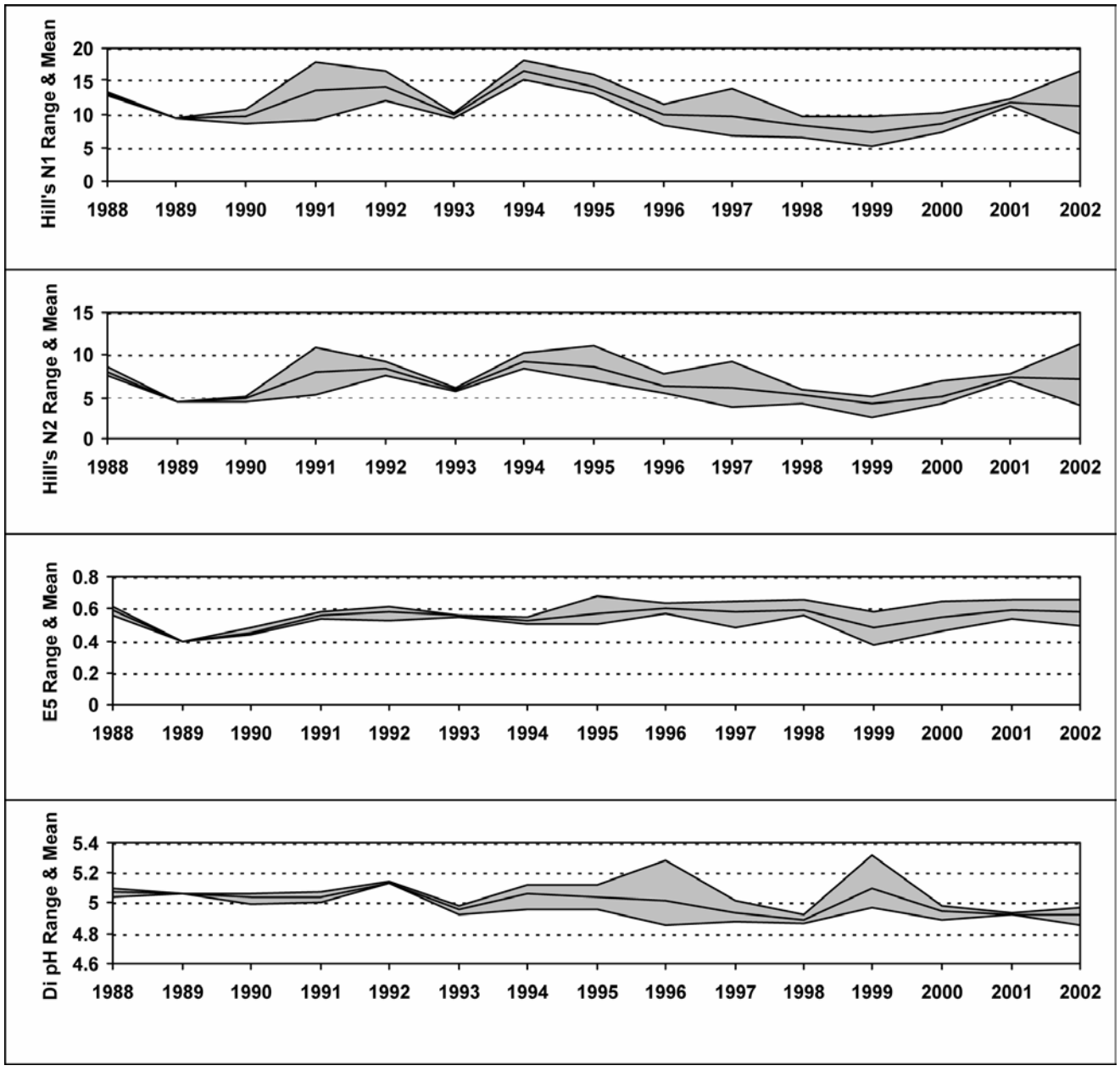
NF = Not fished

10.4. Epilithic diatom data

10.4.1. Percentage abundance summary, Scoat Tarn

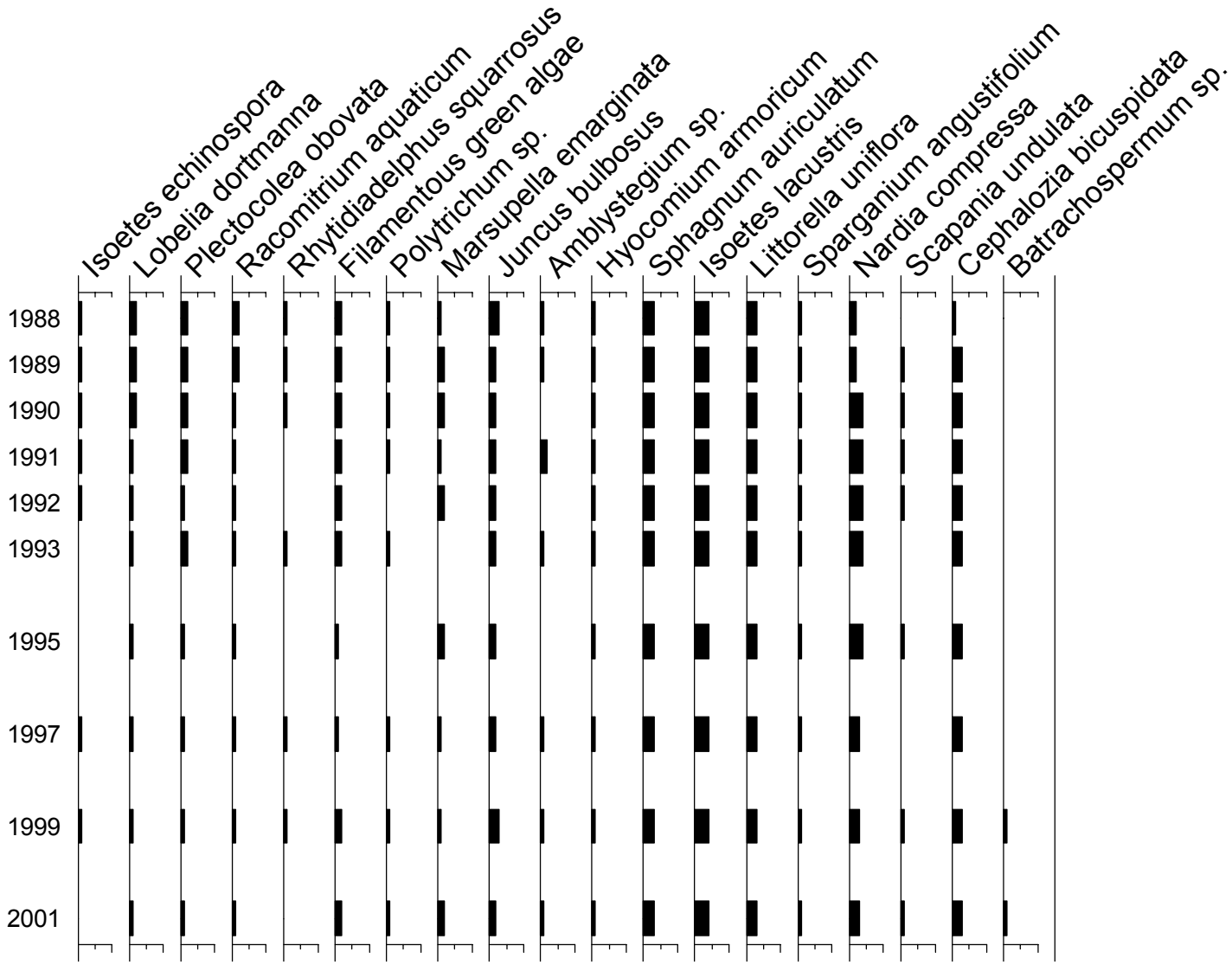


10.4.2. Summary statistics, Scoat Tarn



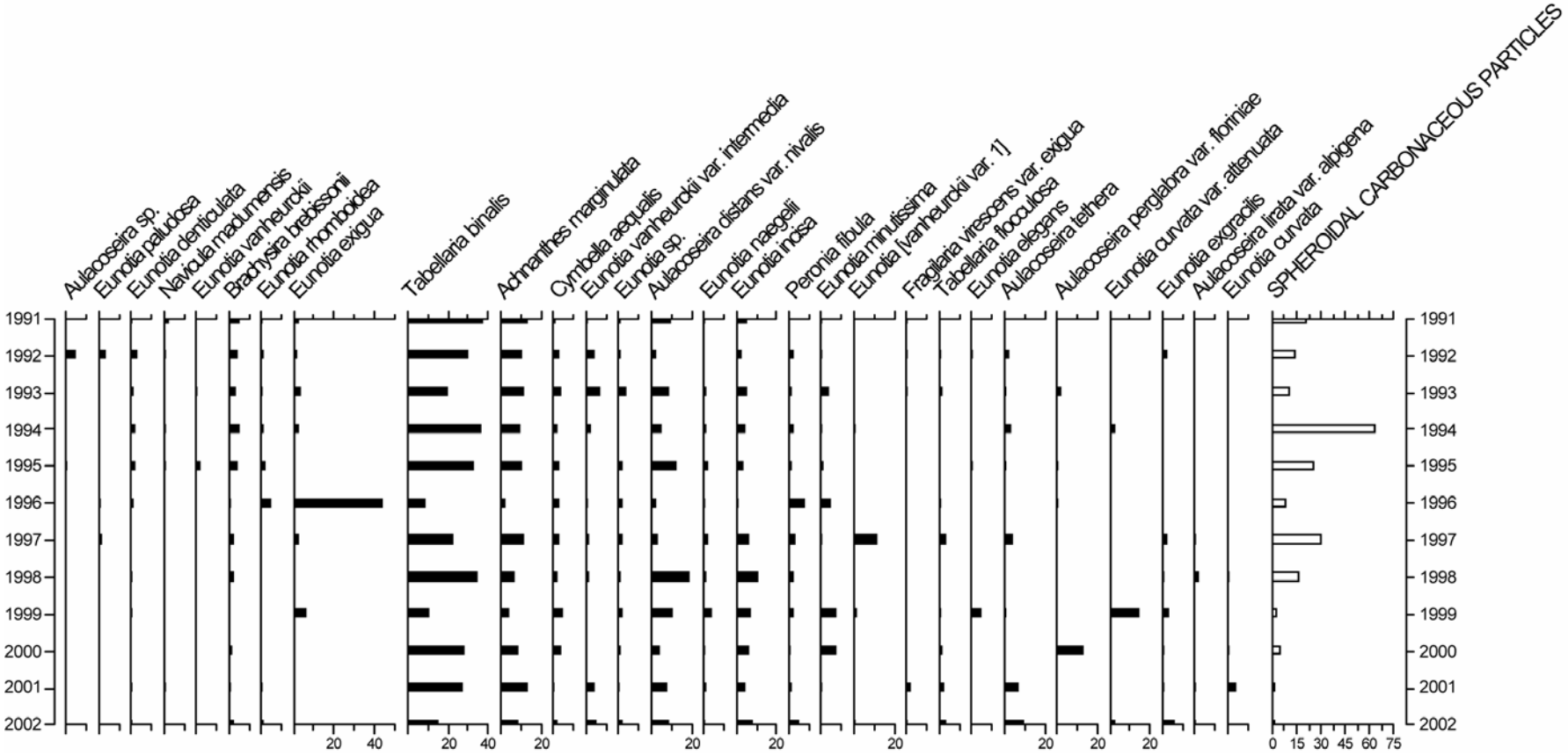
10.5. Aquatic macrophyte data, Scoat Tarn

Species Scores (1-5)



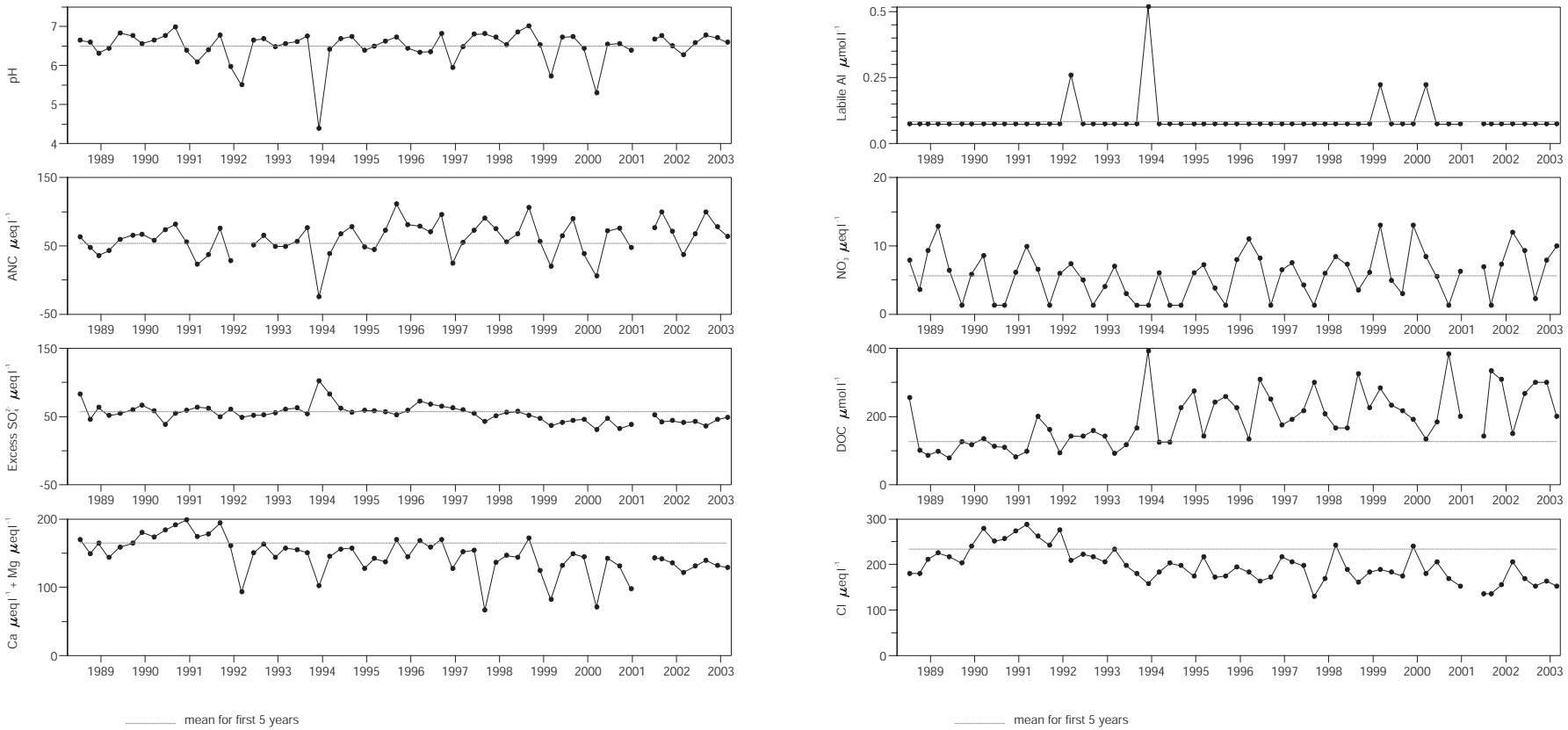
10.6. Sediment trap data, Scoat Tarn

Relative percentage frequency of diatom taxa and carbonaceous particle flux (no. trap^{-1} day^{-1}).



11. Burnmoor Tarn

11.1. Spot sampled chemistry data



Determinand statistics

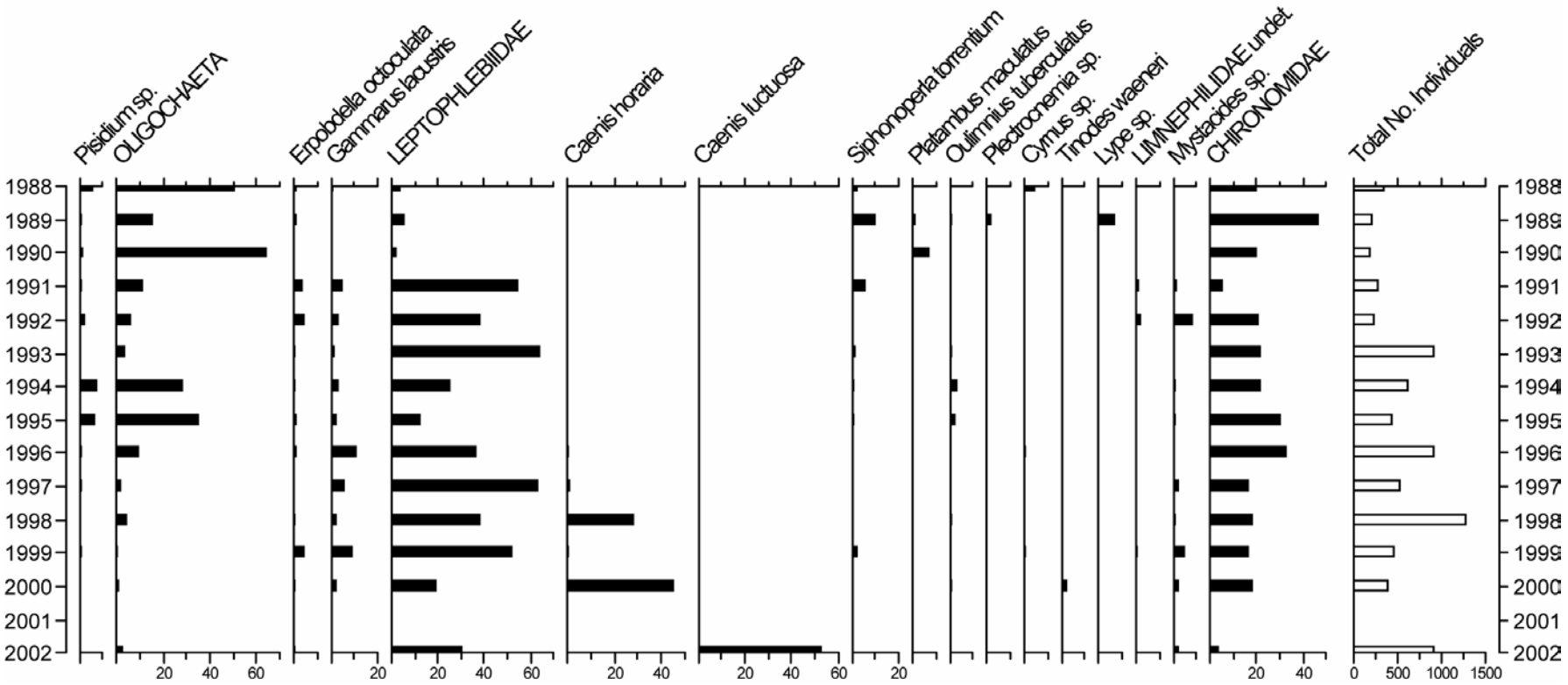
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	6.50	6.66	0.09	0.00	0.74
ANC	54.04	77.28	16.11	1.46	0.06
Ca	95.97	75.88	4.40	**-0.03**	**0.01**
Mg	68.50	56.88	0.80	**-0.01**	**0.00**
Na	208.5	143.5	18.10	**-0.10**	**0.00**
K	9.24	7.12	1.47	**-0.01**	**0.01**
Sol.Al	0.28	0.12	0.09	0.00	0.42

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	0.08	0.07	0.00	0.00	0.75
Cl	233.50	159.20	8.45	**-0.20**	**0.00**
SO_4	81.46	59.90	5.48	**-0.10**	**0.00**
XSO_4	56.93	43.18	5.30	**-0.06**	**0.01**
NO_3	5.63	7.34	3.53	0.00	0.19
Si	53.21	59.64	18.54	0.00	0.84
DOC	126.50	266.70	47.14	**0.13**	**0.00**

* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units μeq l^{-1}, except Sol.Al, Sol.lab.Al and DOC (μmol l^{-1})

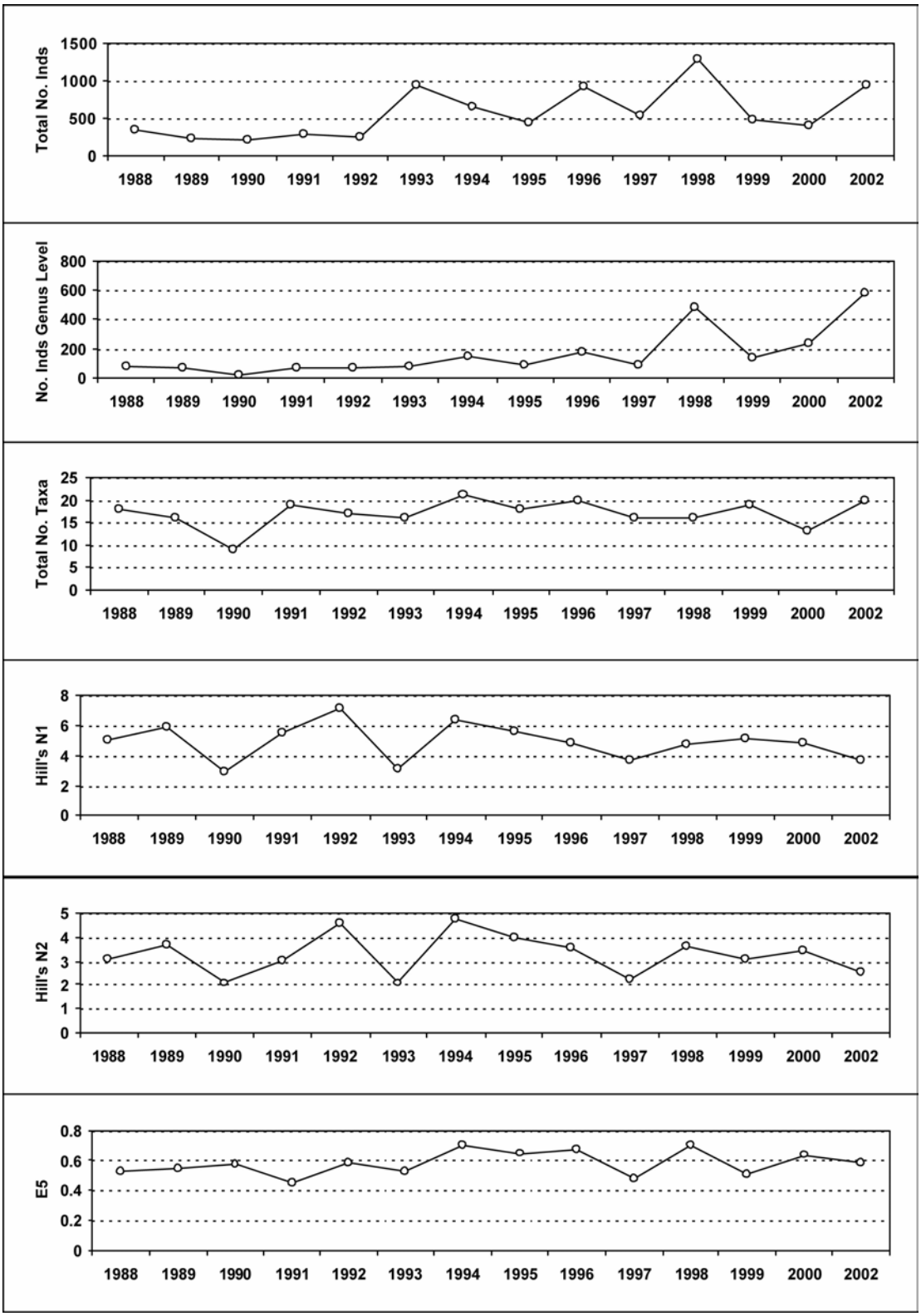
11.2. Macroinvertebrate data

11.2.1. Percentage abundance summary, Burnmoor Tarn



No sampling in 2001 due to Foot and Mouth restrictions.

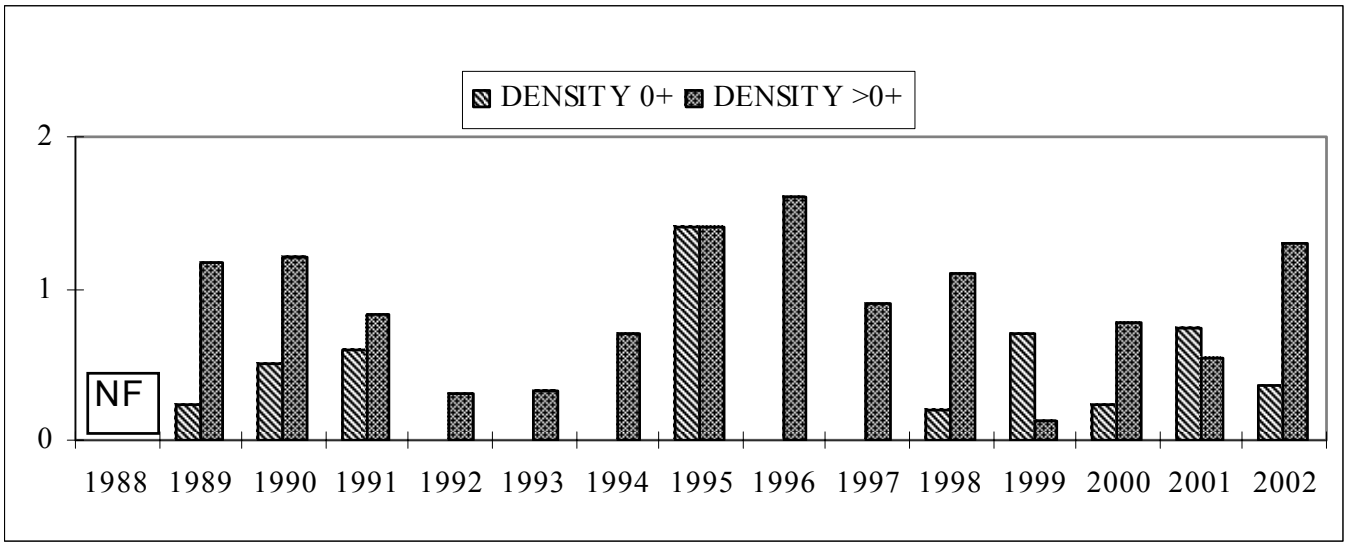
11.2.2. Summary statistics, Burnmoor Tarn



No sampling in 2001 due to Foot and Mouth restrictions.

11.3. Fish data (for outflow stream)

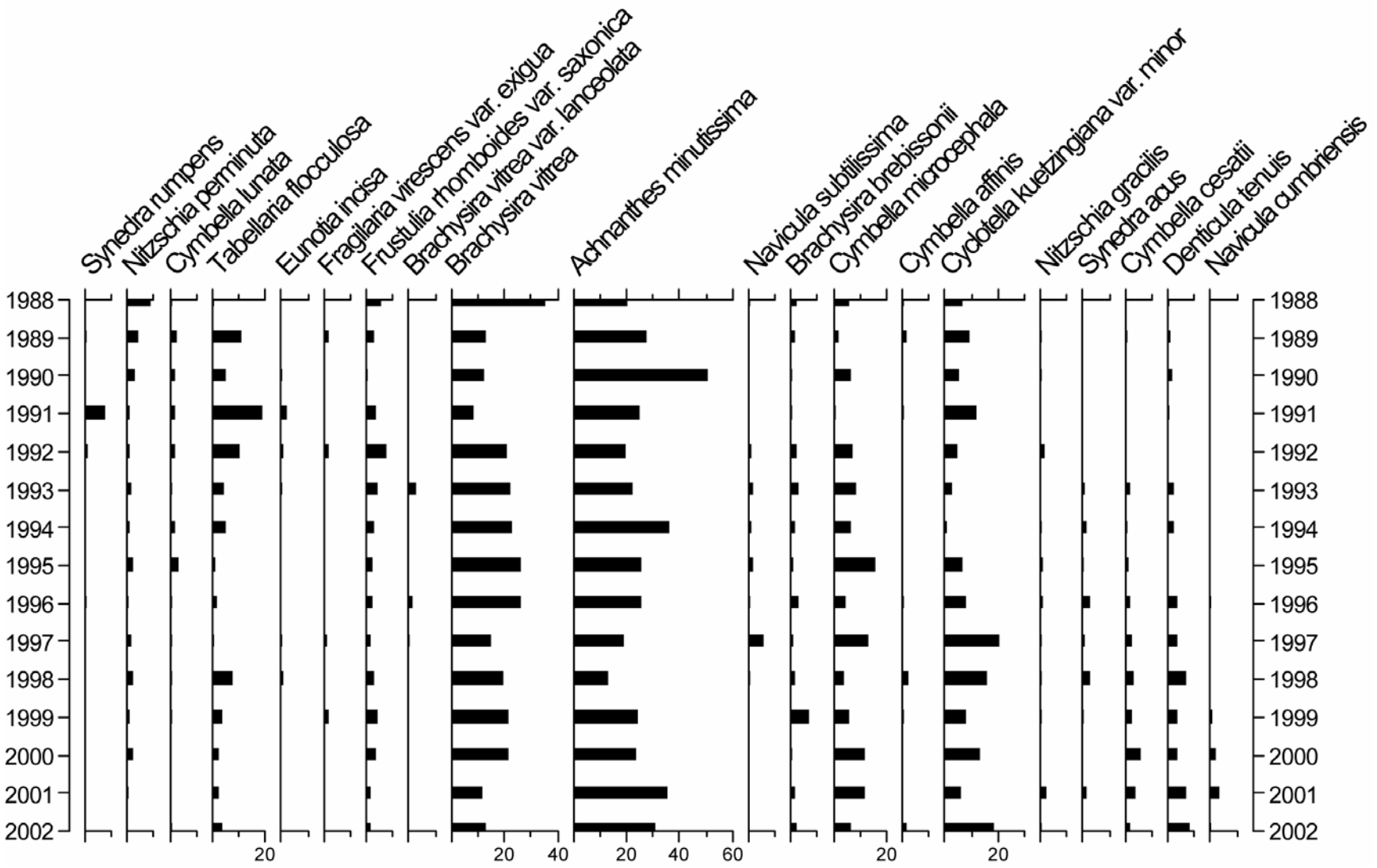
11.3.1. Summary of mean Trout density (numbers $100m^{-2}$), Burnmoor Tarn



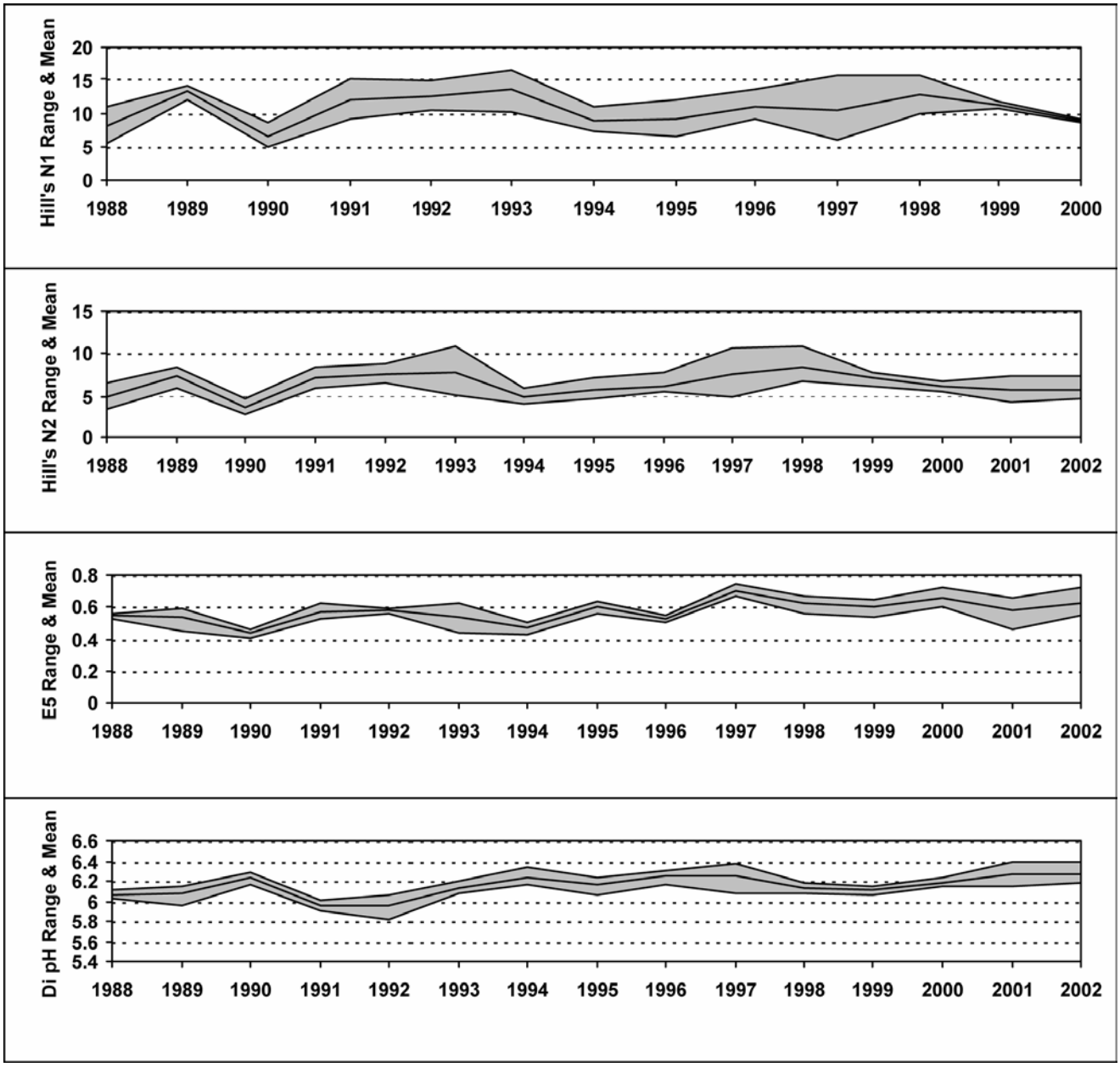
NF = Not fished

11.4. Epilithic diatom data

11.4.1. Percentage abundance summary, Burnmoor Tarn

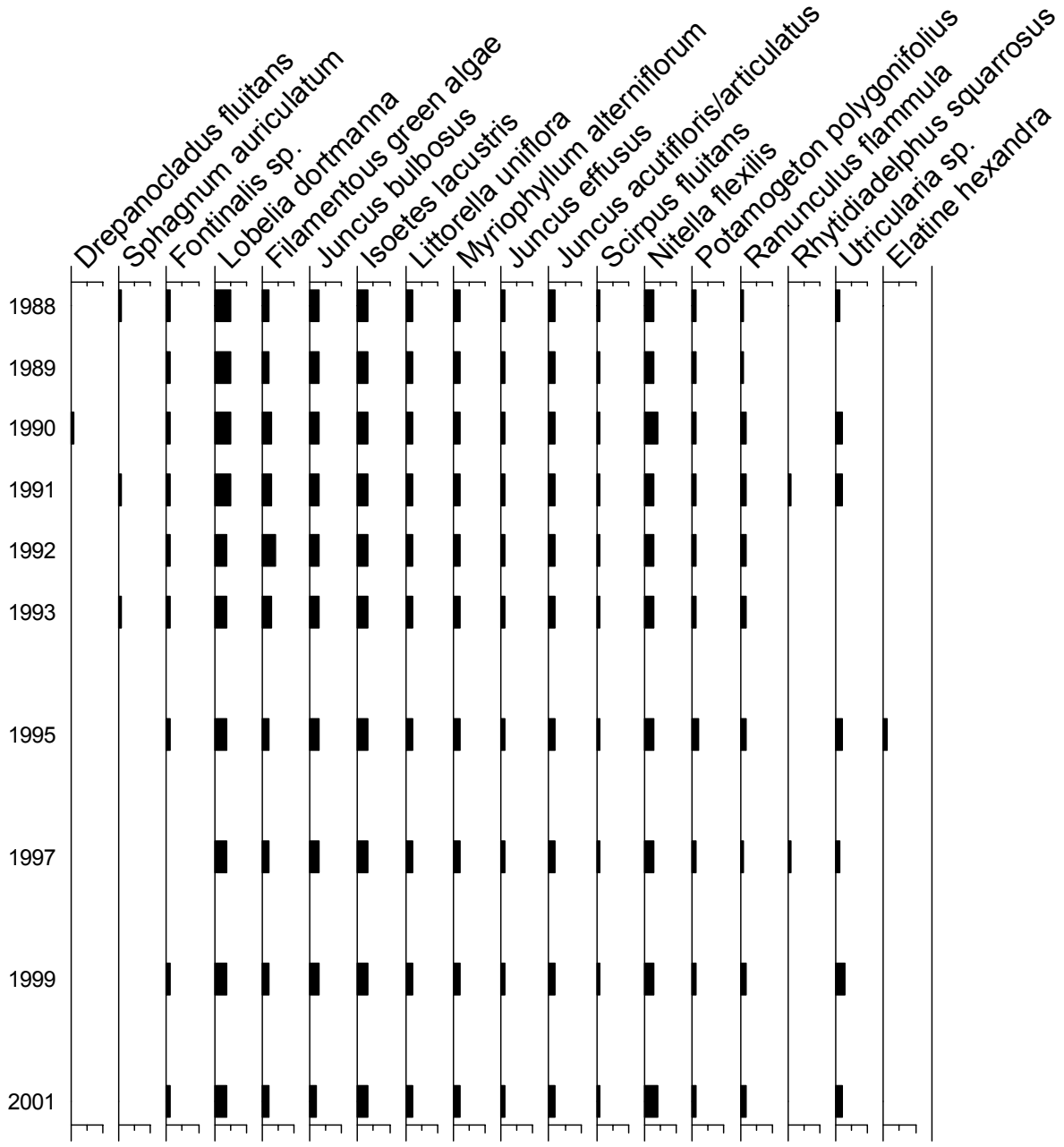


11.4.2. Summary statistics, Burnmoor Tarn



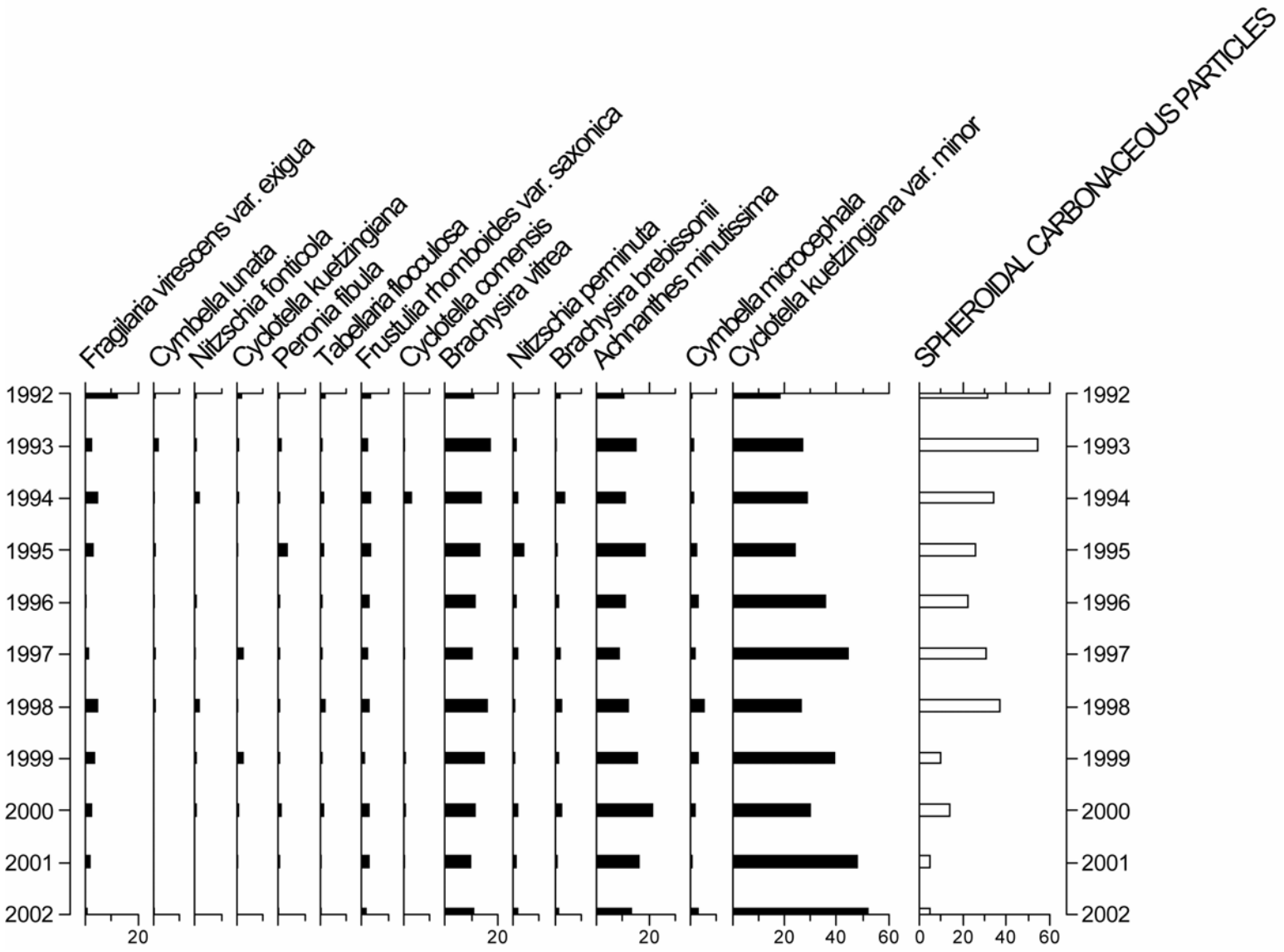
11.5. Aquatic macrophyte data, Burnmoor Tarn

Species Scores (1-5)



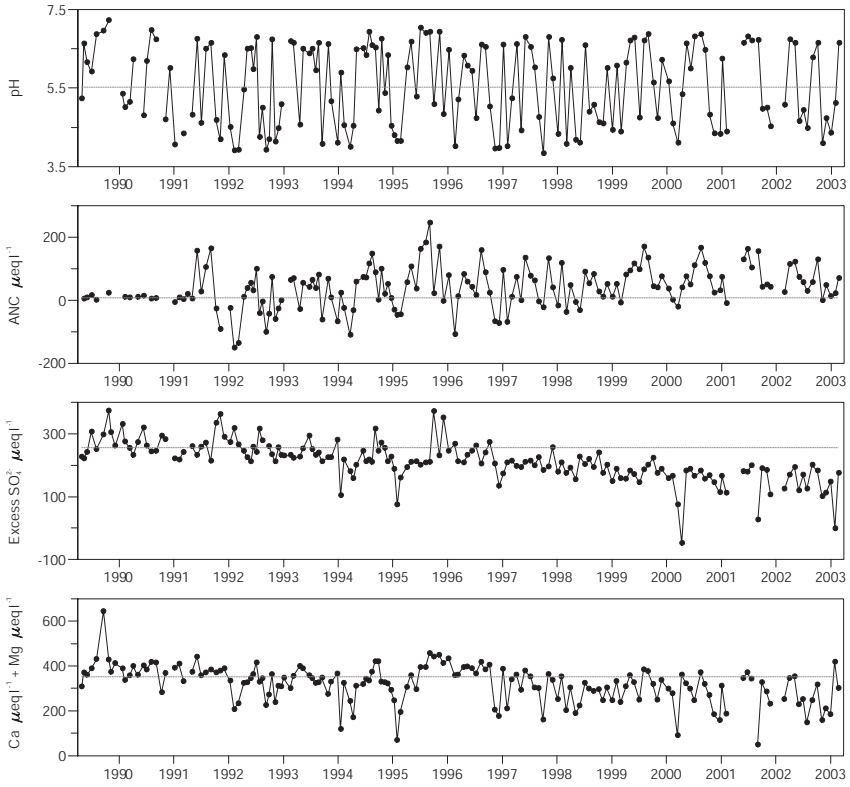
11.6. Sediment trap data, Burnmoor Tarn

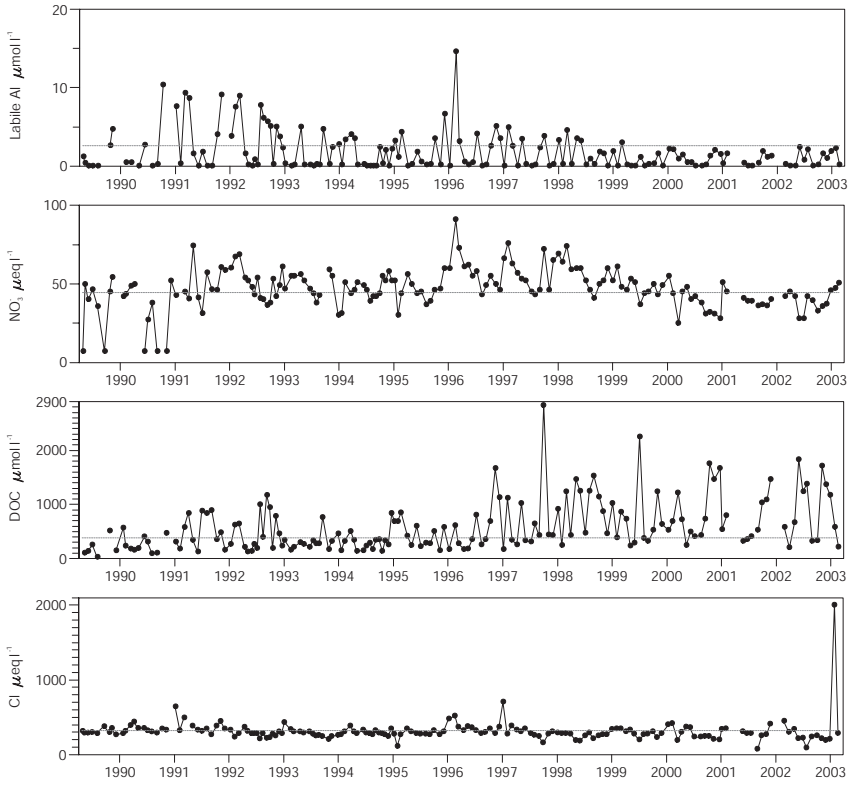
Relative percentage frequency of diatom taxa and carbonaceous particle flux (no. trap^{-1} day^{-1}).



12. River Etherow

12.1. Spot sampled chemistry data





Determinand statistics

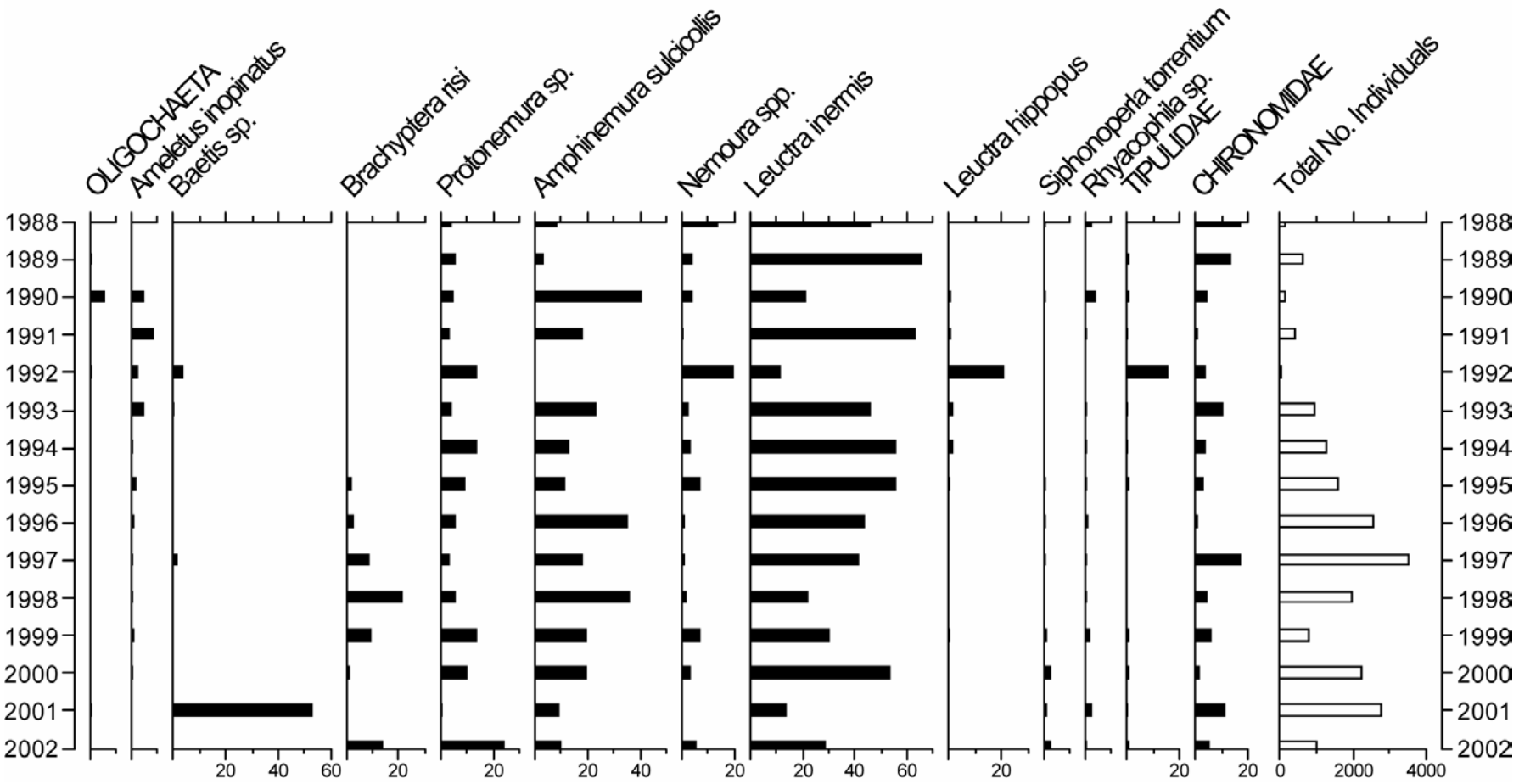
	mean 4/1989-3/1994	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1989-3/2003	p* 4/1989-3/2003
pH	5.53	5.44	1.05	0.01	0.40
ANC	7.58	60.67	43.29	**6.21**	**0.00**
Ca	178.3	136.0	43.16	**-0.07**	**0.01**
Mg	172.1	126.7	44.15	**-0.04**	**0.00**
Na	300.5	354.7	418.6	-0.03	0.35
K	19.83	17.80	5.24	**-0.01**	**0.02**
Sol.Al	5.24	4.58	3.58	-0.50	0.78

	mean 4/1989-3/1994	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1989-3/2003	p* 4/1989-3/2003
Sol.lab.Al	2.64	1.06	0.95	**-1.00**	**0.03**
Cl	316.4	379.8	514.0	-0.10	0.09
SO_4	288.7	180.4	38.82	**-0.44**	**0.00**
XSO_4	255.4	140.5	55.72	**-0.45**	**0.00**
NO_3	44.47	39.46	7.40	0.00	0.74
Si	234.0	201.0	87.14	-0.03	0.09
DOC	377.3	916.7	597.8	**0.39**	**0.00**

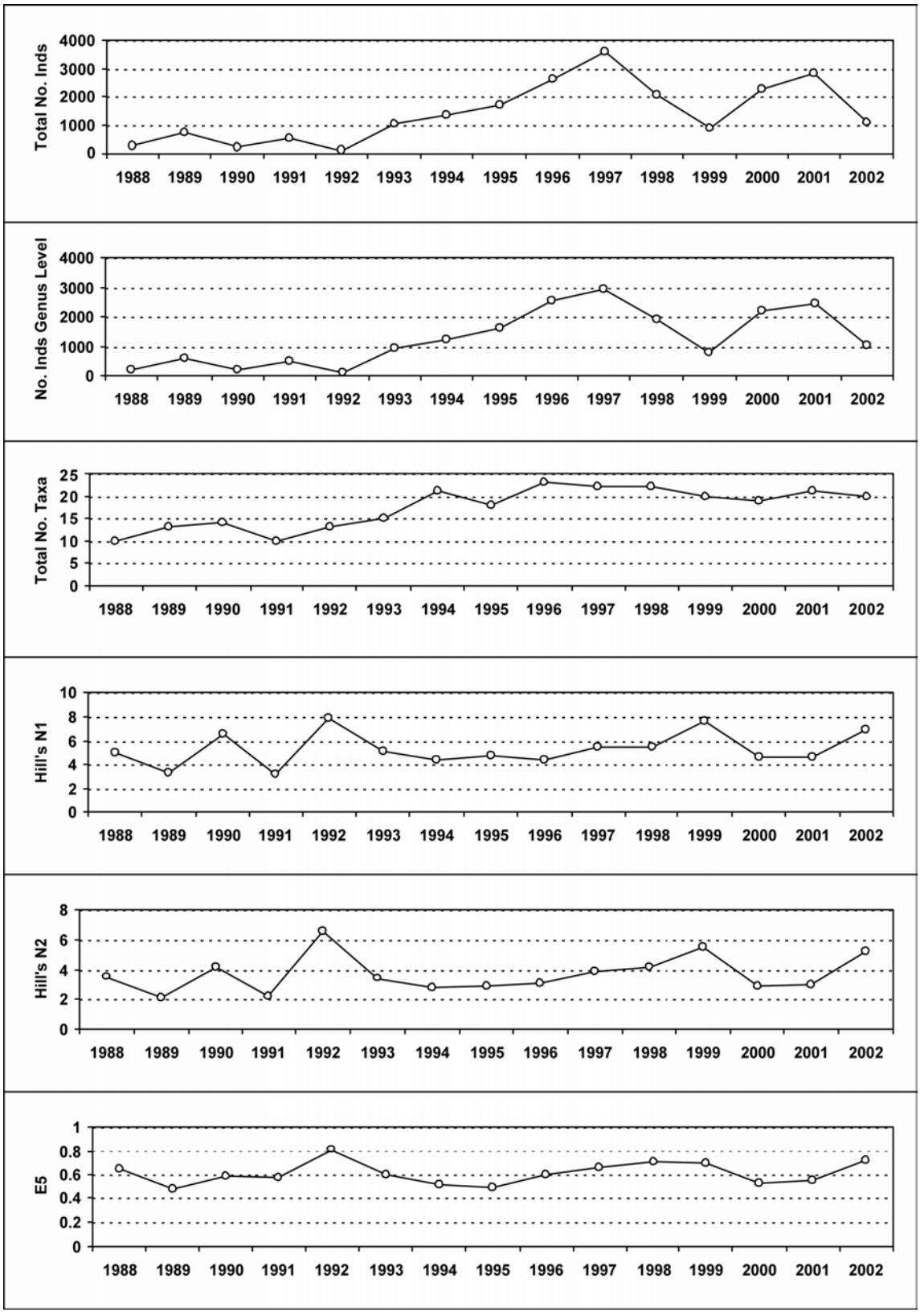
* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq\,l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol\,l^{-1}$)

12.2. Macroinvertebrate data

12.2.1. Percentage abundance summary, River Etherow



12.2.2. Summary statistics, River Etherow

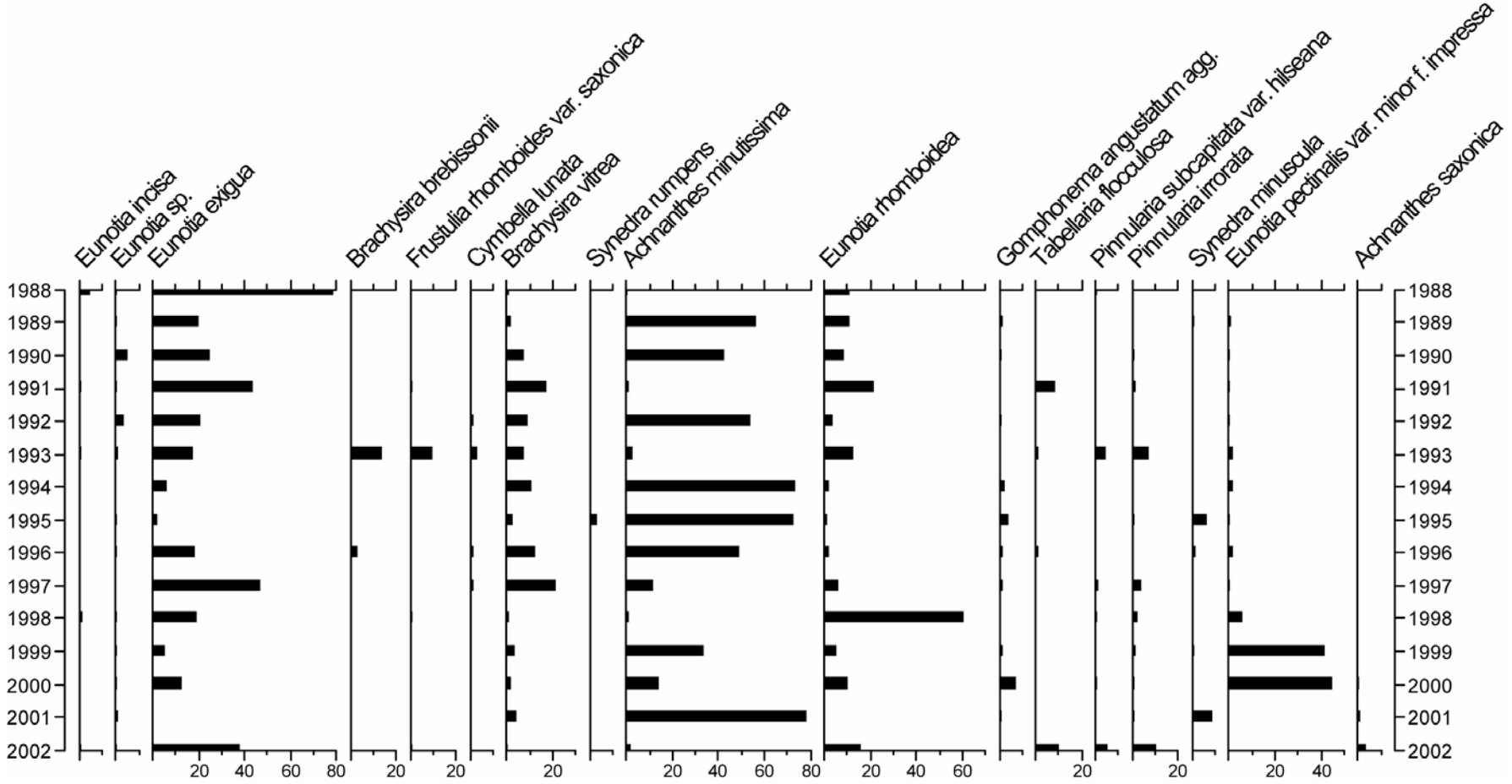


12.3. Fish data

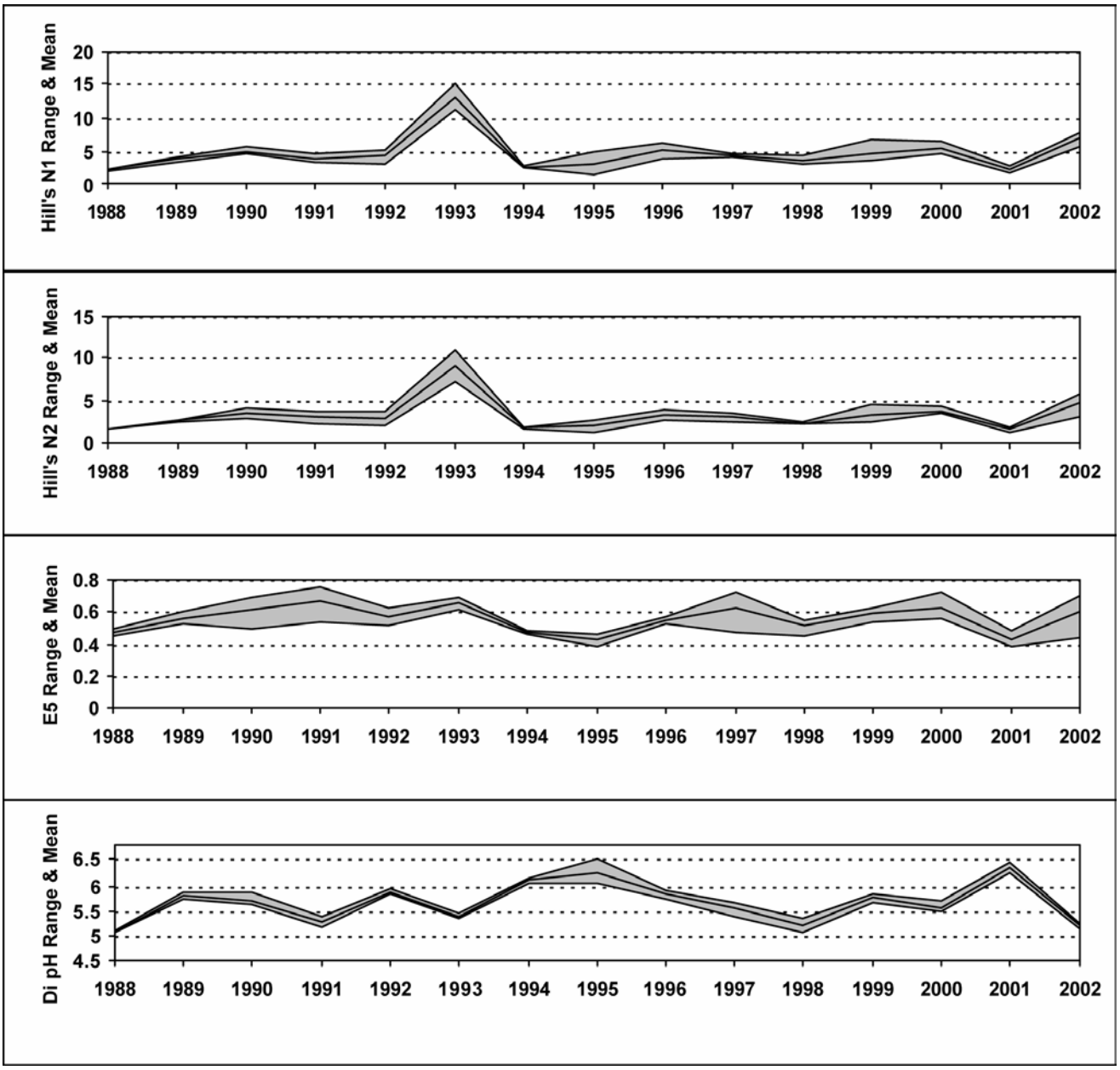
No fish are present in this reach of the river.

12.4. Epilithic diatom data

12.4.1. Percentage abundance summary, River Etherow

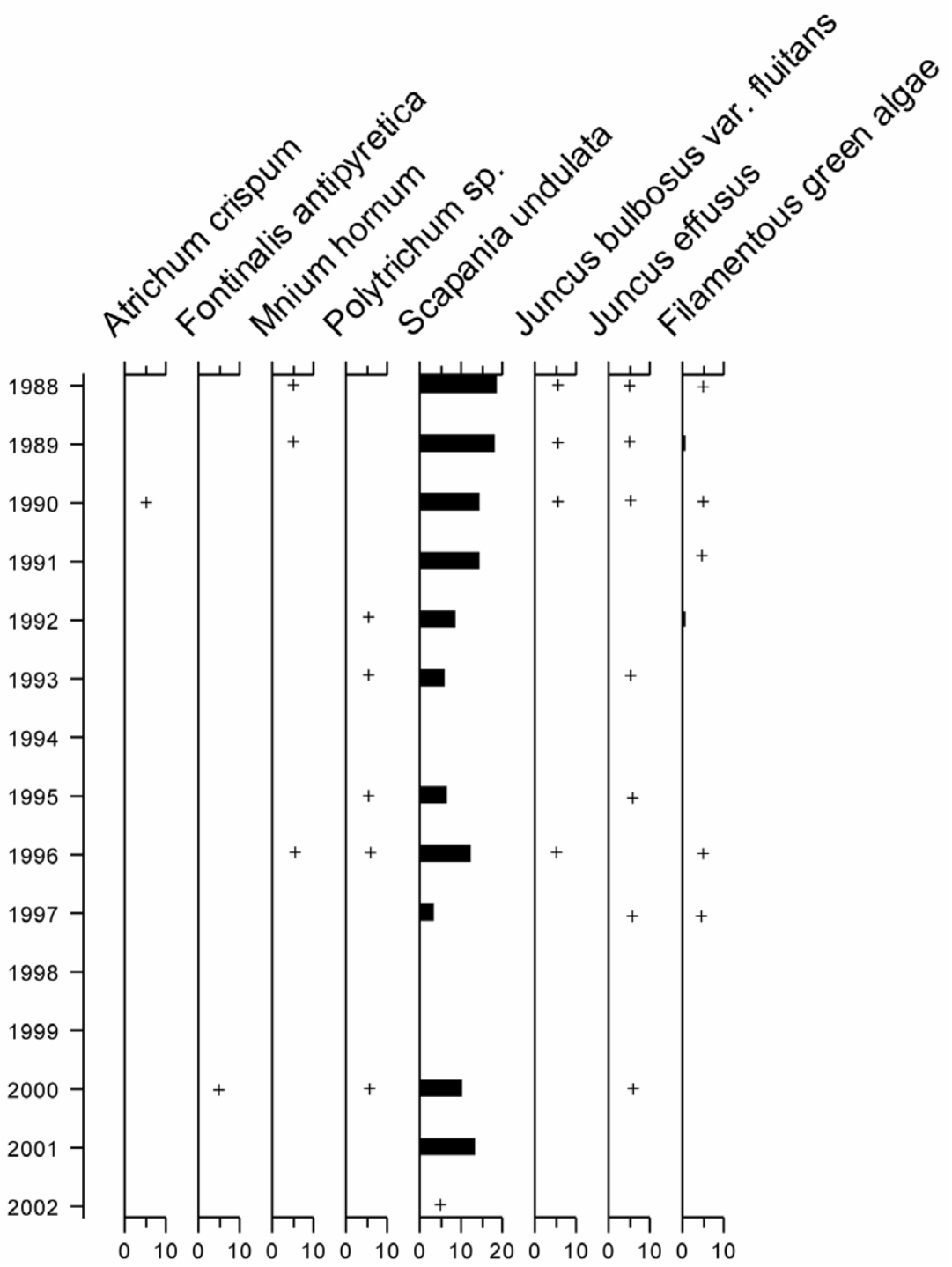


12.4.2. Summary statistics, River Etherow



12.5. Aquatic macrophyte data, River Etherow

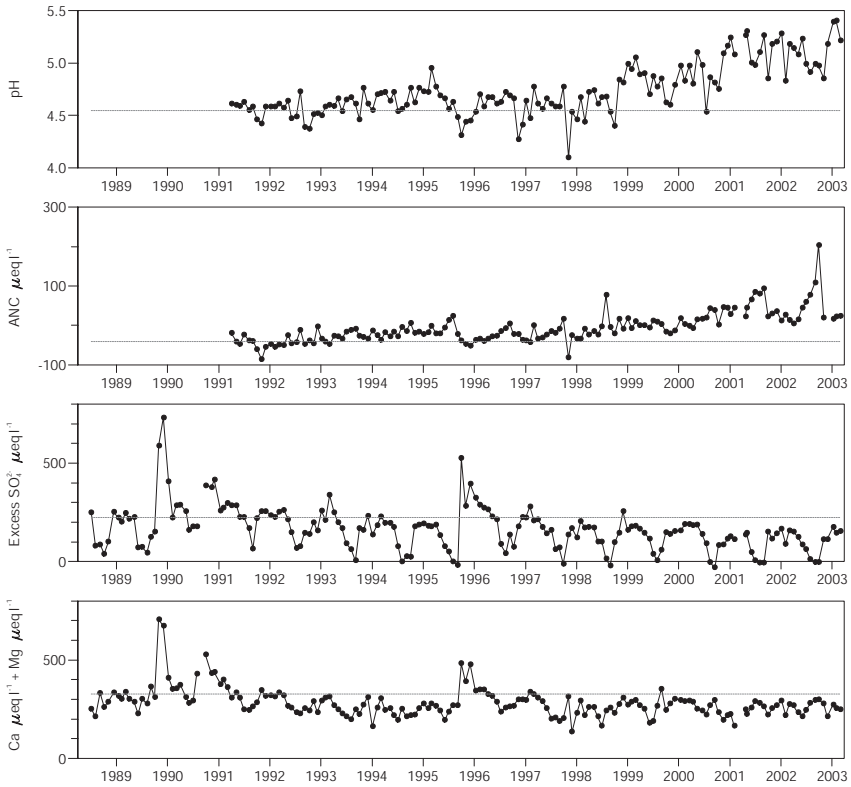
Percentage Species Cover

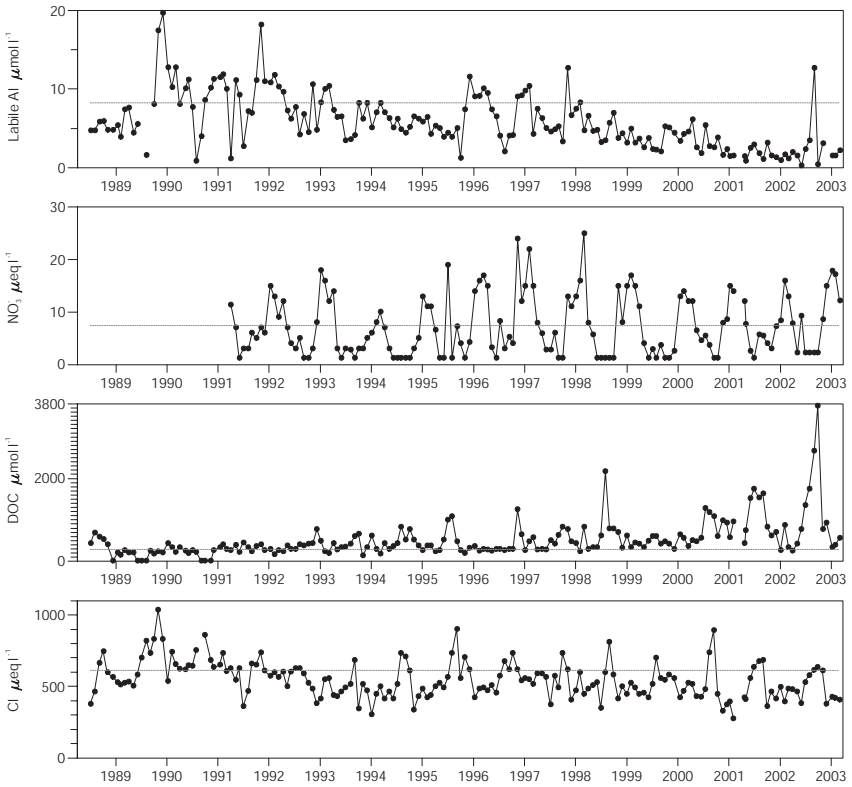


+ Represents <0.1% abundance

13. Old Lodge

13.1. Spot sampled chemistry data





Determinand statistics

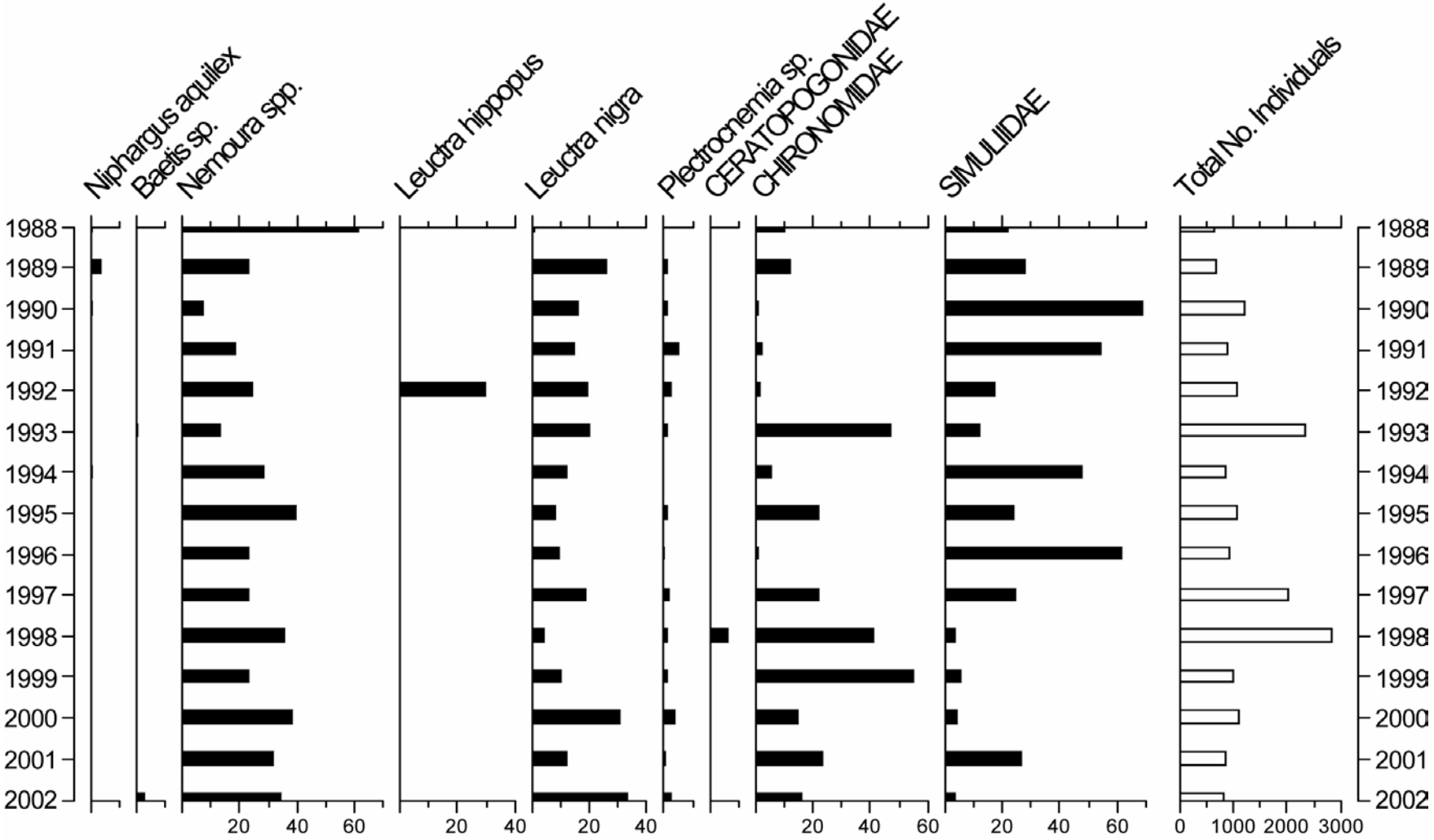
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	4.55	5.11	0.18	**0.05**	**0.00**
ANC	-41.74	53.92	58.80	**7.01**	**0.00**
Ca	167.6	134.4	12.37	**-0.04**	**0.02**
Mg	158.2	123.3	19.51	**-0.03**	**0.01**
Na	490.8	400.7	45.97	**-0.16**	**0.01**
K	22.18	19.38	9.37	-0.01	0.14
Sol.Al	9.97	7.25	5.99	**-9.50**	**0.00**

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	8.26	2.82	3.42	**-13.85**	**0.00**
Cl	614.2	493.0	95.59	**-0.37**	**0.00**
SO_4	289.2	145.5	56.89	**-0.46**	**0.00**
XSO_4	224.7	93.71	63.79	**-0.44**	**00.0**
NO_3	7.39	8.24	6.15	0.00	0.47
Si	133.5	133.2	30.01	0.00	0.51
DOC	288.8	1163.9	1075.0	**0.43**	**0.00**

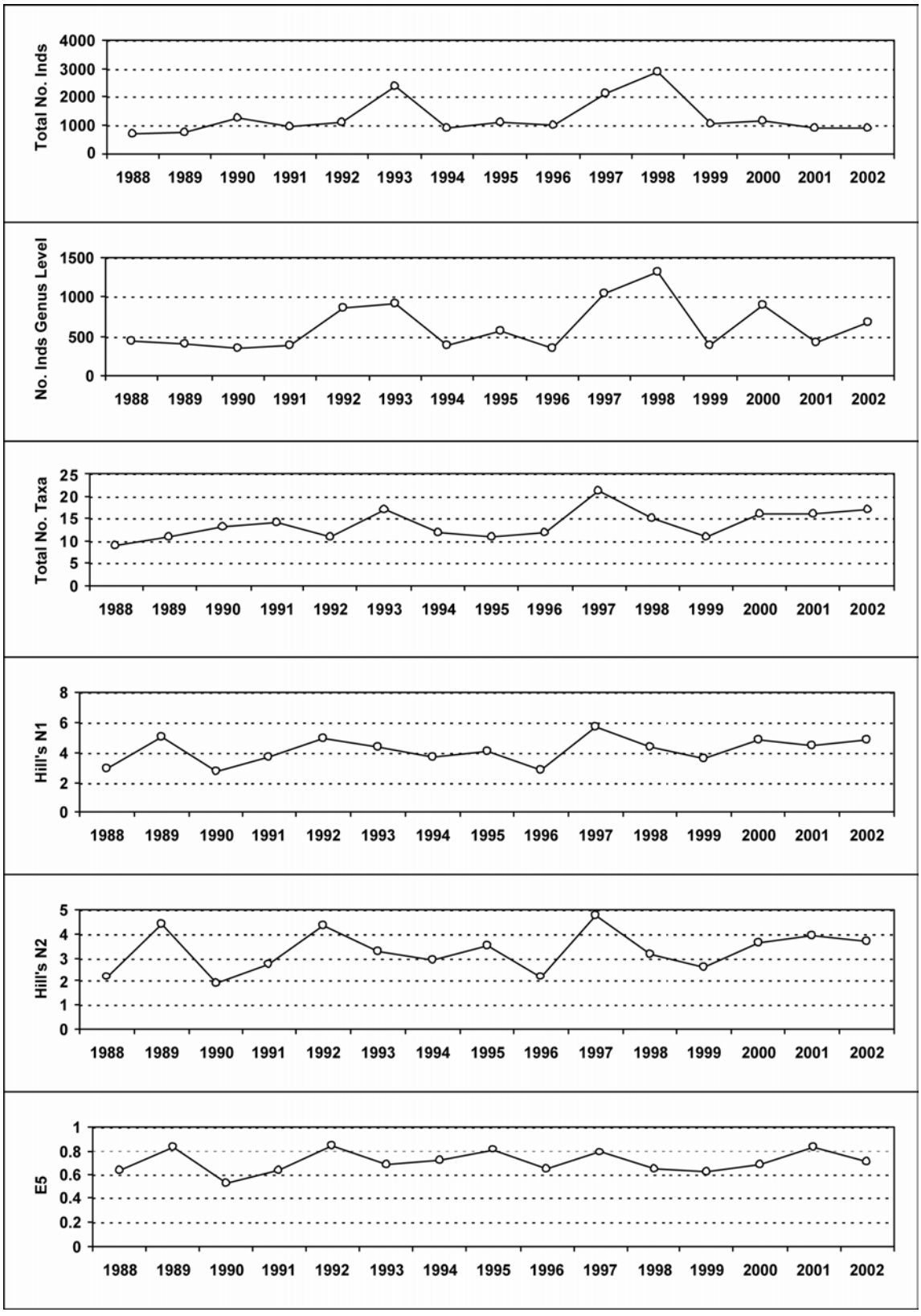
* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol l^{-1}$)

13.2. Macroinvertebrate data

13.2.1. Percentage abundance summary, Old Lodge

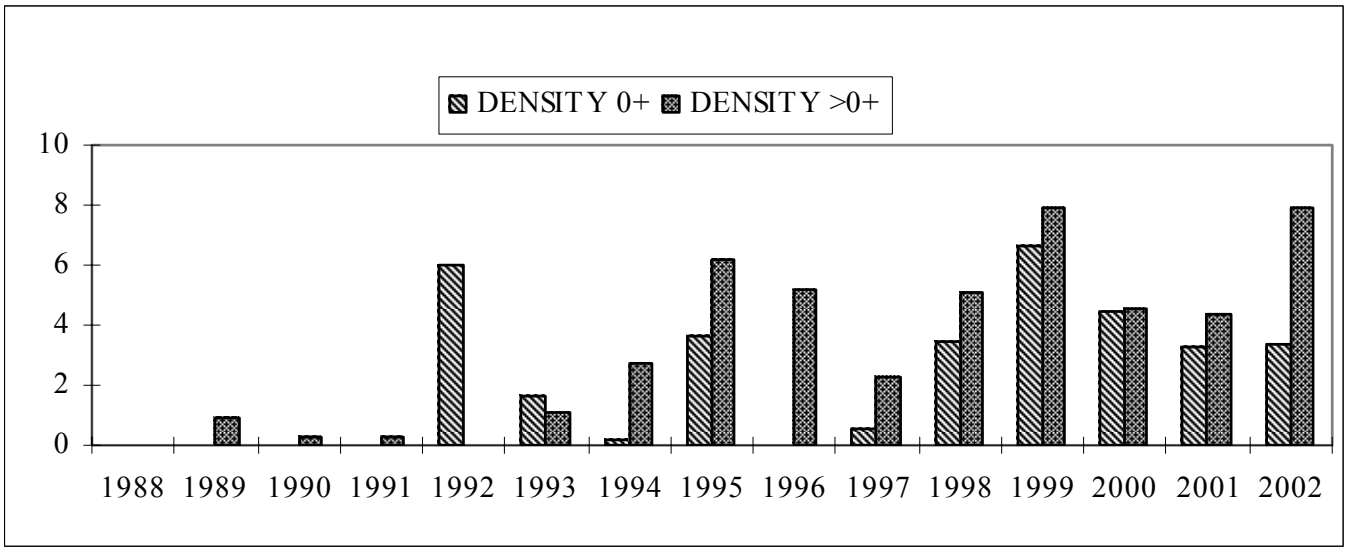


13.2.2. Summary statistics, Old Lodge



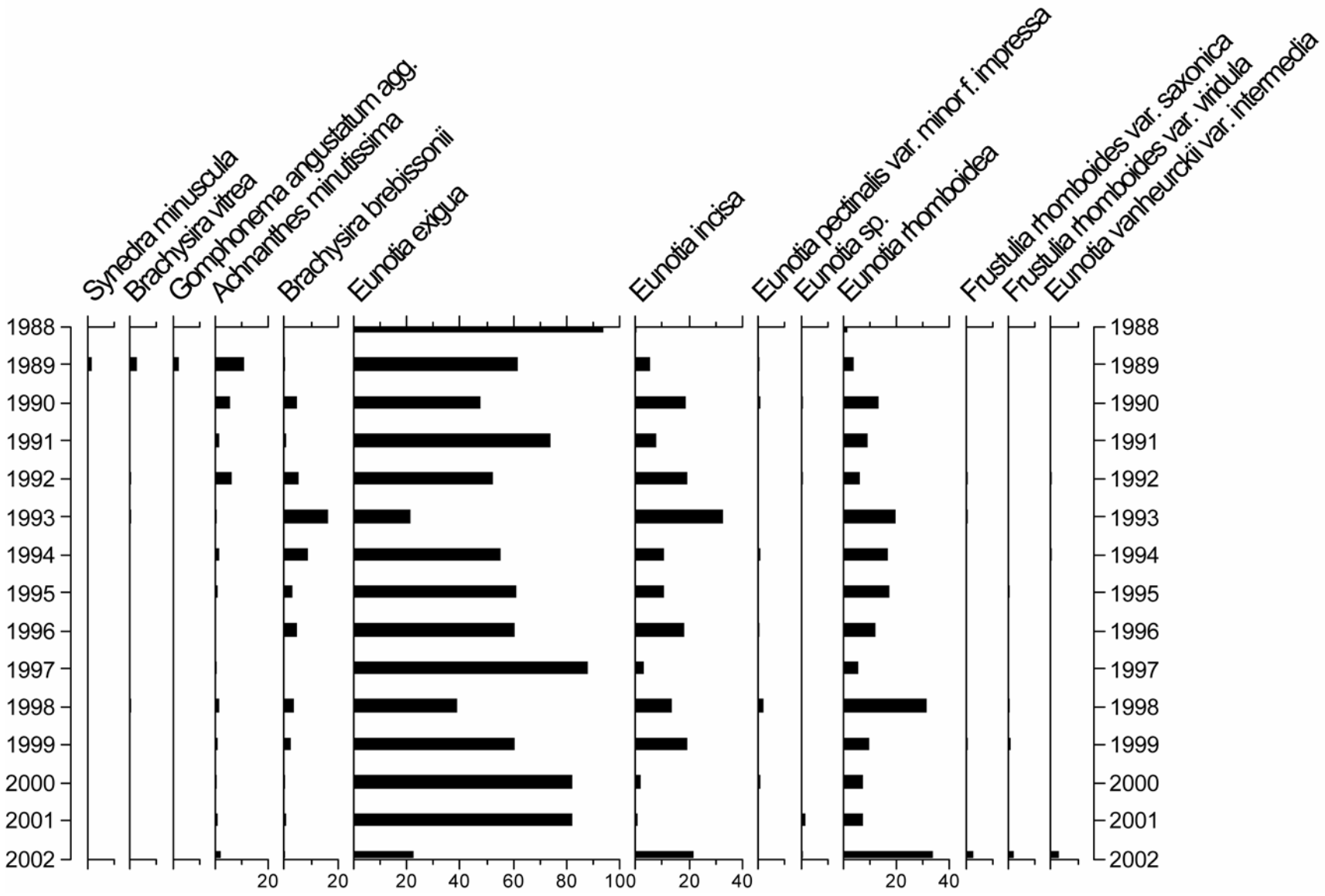
13.3. Fish data

13.3.1. Summary of mean Trout density (numbers $100m^{-2}$), Old Lodge

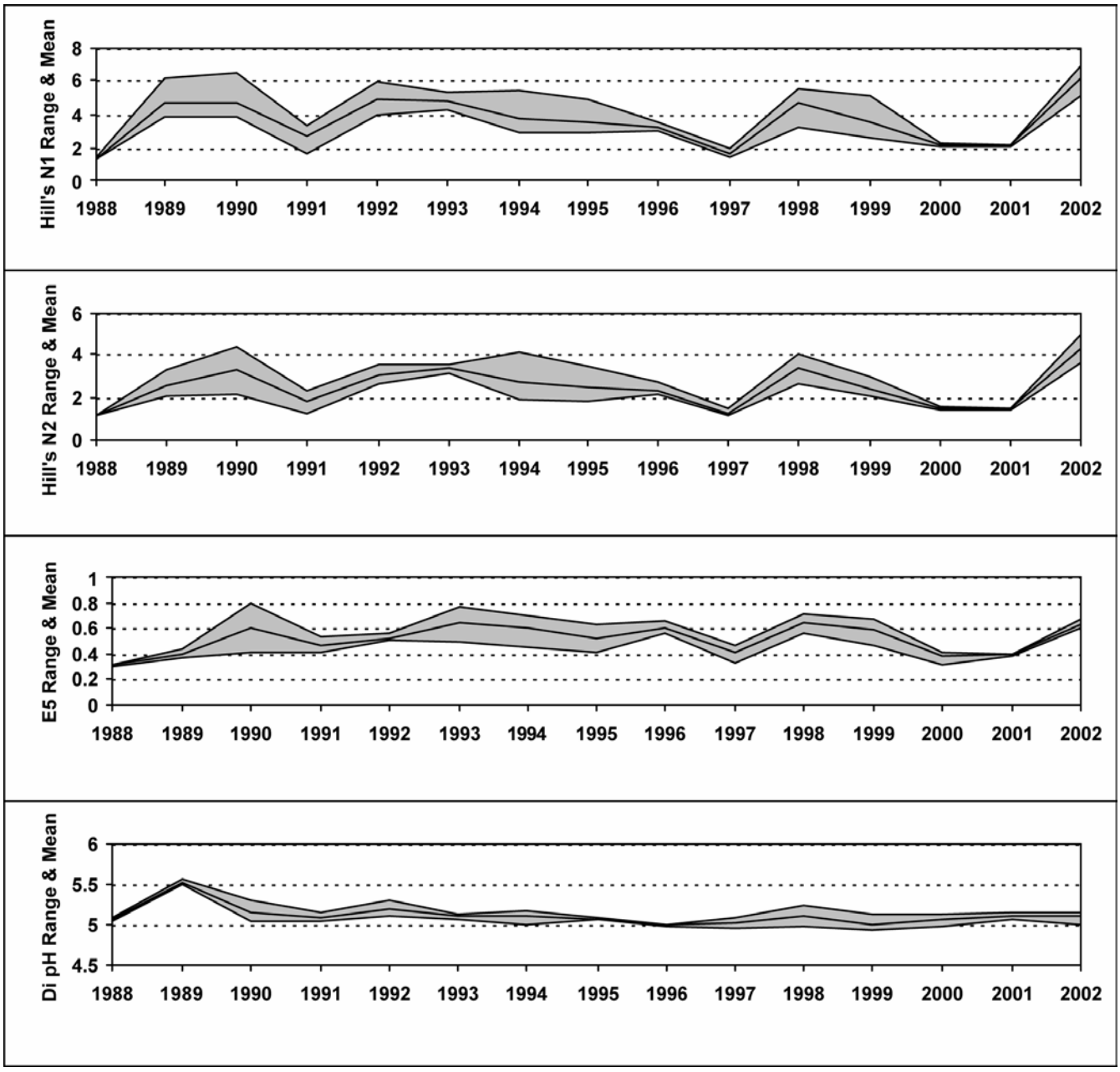


13.4. Epilithic diatom data

13.4.1. Percentage abundance summary, Old Lodge

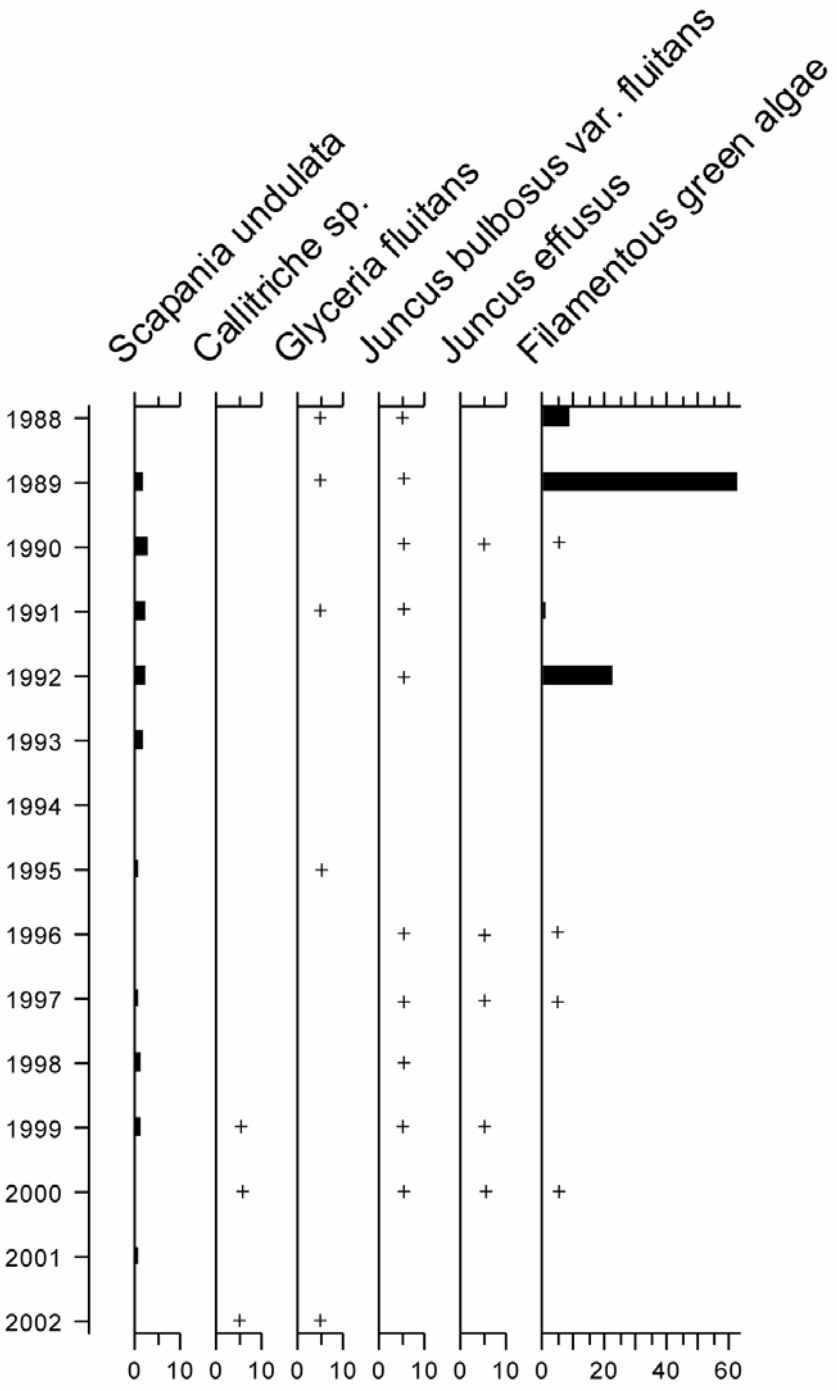


13.4.2. Summary statistics, Old Lodge



13.5. Aquatic macrophyte data, Old Lodge

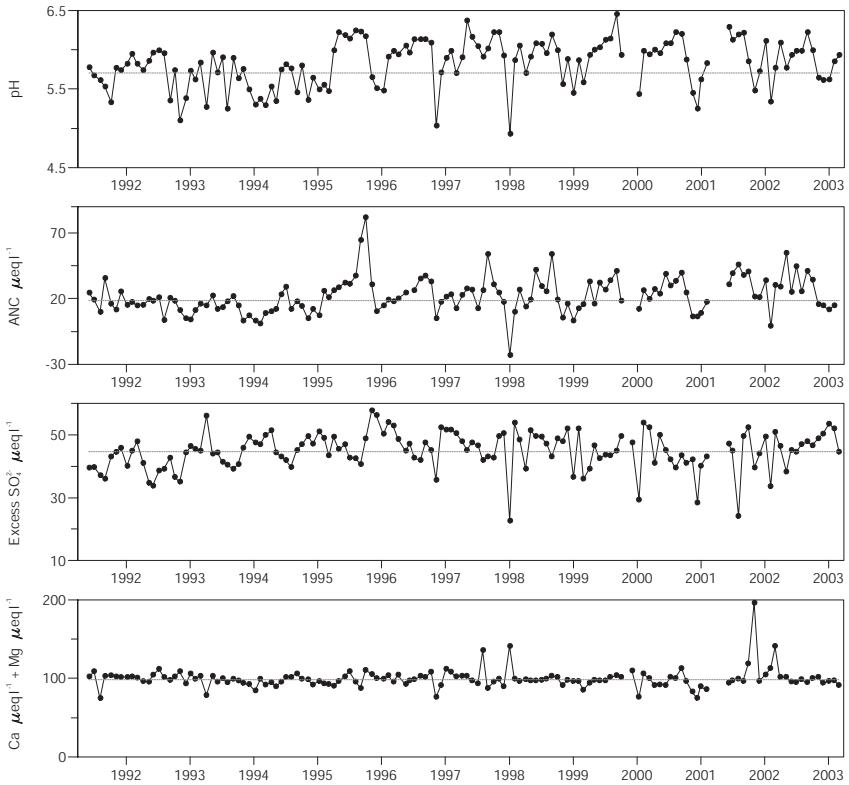
Percentage Species Cover

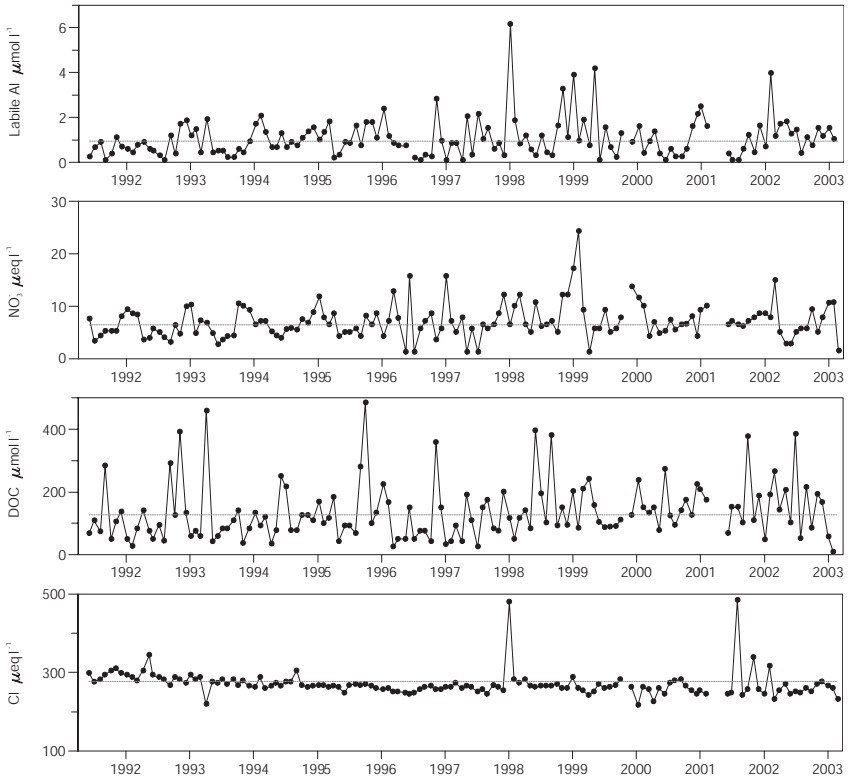


+ Represents <0.1% abundance

14. Narrator Brook

14.1. Spot sampled chemistry data





Determinand statistics

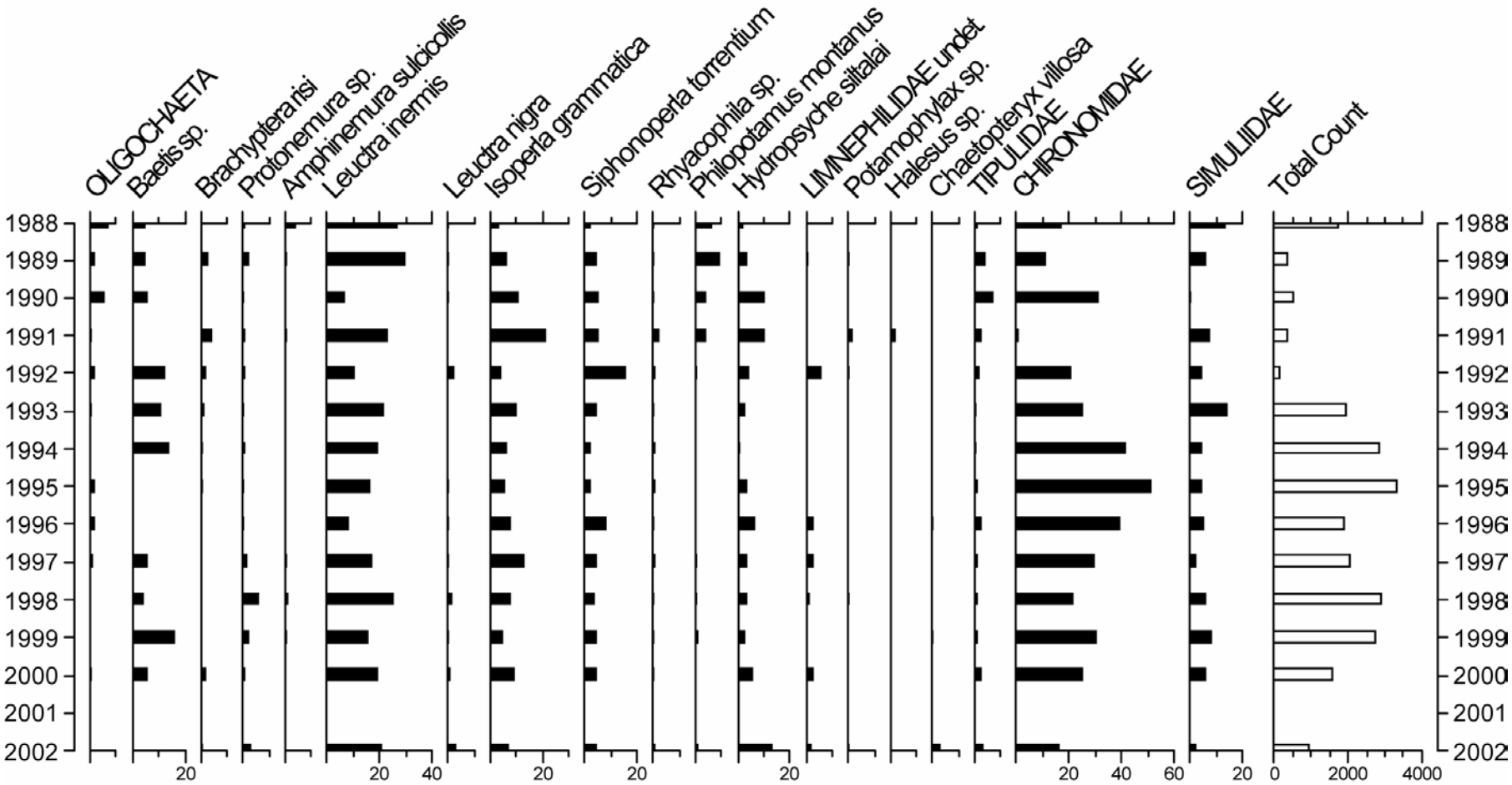
	mean 4/1991-3/1996	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1991-3/2003	p* 4/1991-3/2003
pH	5.71	5.88	0.19	0.03	0.06
ANC	18.56	28.24	14.20	**1.19**	**0.05**
Ca	33.77	32.00	1.54	0.00	0.23
Mg	64.52	65.00	2.10	0.00	0.10
Na	254.5	237.0	7.97	**-0.05**	**0.00**
K	19.52	19.49	2.57	0.00	0.31
Sol.Al	2.09	2.81	1.24	**2.00**	**0.00**

	mean 4/1991-3/1996	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1991-3/2003	p* 4/1991-3/2003
Sol.lab.Al	0.93	1.25	0.42	0.67	0.16
Cl	275.70	256.6	12.74	**-0.10**	**0.00**
SO_4	73.59	73.96	4.49	0.00	0.24
XSO_4	44.63	47.01	3.96	**0.02**	**0.04**
NO_3	6.42	6.01	3.05	0.00	0.07
Si	151.30	162.9	16.75	0.01	0.22
DOC	125.30	146.6	104.5	**0.06**	**0.01**

* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq\,l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol\,l^{-1}$)

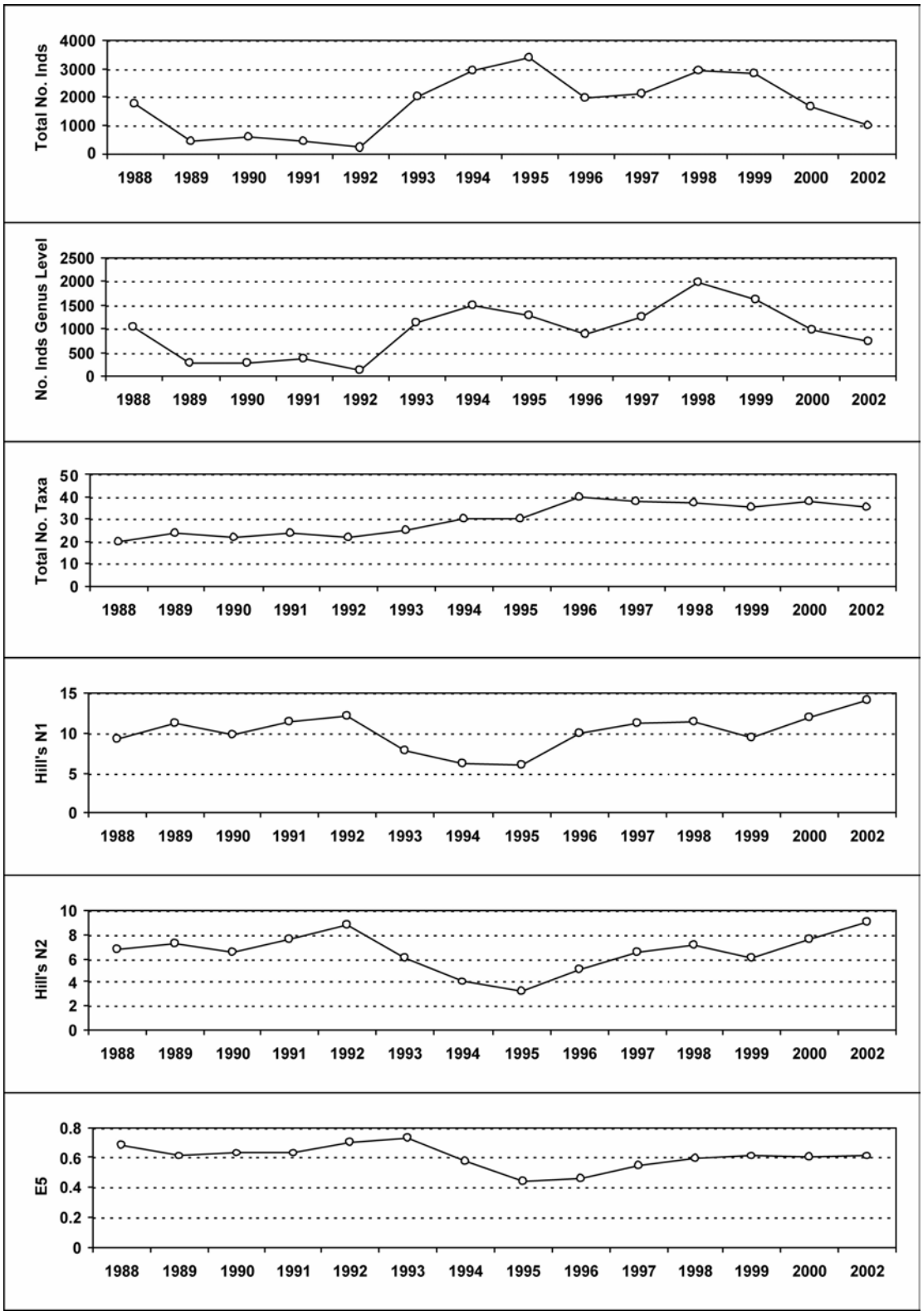
14.2. Macroinvertebrate data

14.2.1. Percentage abundance summary, Narrator Brook



No sampling in 2001 due to Foot and Mouth restrictions.

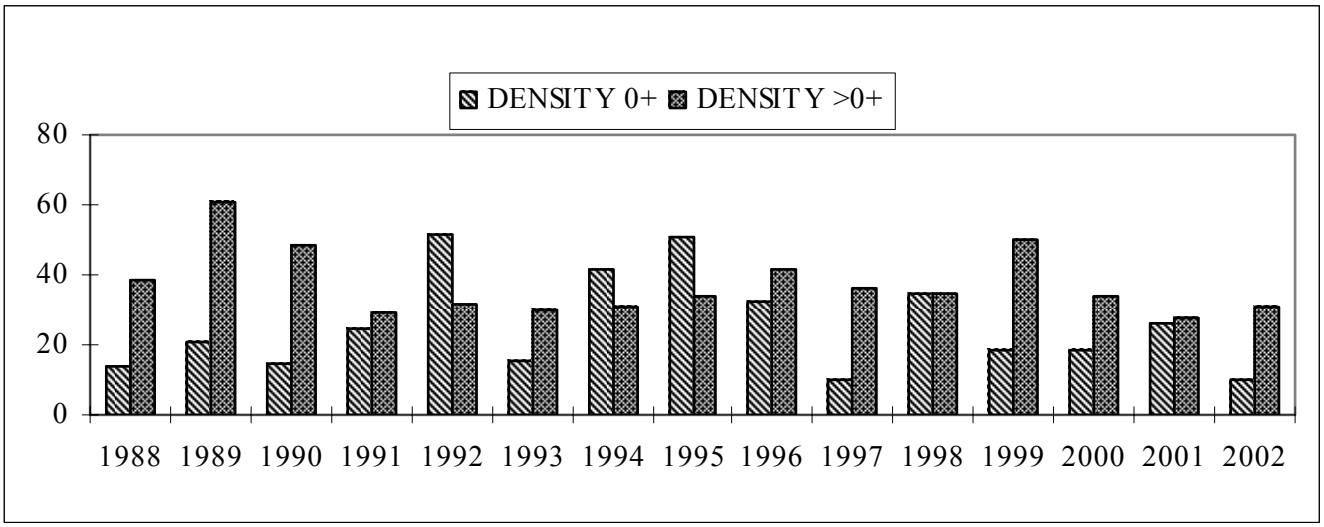
14.2.2. Summary statistics, Narrator Brook



No sampling in 2001 due to Foot and Mouth restrictions.

14.3. Fish data

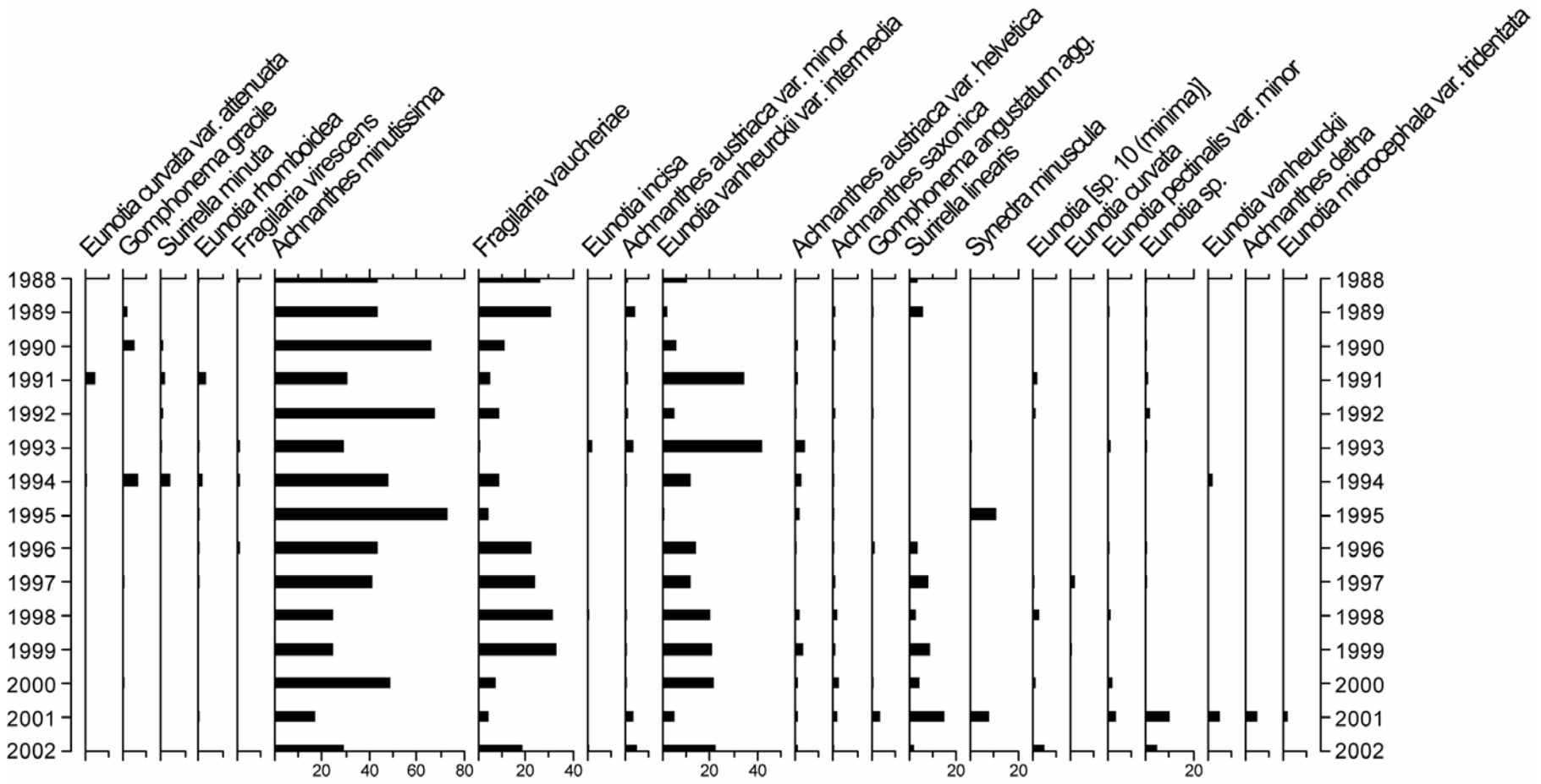
14.3.1. Summary of mean Trout density (numbers $100m^{-2}$), Narrator Brook



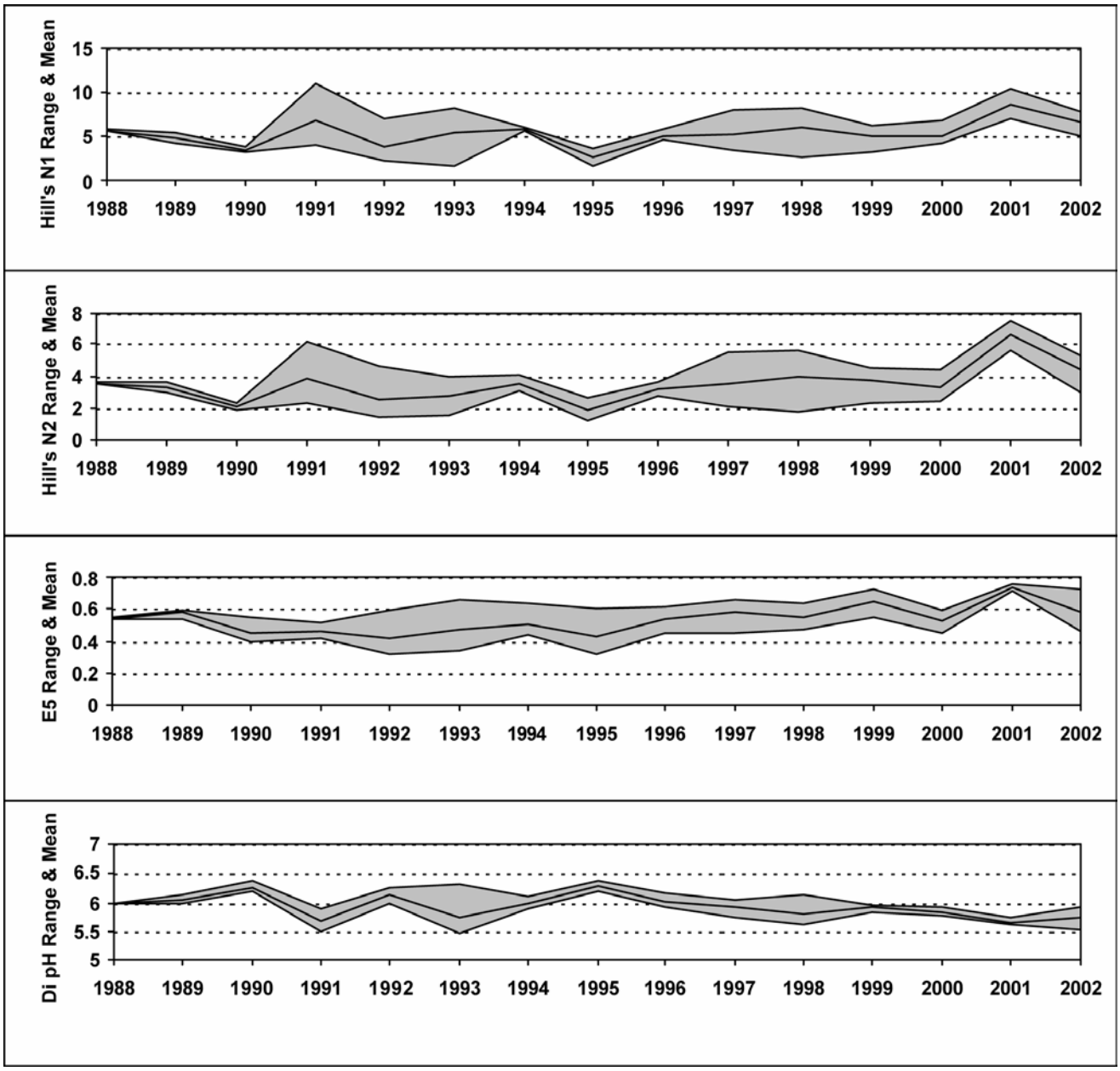
NF = Not fished

14.4. Epilithic diatom data

14.4.1. Percentage abundance summary, Narrator Brook

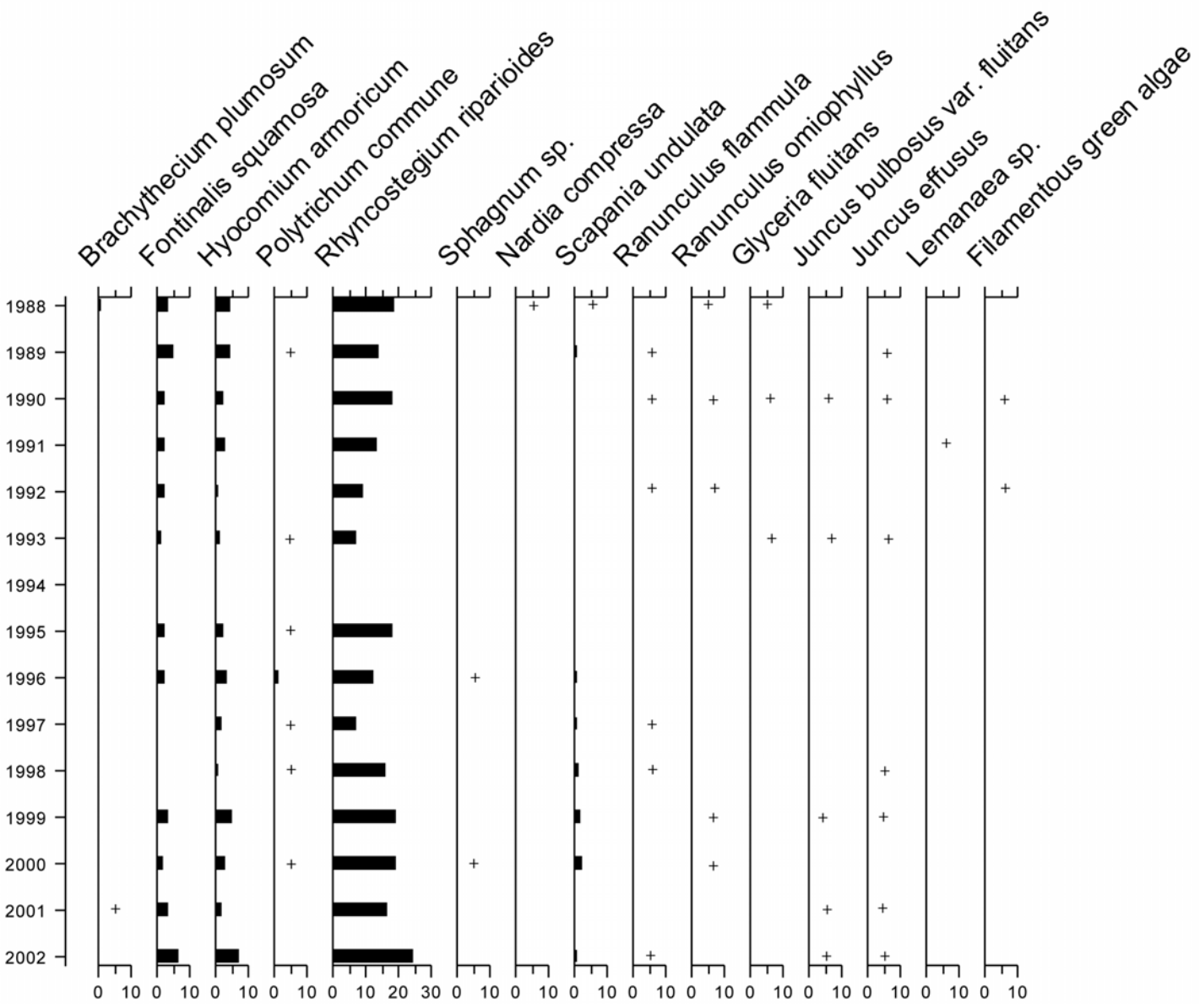


14.4.2. Summary statistics, Narrator Brook



14.5. Aquatic macrophyte data, Narrator Brook

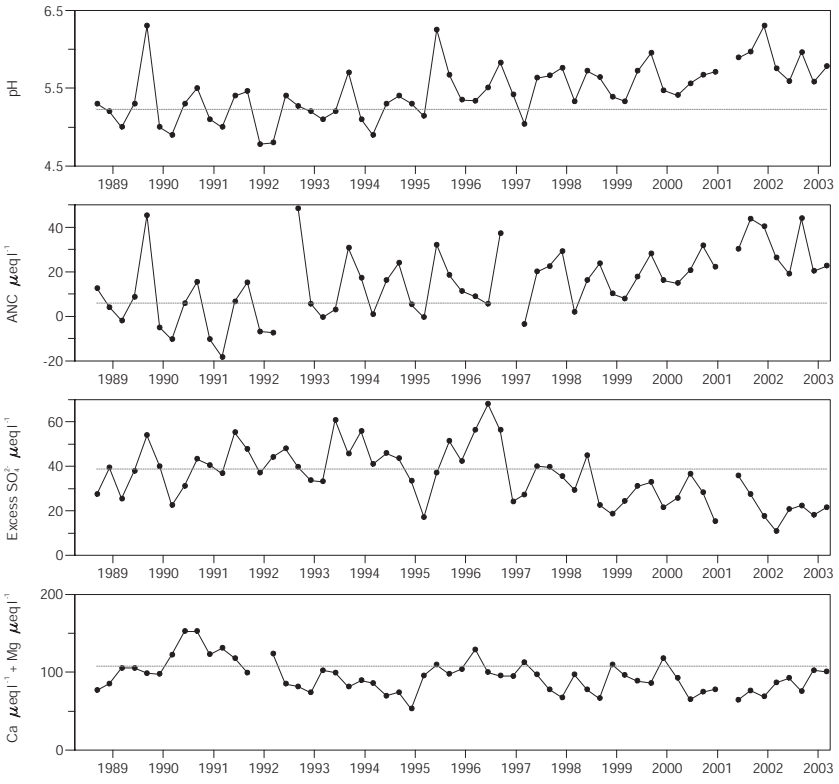
Percentage Species Cover

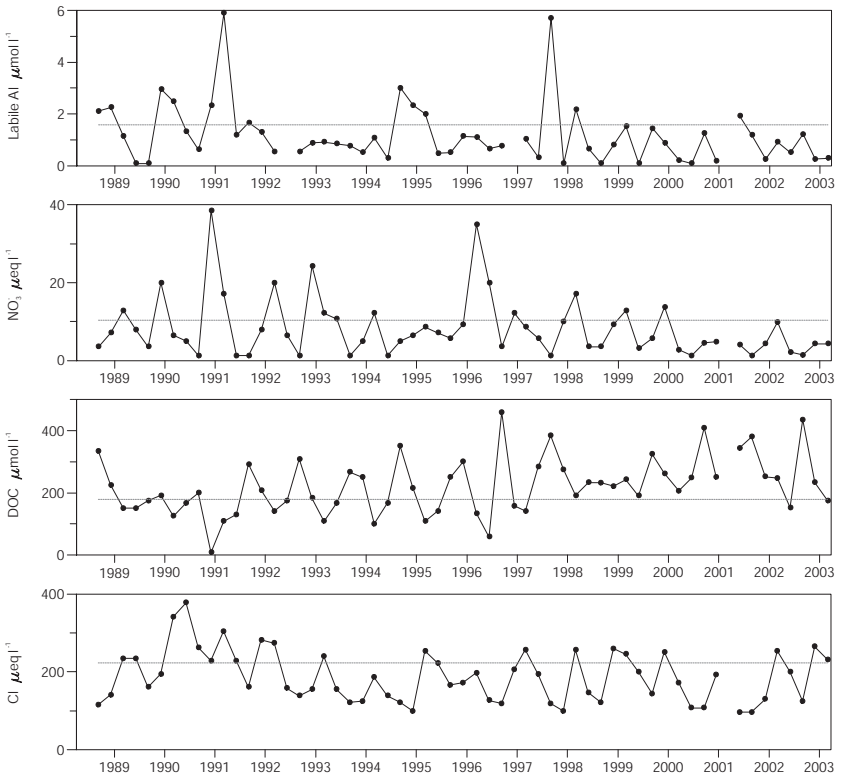


+ Represents <0.1% abundance

15. Llyn Llagi

15.1. Spot sampled chemistry data





Determinand statistics

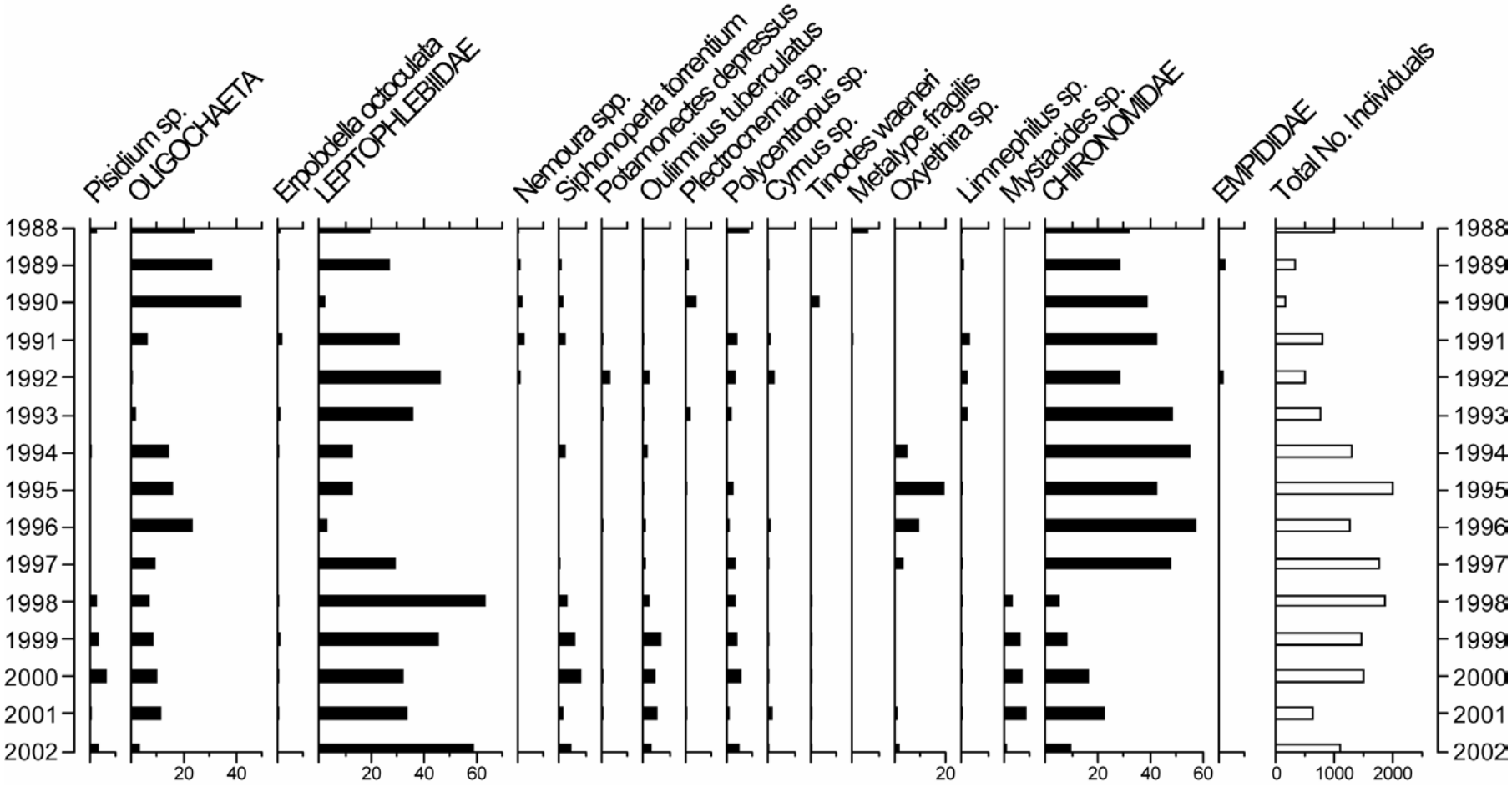
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	5.23	5.73	0.18	**0.05**	**0.00**
ANC	5.93	26.44	11.79	**1.95**	**0.00**
Ca	57.06	45.75	3.57	**-0.02**	**0.02**
Mg	50.53	46.88	8.70	-0.01	0.09
Na	187.4	172.8	40.38	-0.06	0.12
K	3.60	3.78	2.19	0.00	0.95
Sol.Al	2.81	2.72	0.87	0.30	0.62

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	1.58	0.57	0.45	**-1.67**	**0.03**
Cl	222.4	204.9	60.13	-0.12	0.13
SO_4	62.17	42.19	4.92	**-0.10**	**0.00**
XSO_4	38.82	20.67	1.90	**-0.08**	**0.01**
NO_3	10.42	3.04	1.47	0.00	0.11
Si	34.96	9.82	7.90	0.00	0.12
DOC	177.9	248.5	128.4	**0.10**	**0.00**

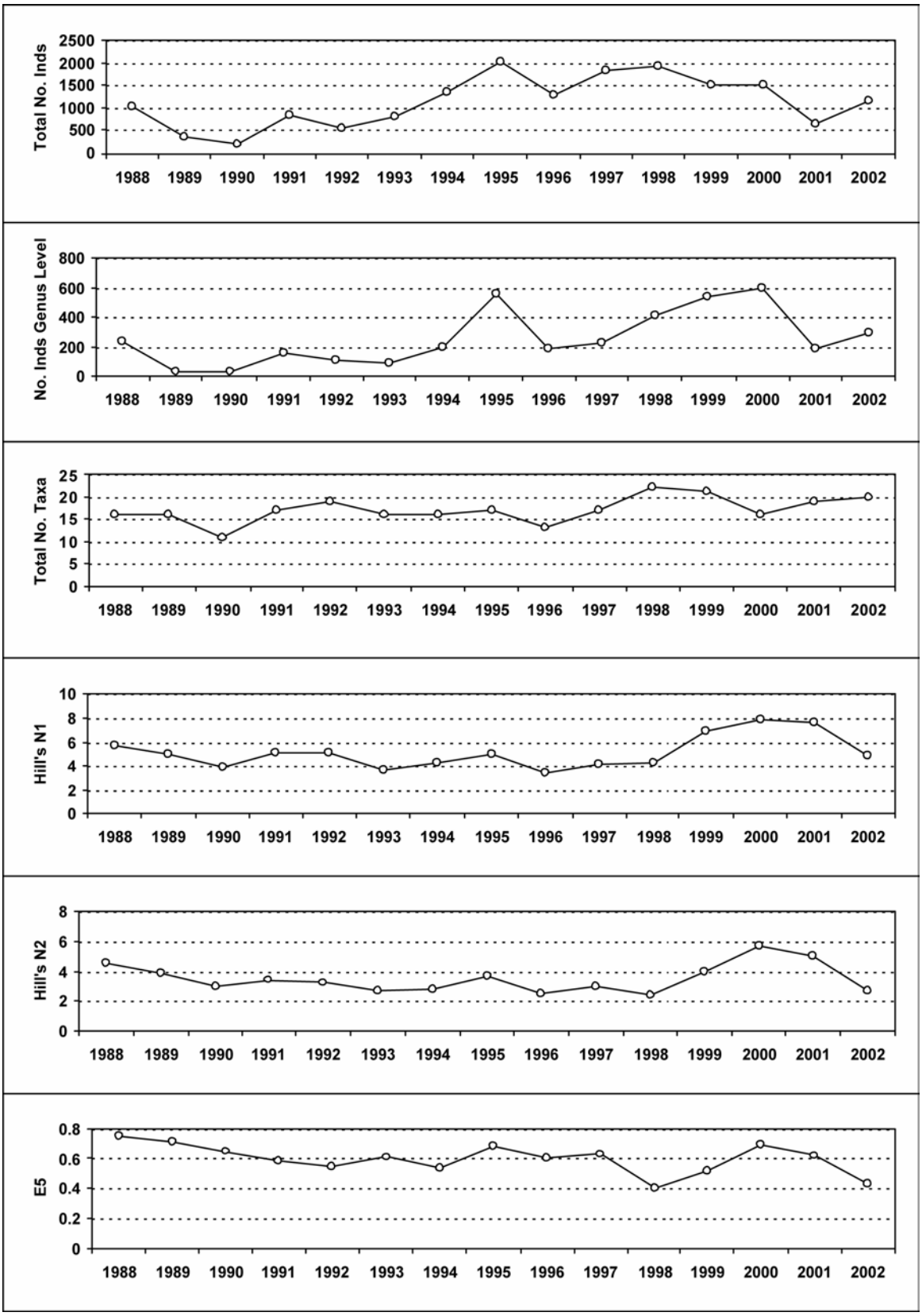
* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol l^{-1}$)

15.2. Macroinvertebrate data

15.2.1. Percentage abundance summary, Llyn Llagi

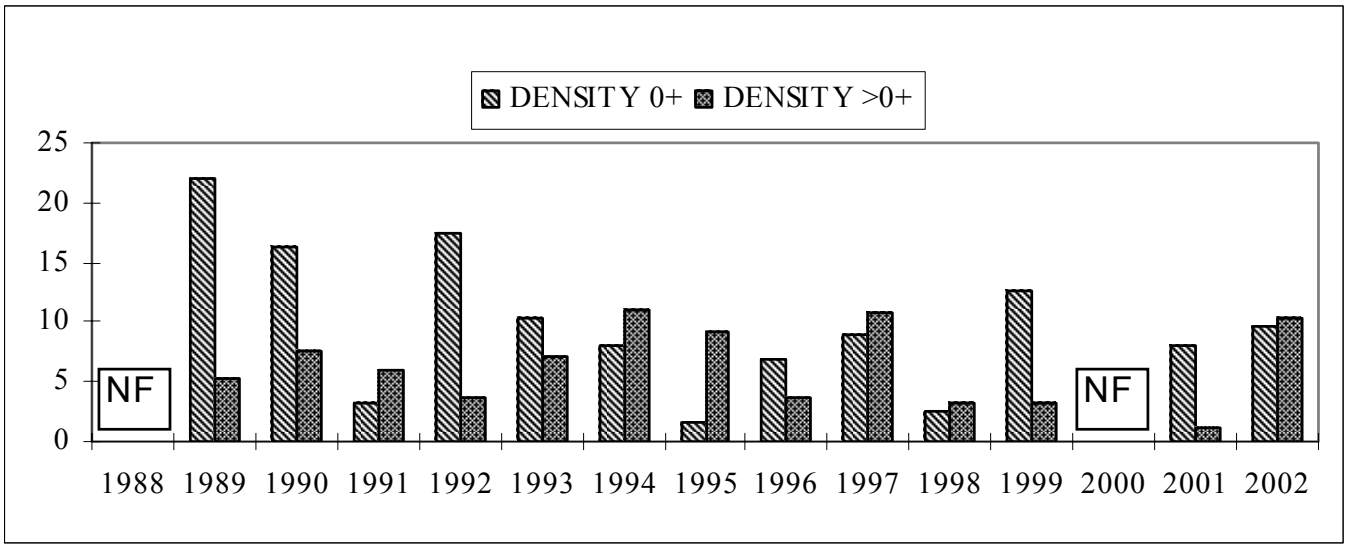


15.2.2. Summary statistics, Llyn Llagi



15.3. Fish data (for outflow stream)

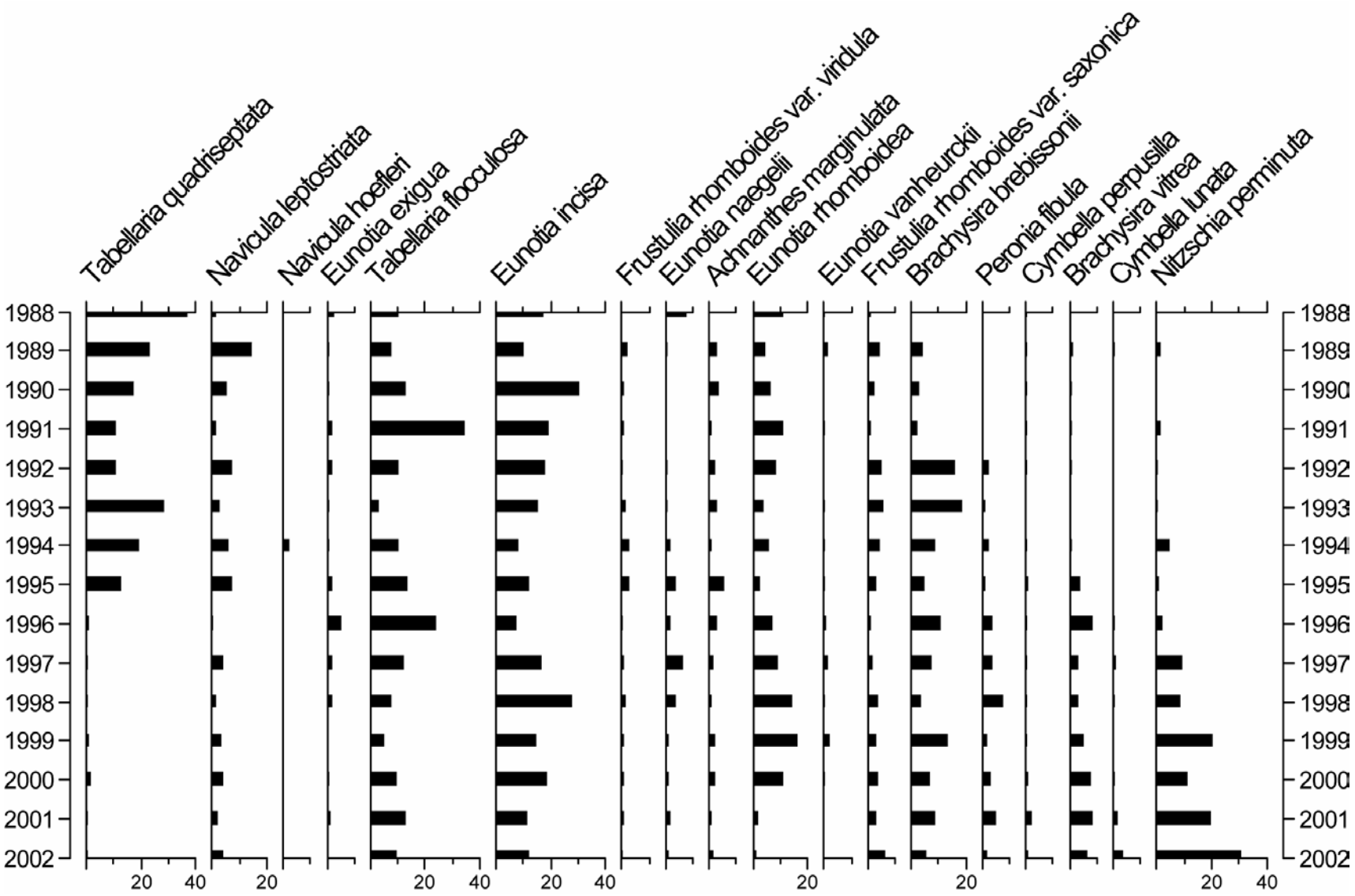
15.3.1. Summary of mean Trout density (numbers 100m^{-2}), Llyn Llagi



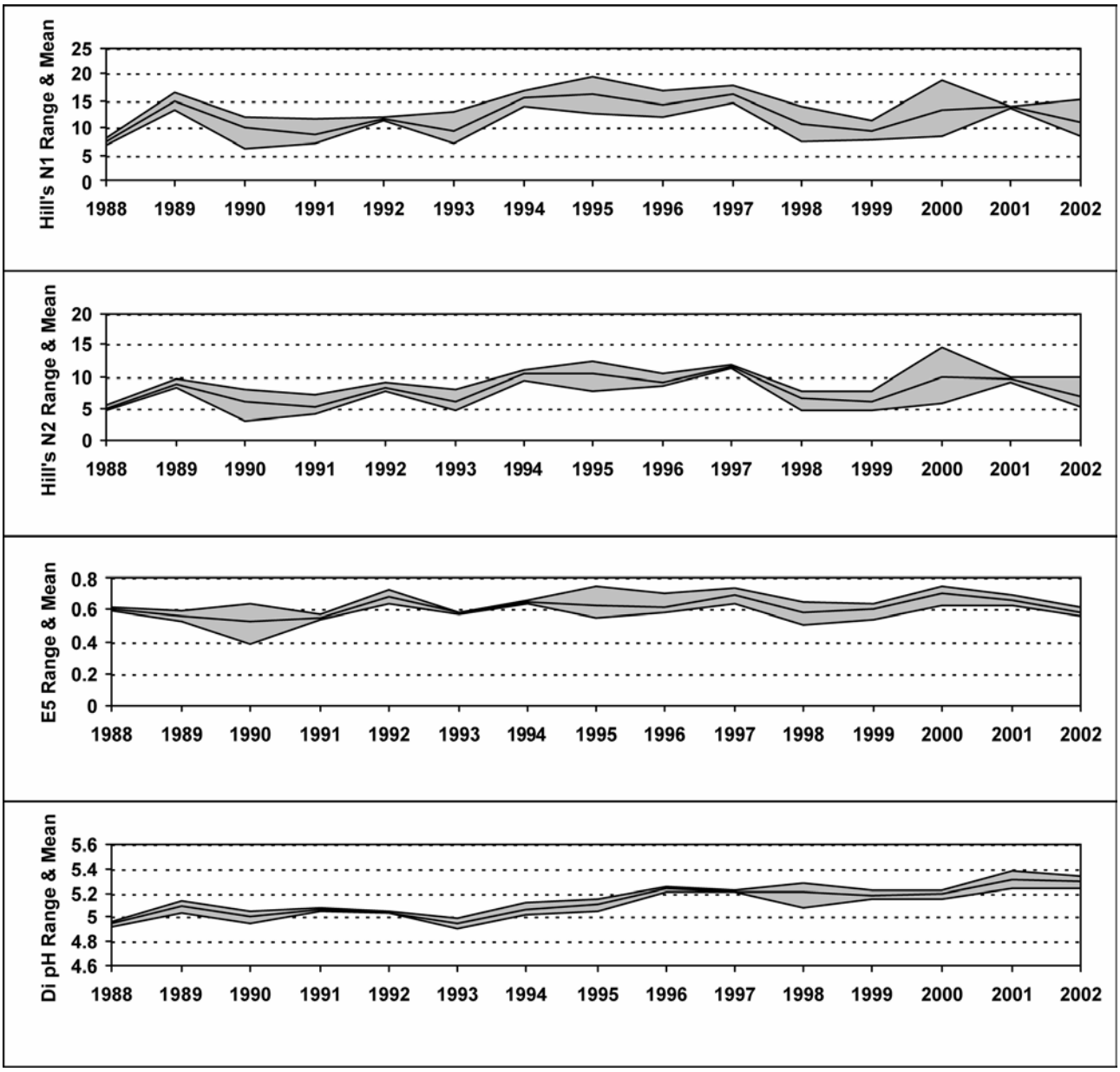
NF = Not fished

15.4. Epilithic diatom data

15.4.1. Percentage abundance summary, Llyn Llagi

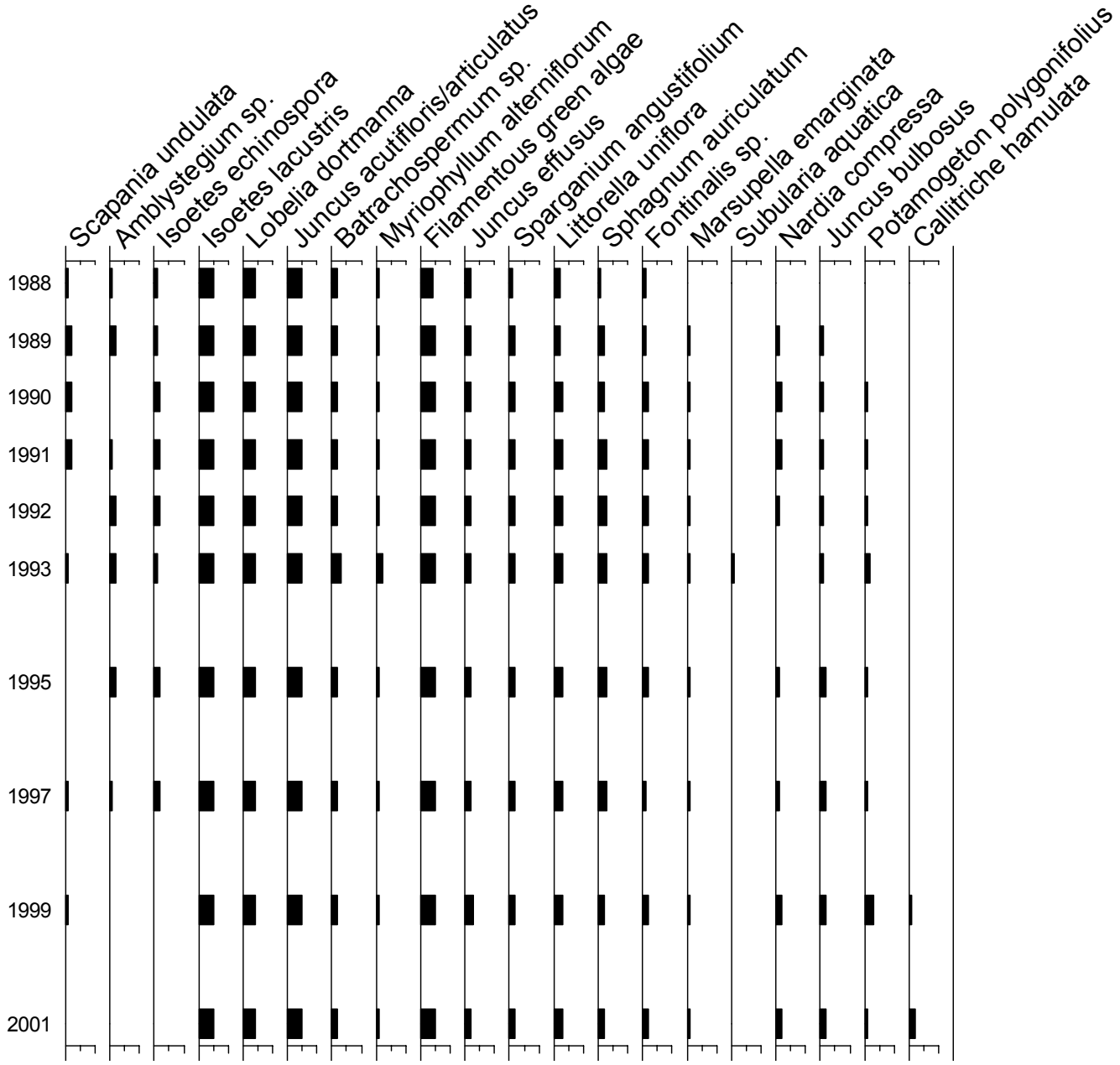


15.4.2. Summary statistics, Llyn Llagi



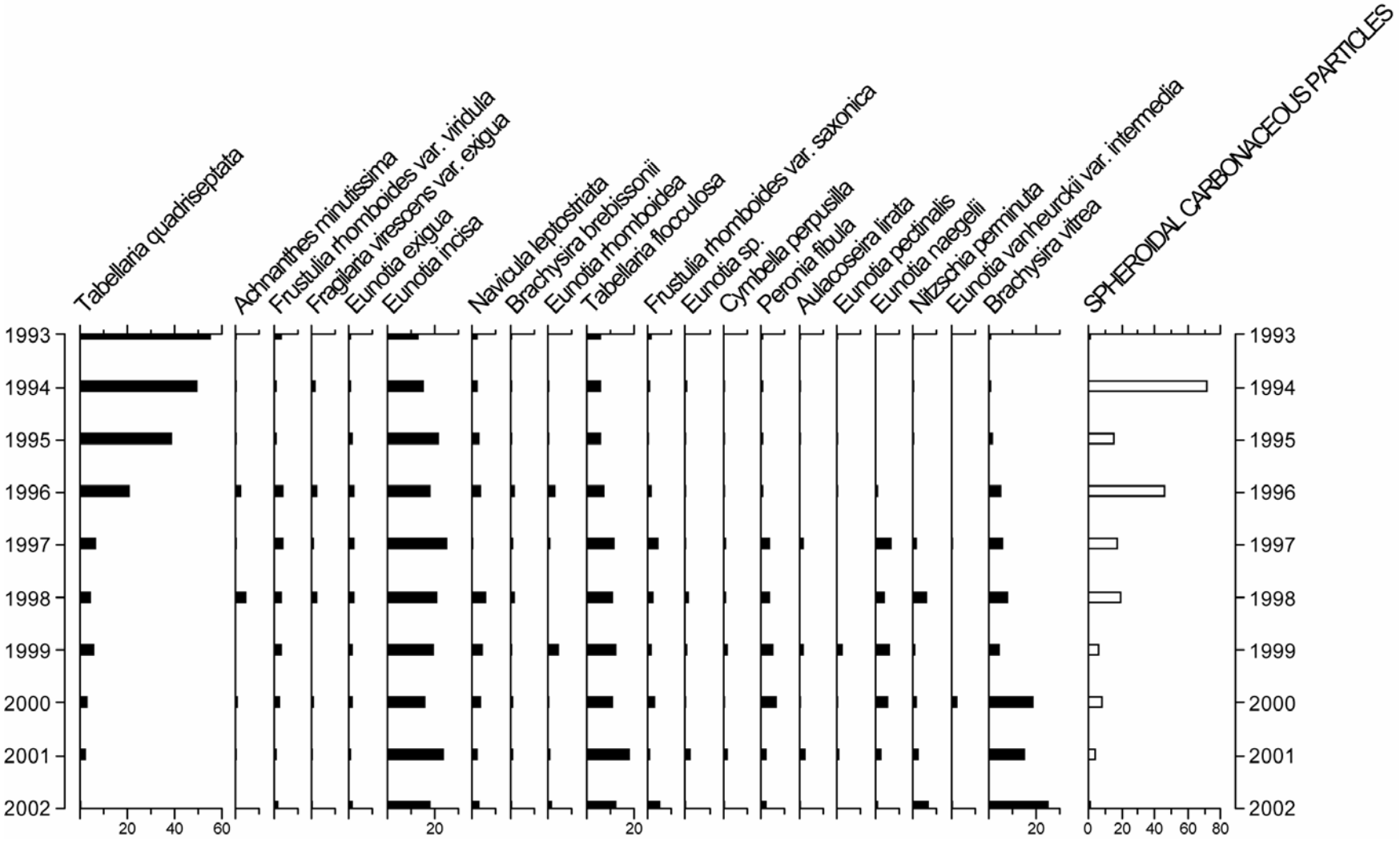
15.5. Aquatic macrophyte data, Llyn Llagi

Species Scores (1-5)



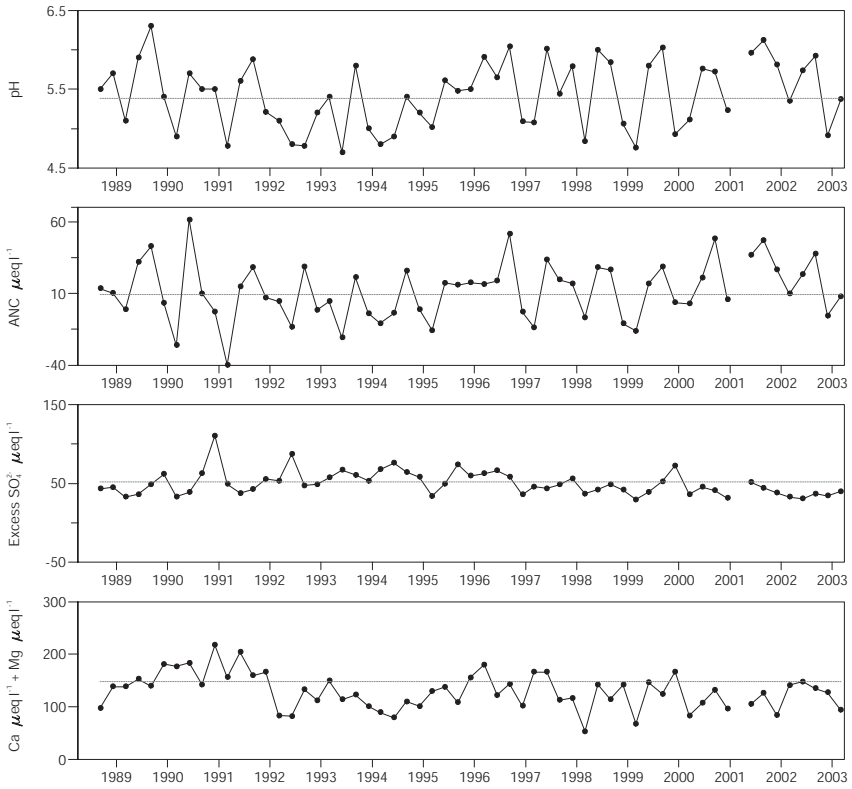
15.6. Sediment trap data, Llyn Llagi

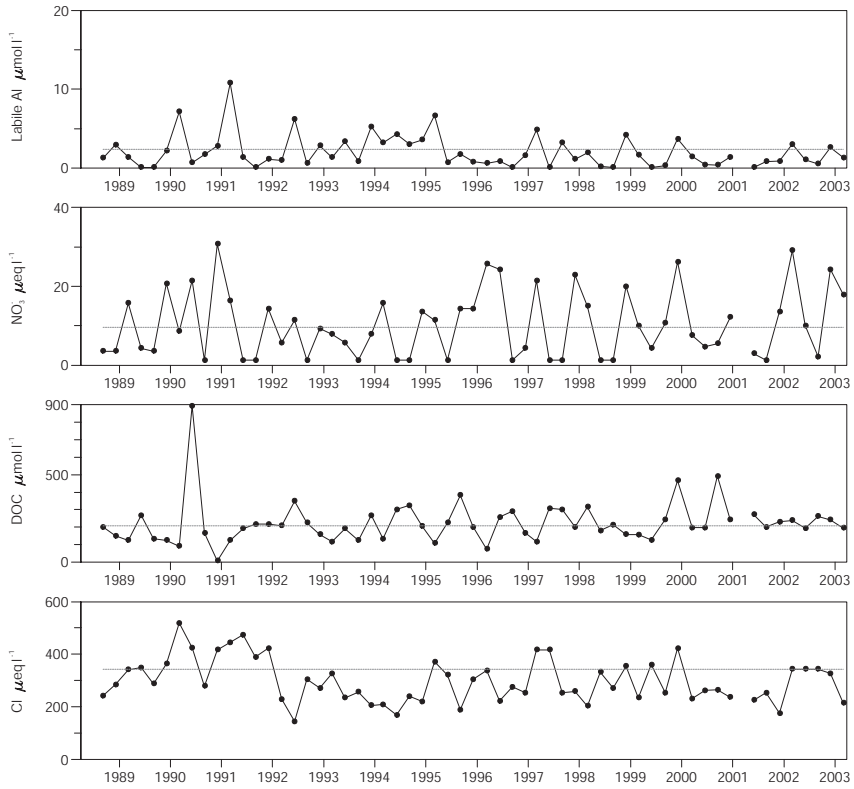
Relative percentage frequency of diatom taxa and carbonaceous particle flux (no. trap^{-1} day^{-1}).



16. Llyn Cwm Mynach

16.1. Spot sampled chemistry data





Determinand statistics

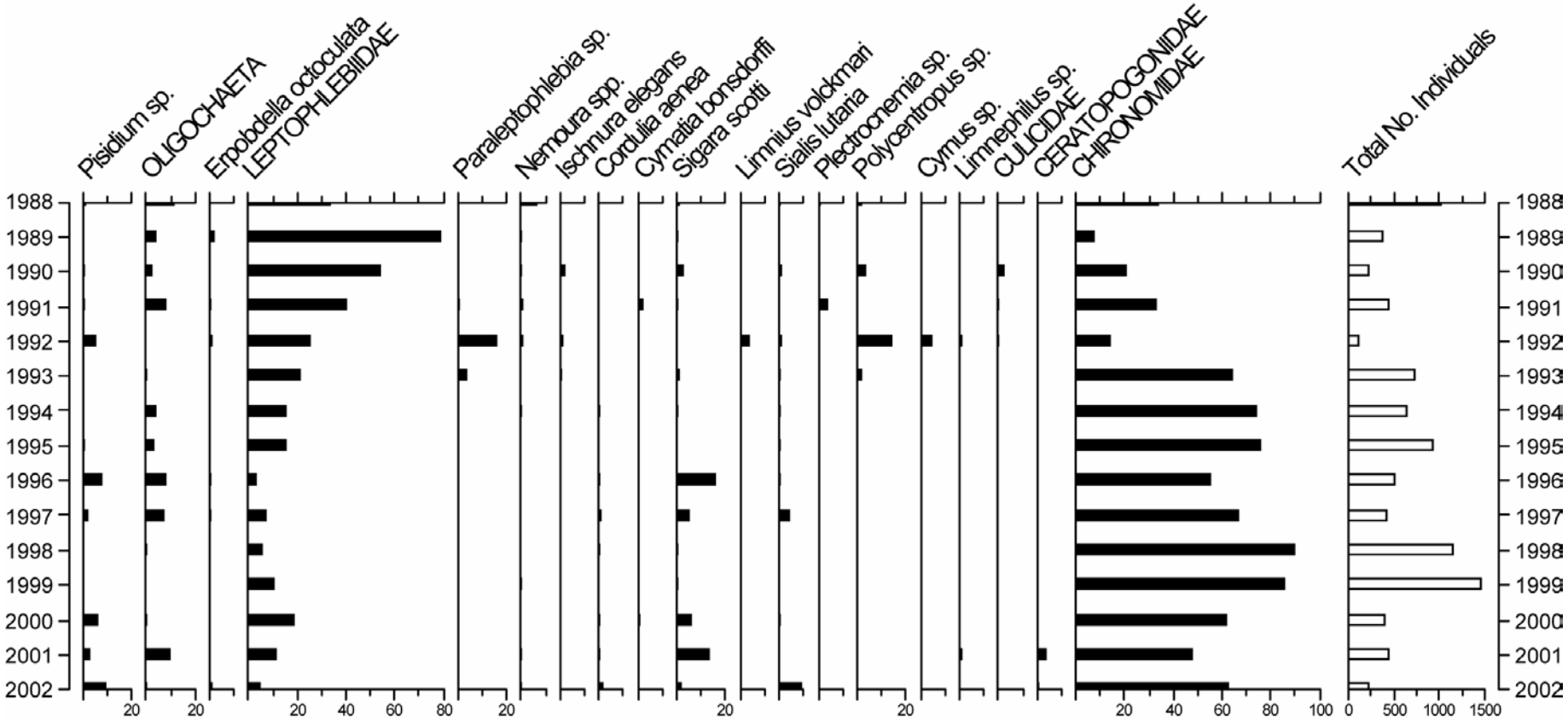
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	5.38	5.49	0.45	0.01	0.43
ANC	9.30	15.91	18.70	**0.87**	**0.05**
Ca	79.13	60.50	14.68	-0.03	0.13
Mg	68.86	65.42	10.10	-0.01	0.37
Na	294.5	267.4	42.38	-0.05	0.25
K	3.41	5.32	1.89	**0.00**	**0.00**
Sol.Al	3.94	4.80	2.84	**2.50**	**0.05**

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	2.42	1.40	0.88	-1.07	0.34
Cl	342.6	307.0	62.48	-0.10	0.33
SO_4	88.16	67.71	4.34	**-0.08**	**0.01**
XSO_4	52.17	35.47	3.98	-0.04	0.16
NO_3	9.59	13.57	9.60	0.00	0.33
Si	56.77	22.68	16.48	**-0.02**	**0.02**
DOC	208.8	223.5	34.04	**0.06**	**0.02**

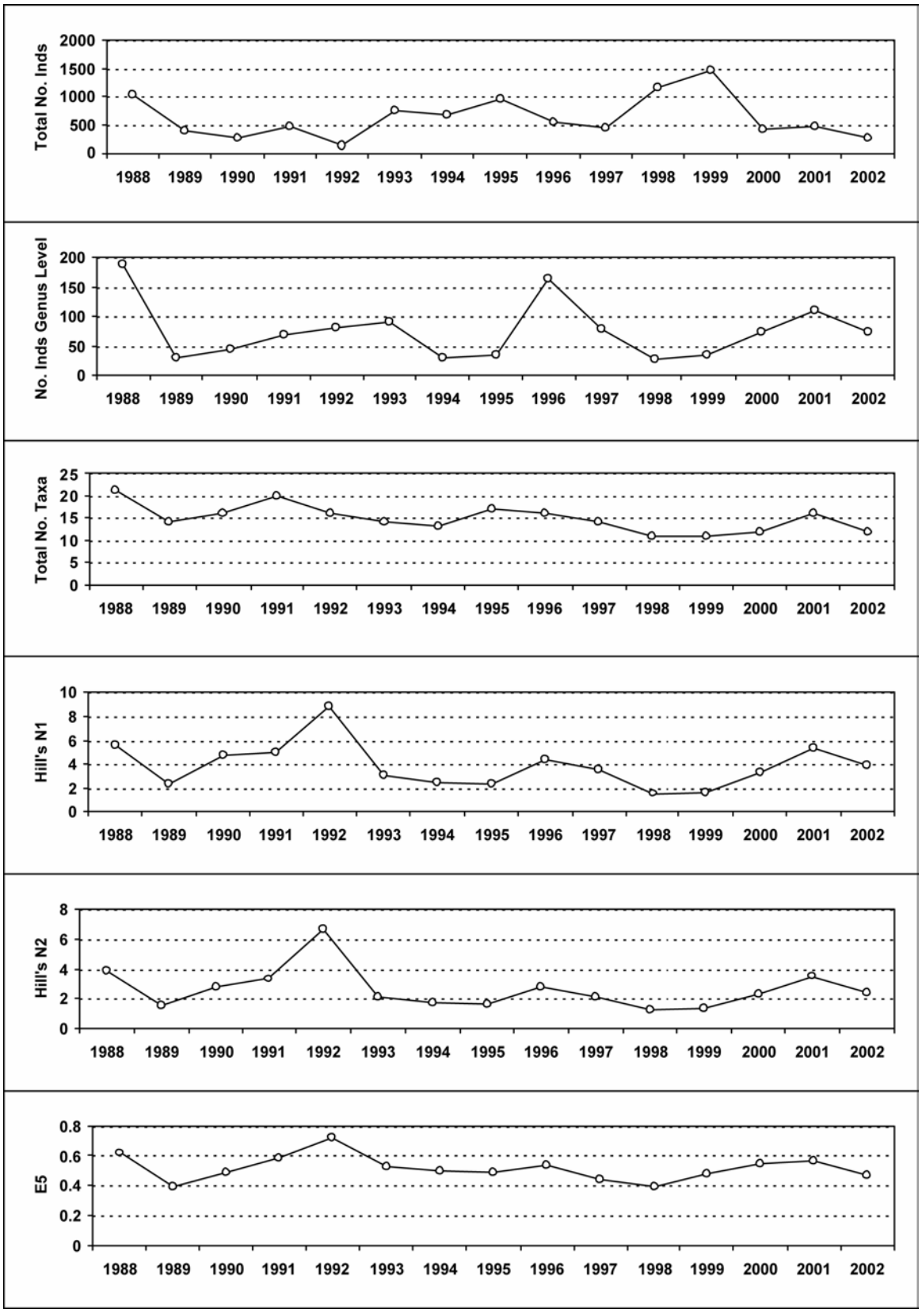
* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units μeq l^{-1}, except Sol.Al, Sol.lab.Al and DOC (μmol l^{-1})

16.2. Macroinvertebrate data

16.2.1. Percentage abundance summary, Llyn Cwm Mynach

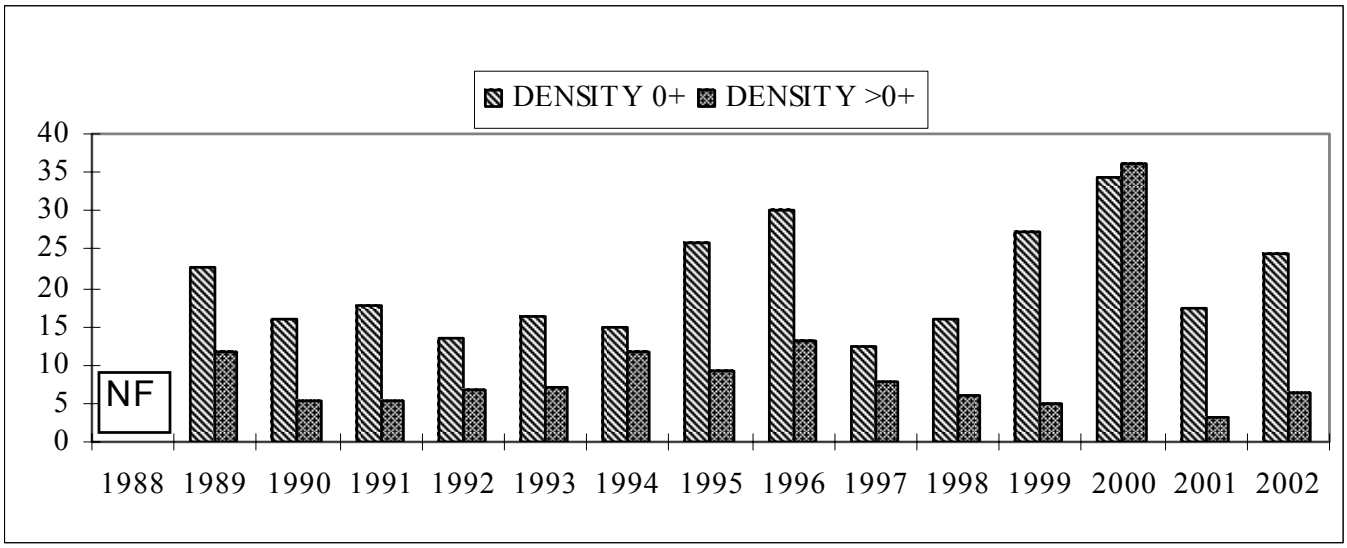


16.2.2. Summary statistics, Llyn Cwm Mynach



16.3. Fish data (for outflow stream)

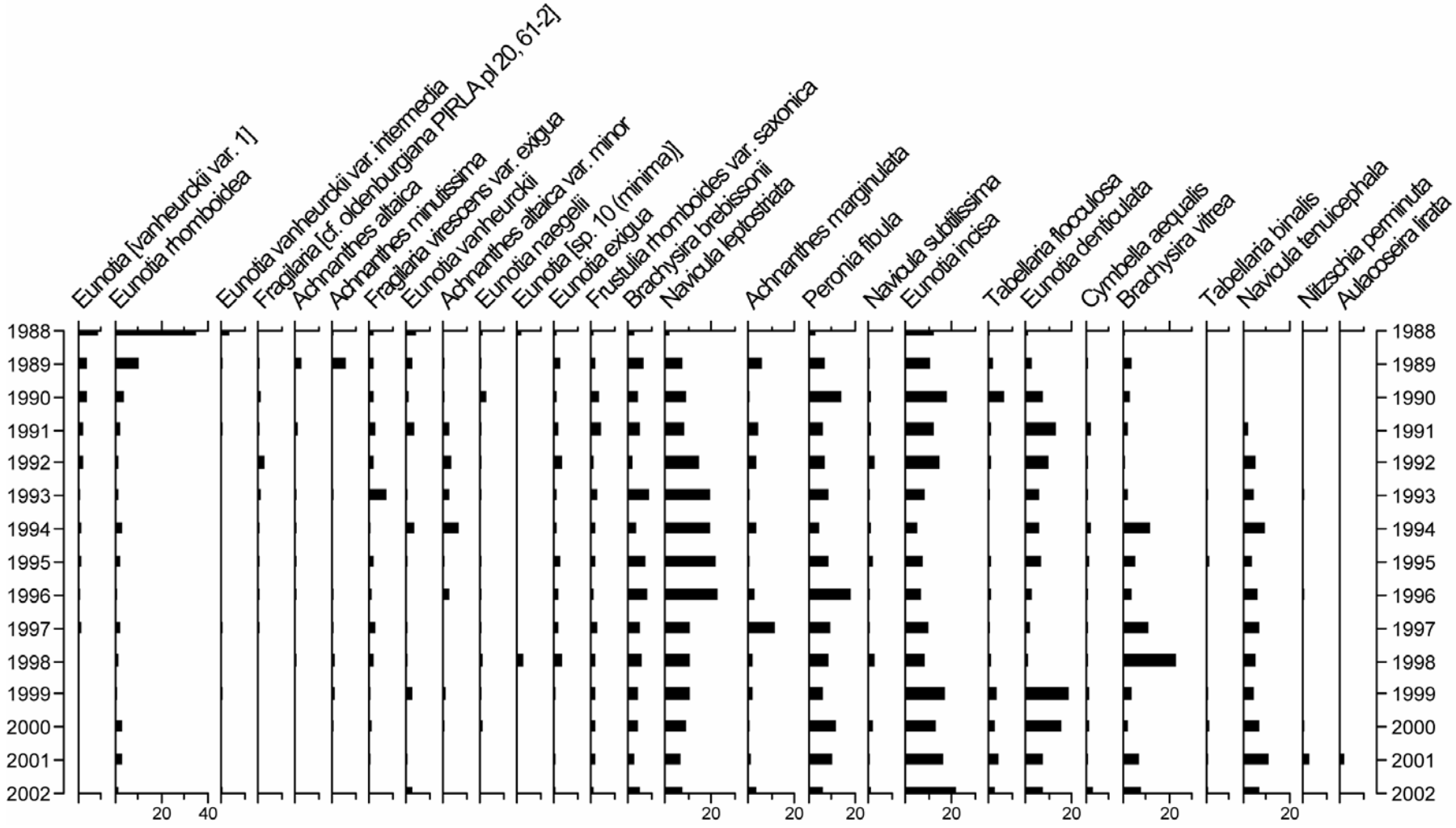
16.3.1. Summary of mean Trout density (numbers $100m^{-2}$), Llyn Cwm Mynach



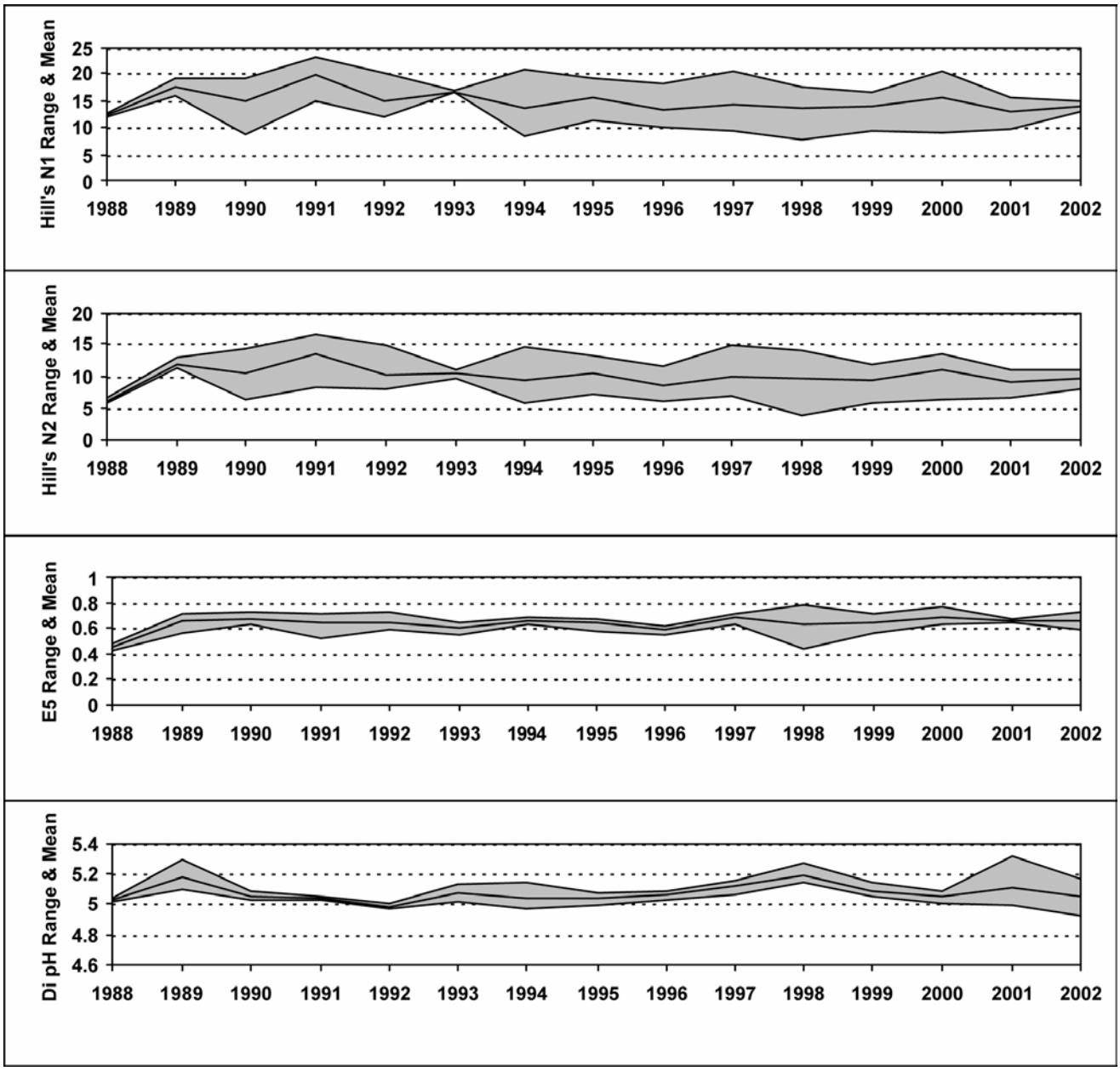
NF = Not fished

16.4. Epilithic diatom data

16.4.1. Percentage abundance summary, Llyn Cwm Mynach

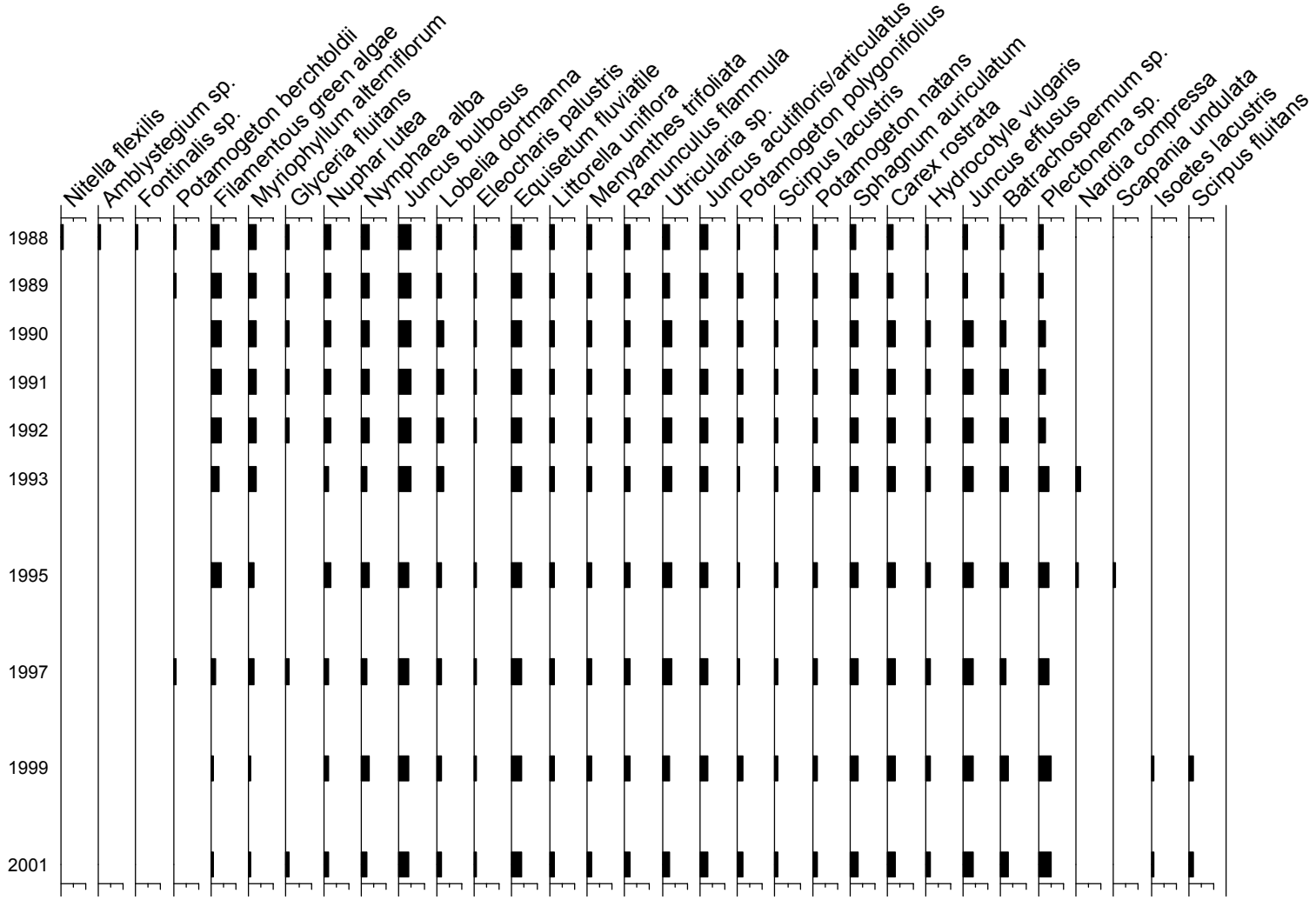


16.4.2. Summary statistics, Llyn Cwm Mynach



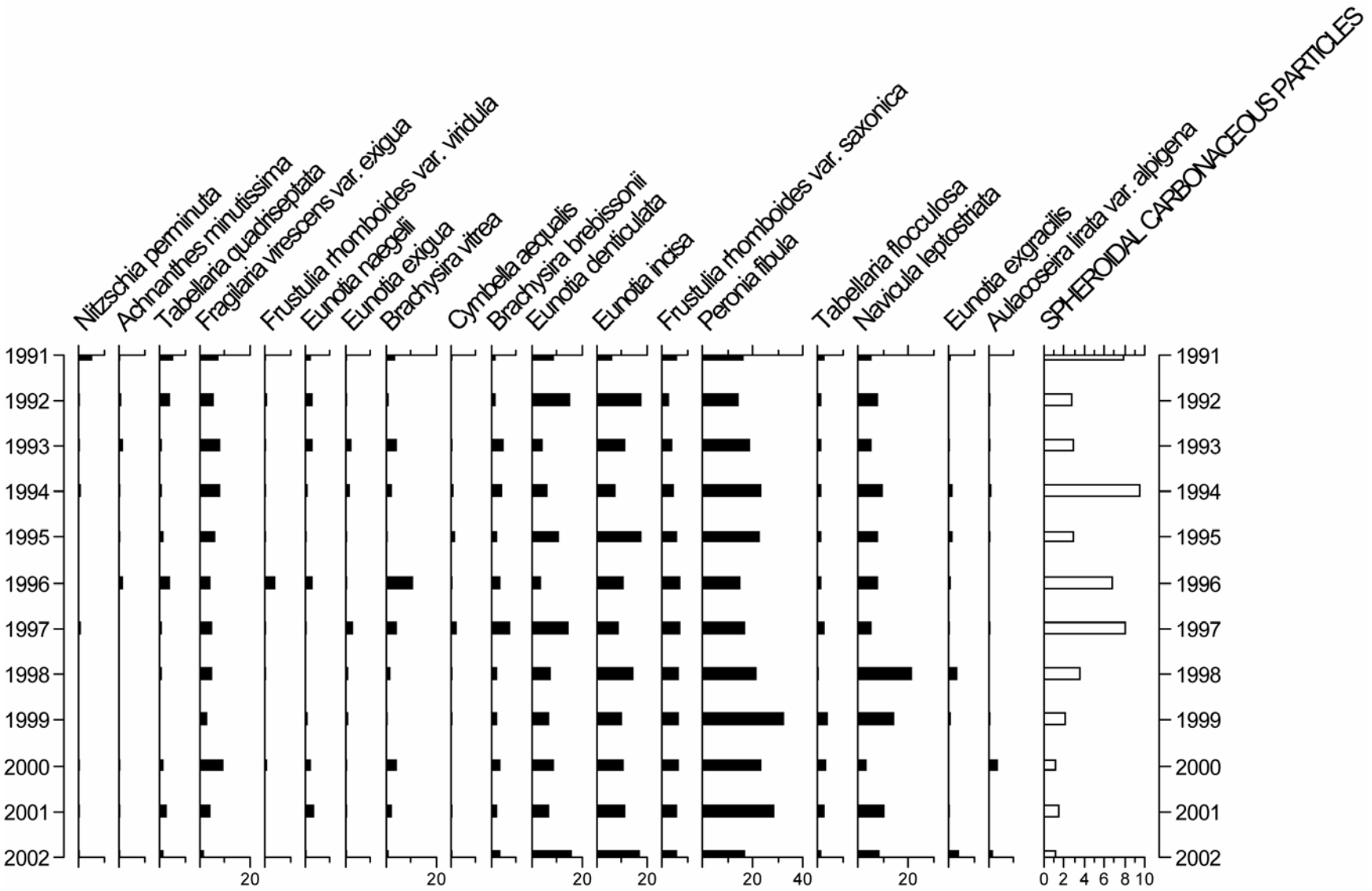
16.5. Aquatic macrophyte data, Llyn Cwm Mynach

Species Scores (1-5)



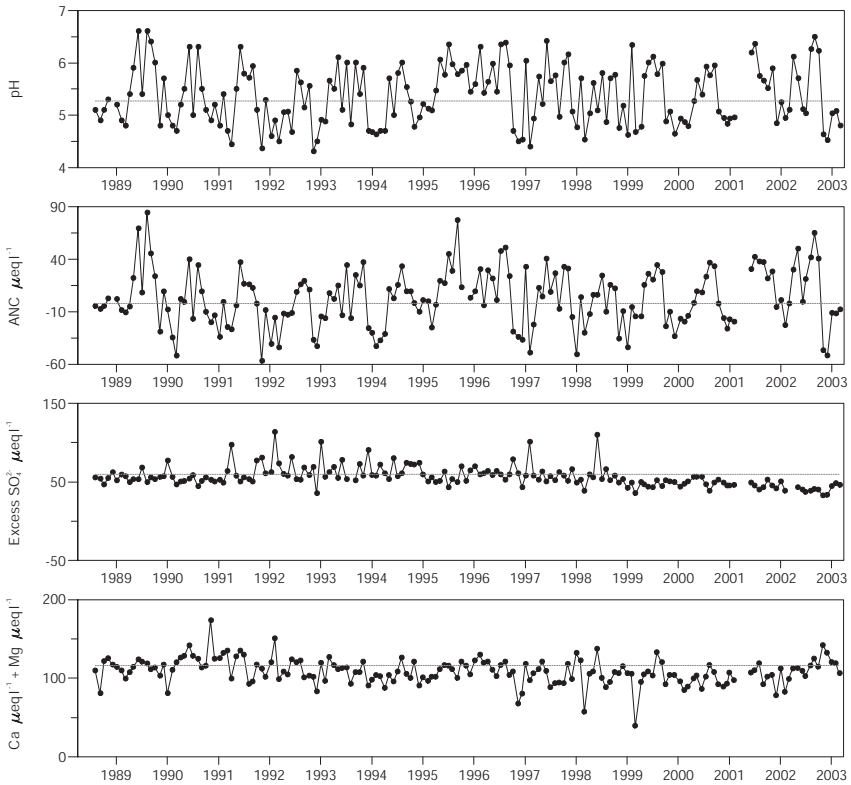
16.6. Sediment trap data, Llyn Cwm Mynach

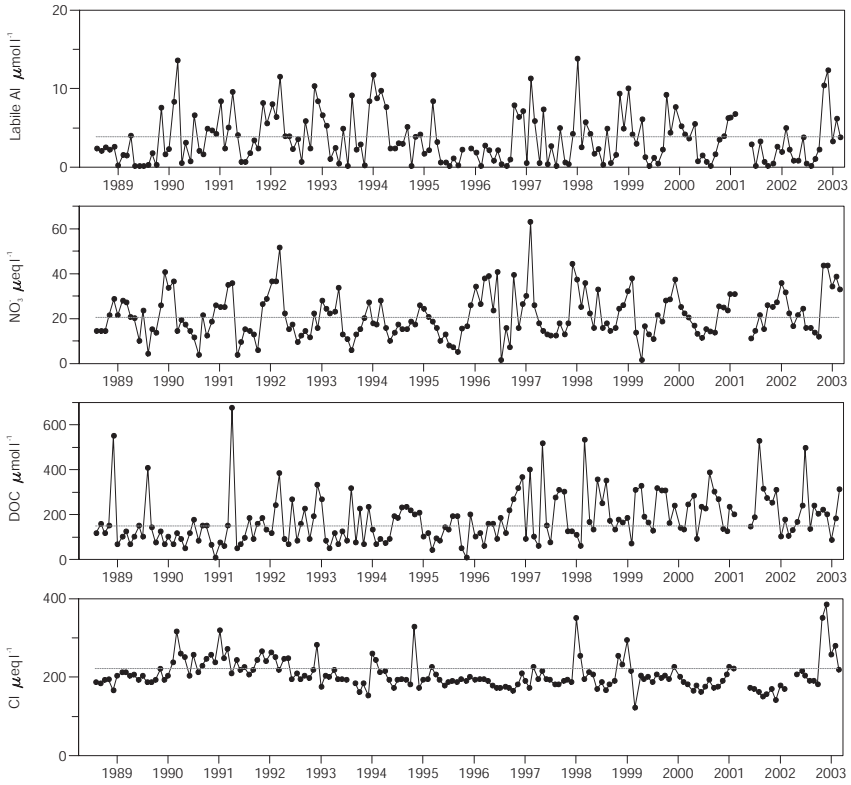
Relative percentage frequency of diatom taxa and carbonaceous particle flux (no. trap^{-1} day^{-1}).



17. Afon Hafren

17.1. Spot sampled chemistry data





Determinand statistics

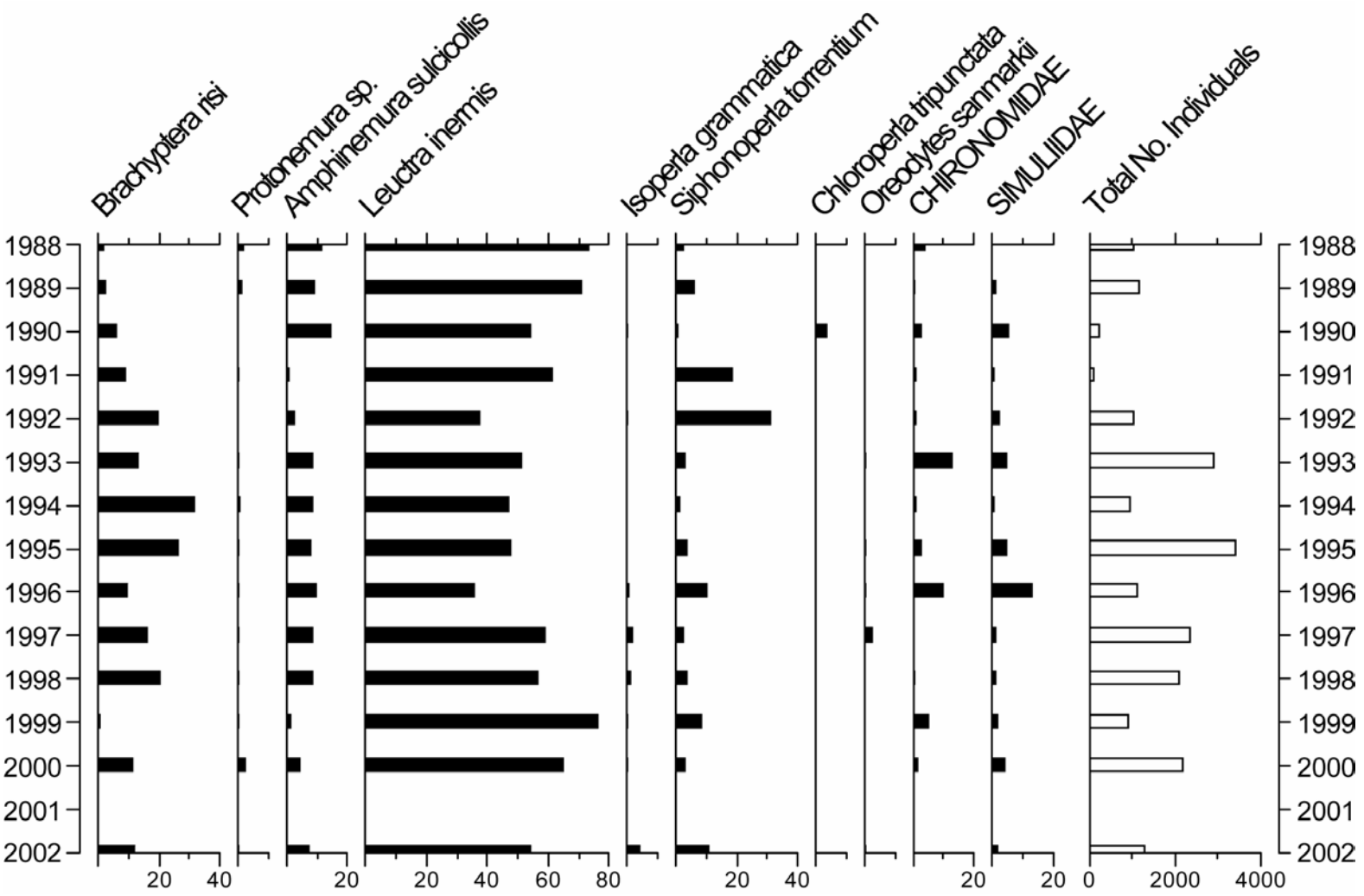
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	5.27	5.41	0.70	0.01	0.42
ANC	-2.53	9.61	37.48	1.04	0.19
Ca	48.08	44.25	5.05	**-0.01**	**0.01**
Mg	67.32	72.92	10.10	0.00	0.09
Na	201.0	207.6	37.54	**-0.03**	**0.03**
K	3.20	5.38	2.31	**0.00**	**0.00**
Sol.Al	6.38	7.09	4.55	2.45	0.43

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	3.83	3.74	3.98	-0.50	0.74
Cl	221.8	242.3	68.36	-0.07	0.07
SO_4	82.70	65.53	6.55	**-0.06**	**0.00**
XSO_4	59.41	40.09	4.99	**-0.05**	**0.01**
NO_3	20.45	25.98	11.95	0.00	0.15
Si	113.8	100.4	19.43	**-0.02**	**0.01**
DOC	149.3	216.9	106.1	**0.10**	**0.00**

* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq\,l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol\,l^{-1}$)

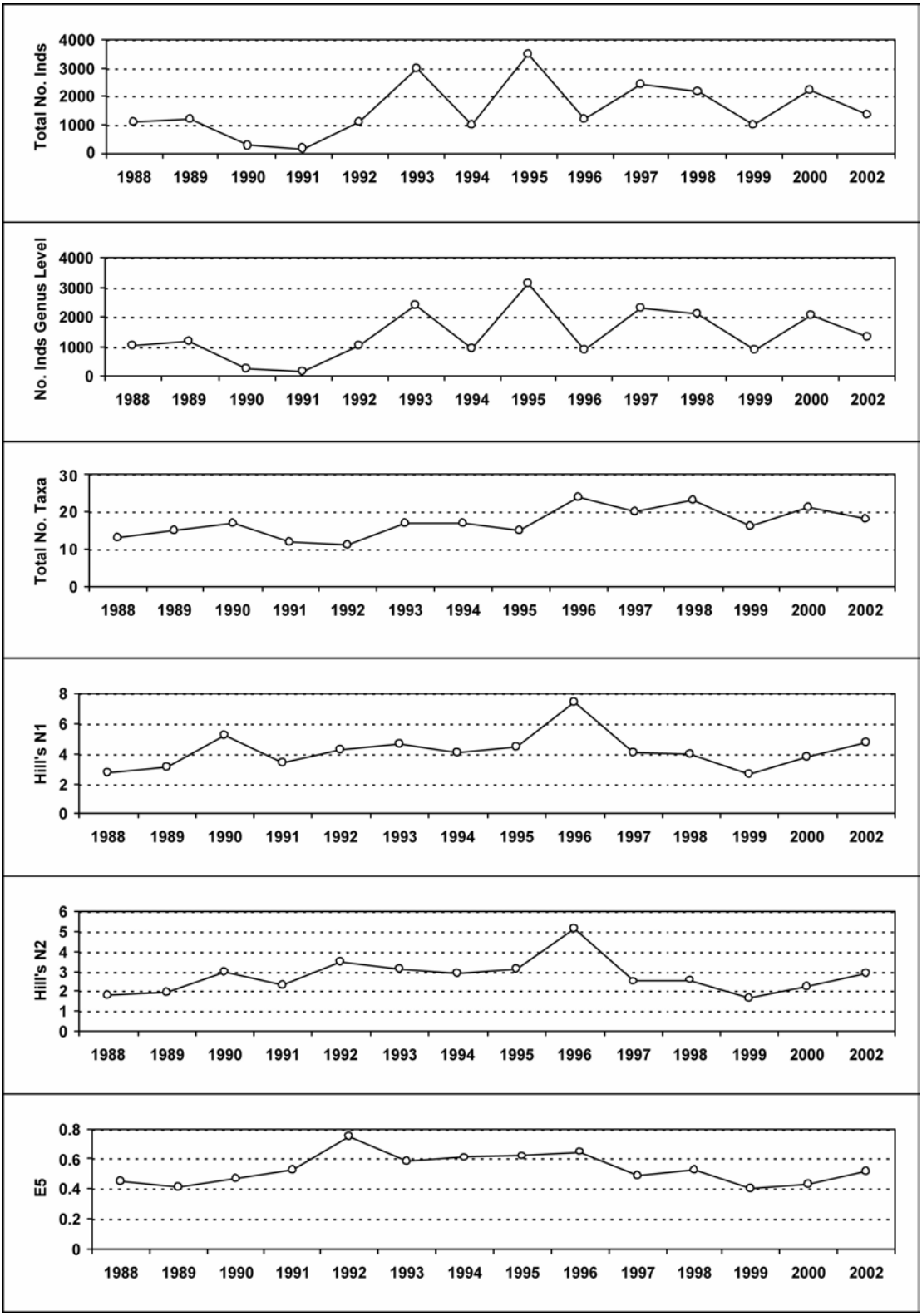
17.2. Macroinvertebrate data

17.2.1. Percentage abundance summary, Afon Hafren



No sampling in 2001 due to Foot and Mouth restrictions.

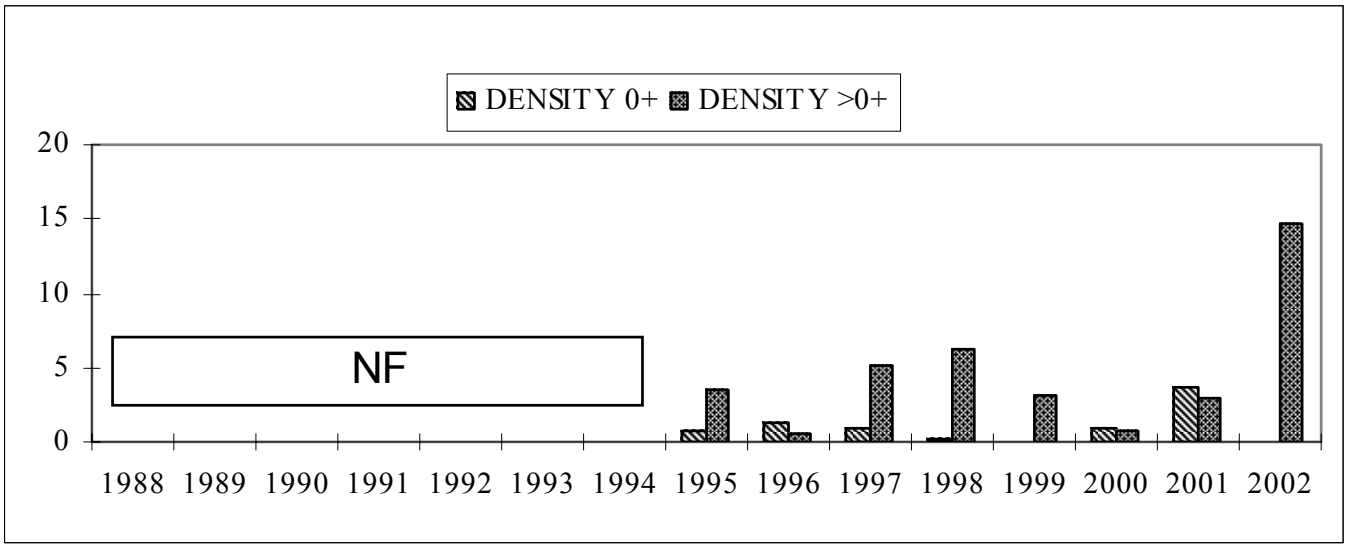
17.2.2. Summary statistics, Afon Hafren



No sampling in 2001 due to Foot and Mouth restrictions.

17.3. Fish data

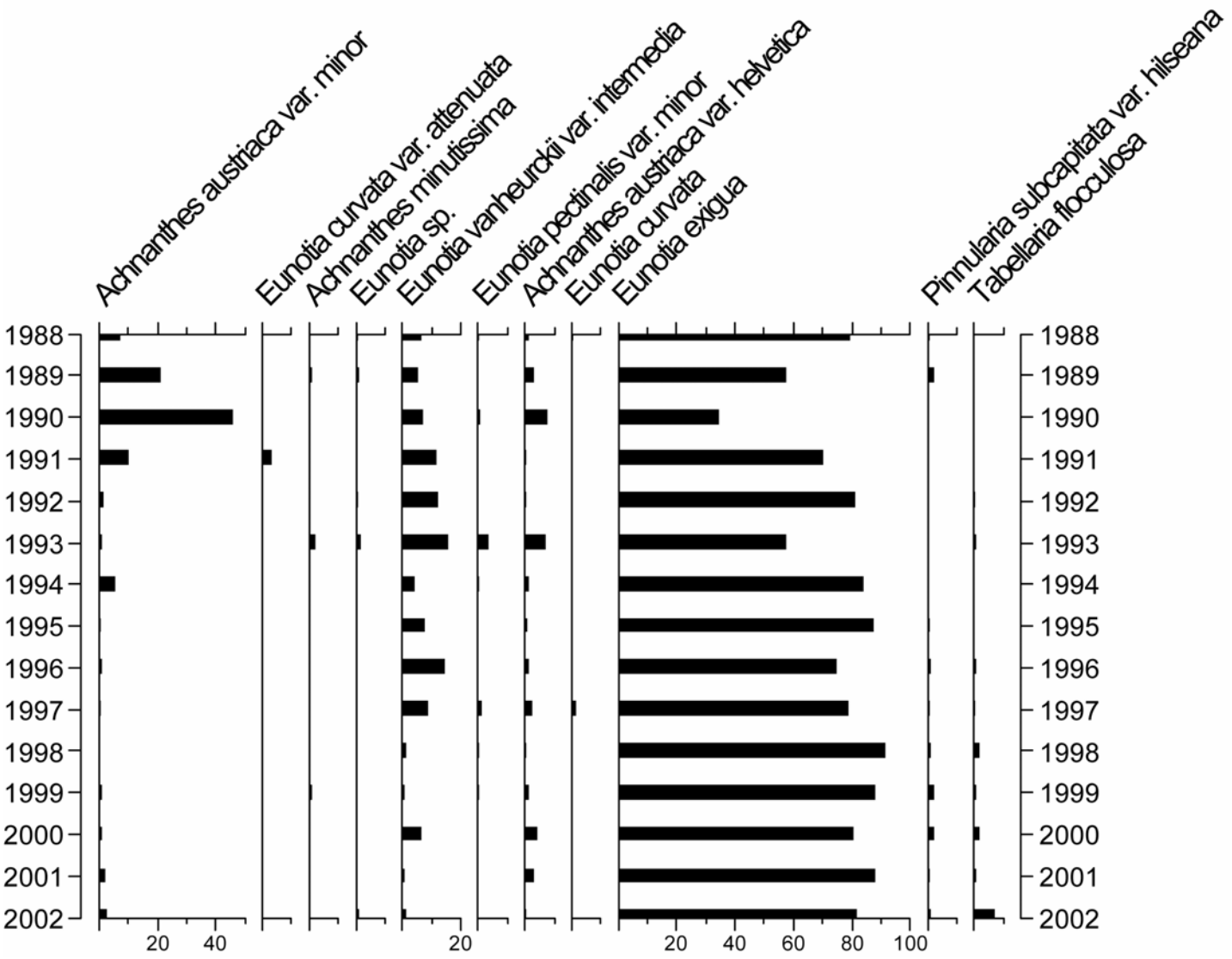
17.3.1. Summary of mean Trout density (numbers $100m^{-2}$), Afon Hafren



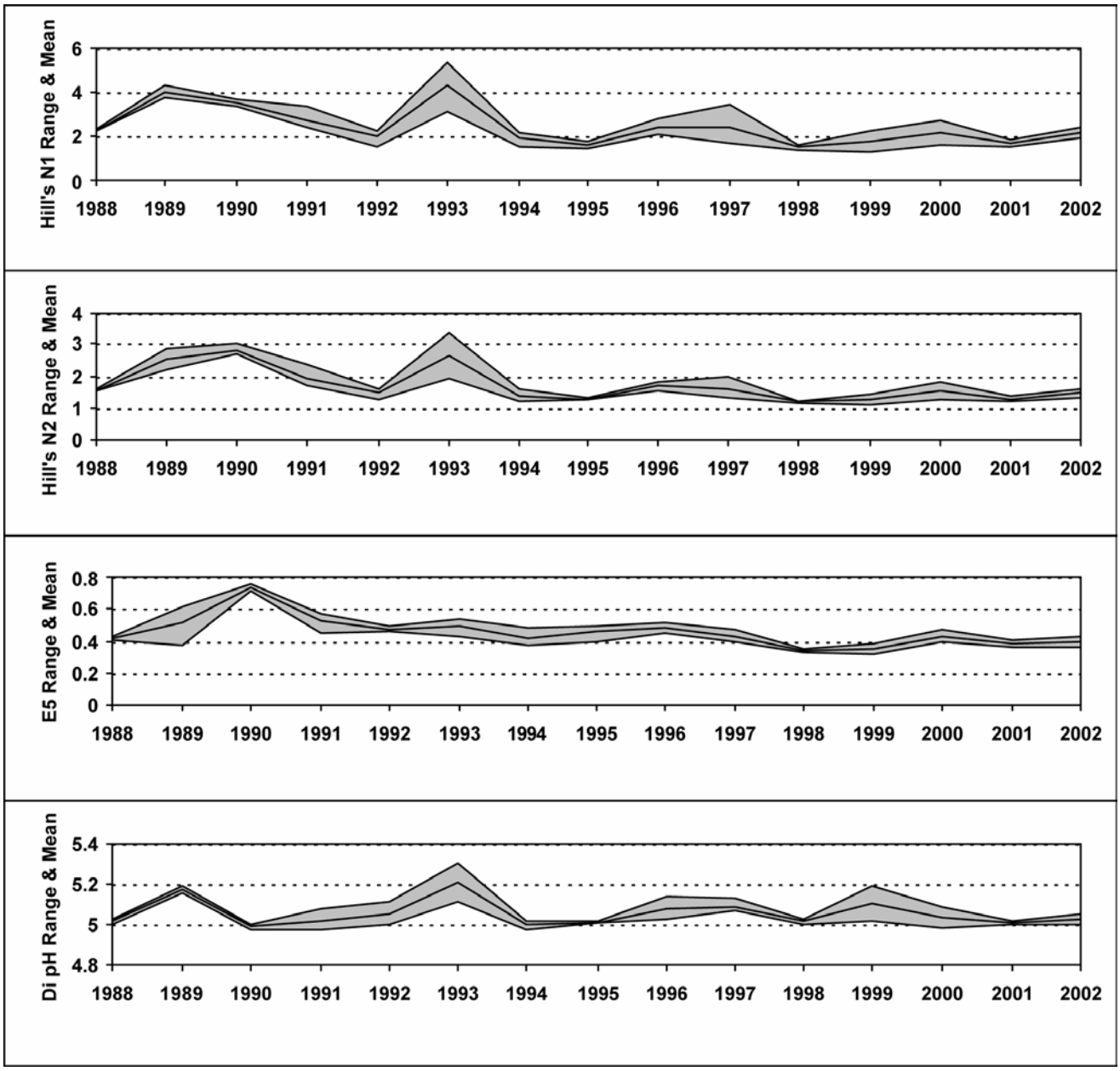
NF = Not fished

17.4. Epilithic diatom data

17.4.1. Percentage abundance summary, Afon Hafren

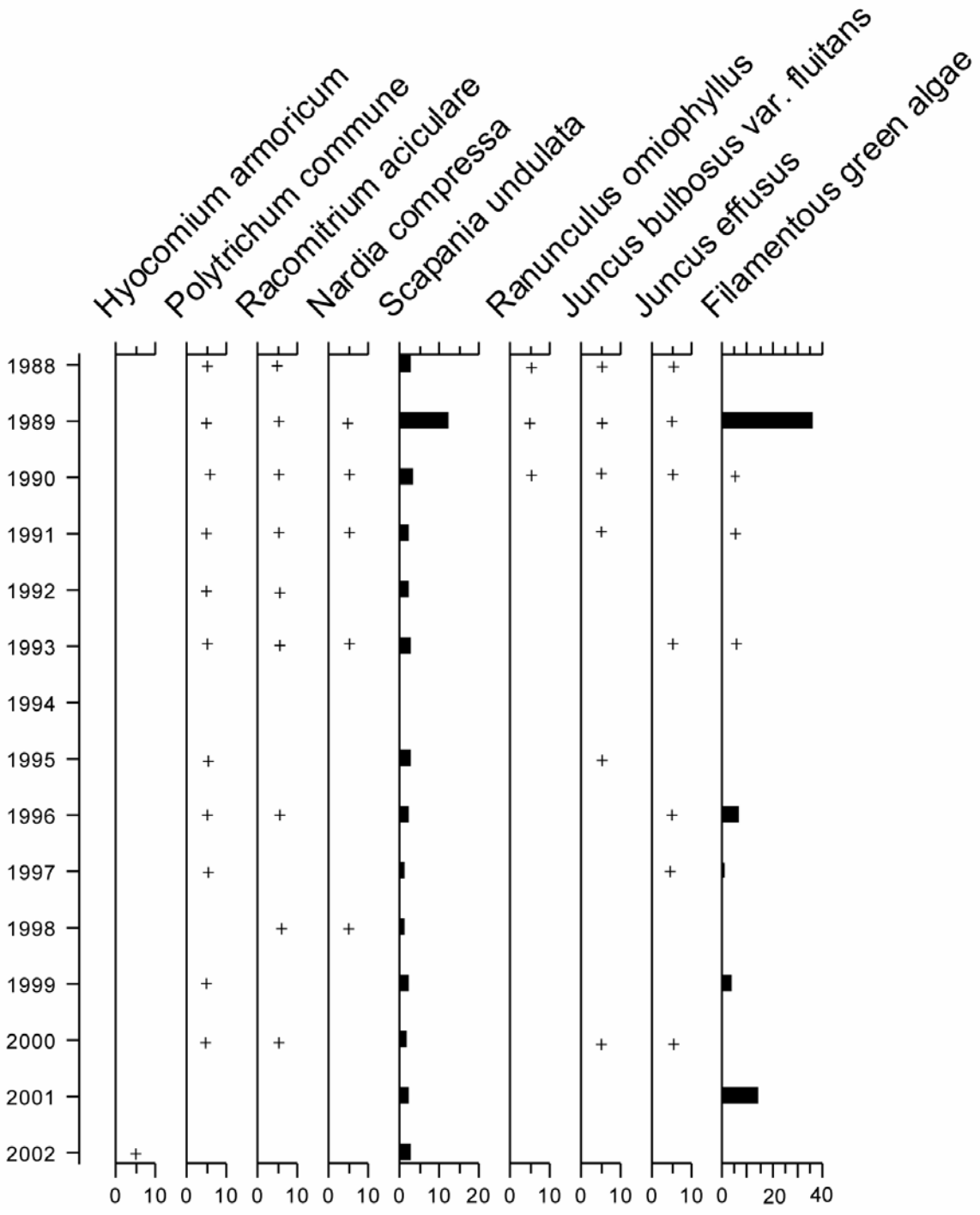


17.4.2. Summary statistics, Afon Hafren



17.5. Aquatic macrophyte data, Afon Hafren

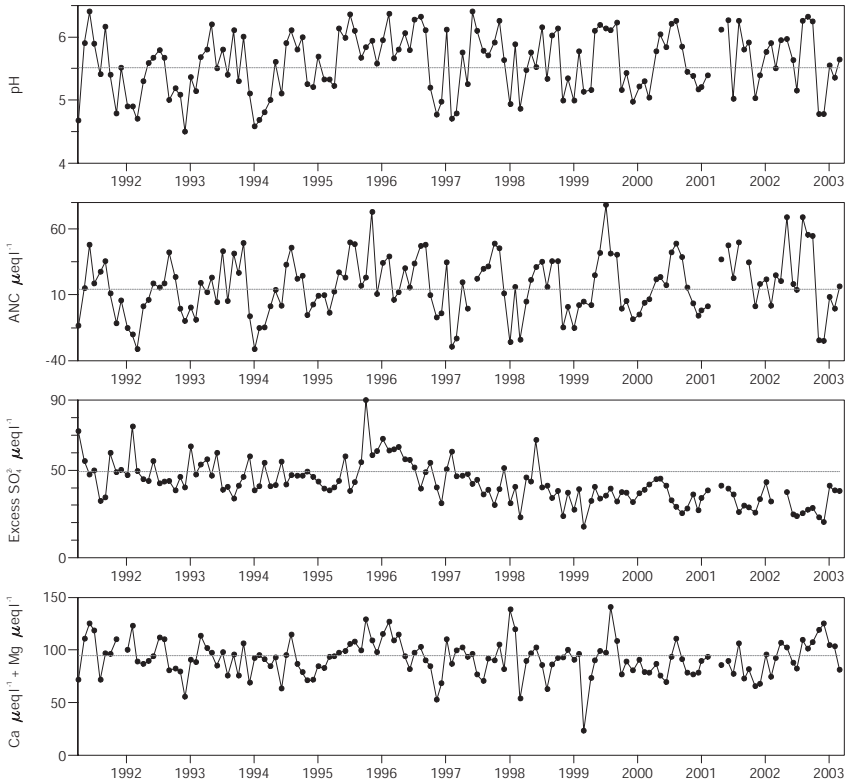
Percentage Species Cover

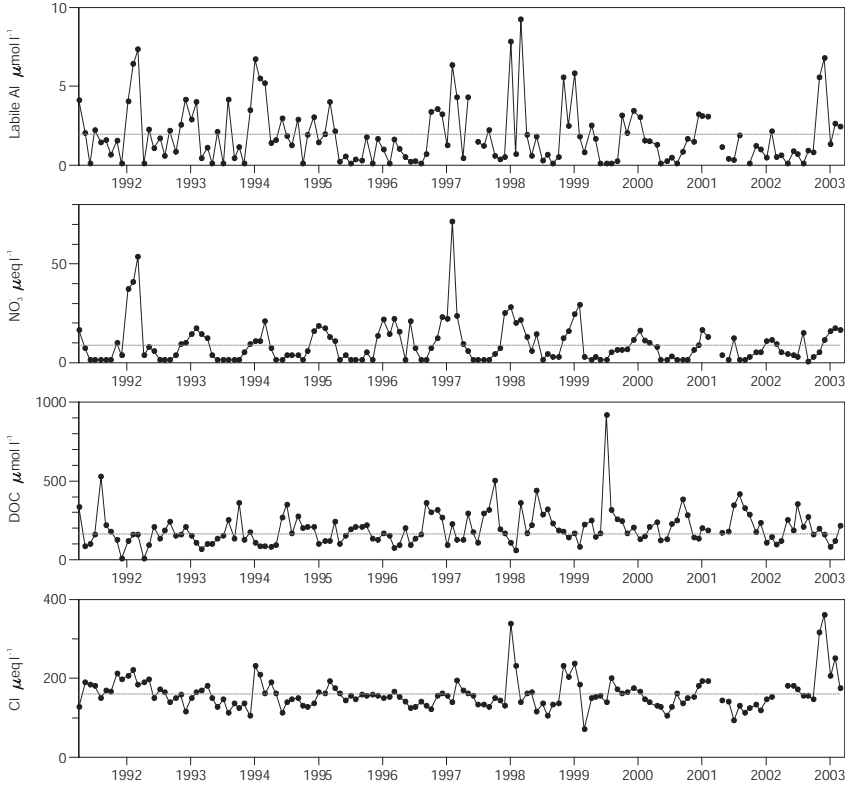


+ Represents <0.1% abundance

18. Afon Gwy

18.1. Spot sampled chemistry data





Determinand statistics

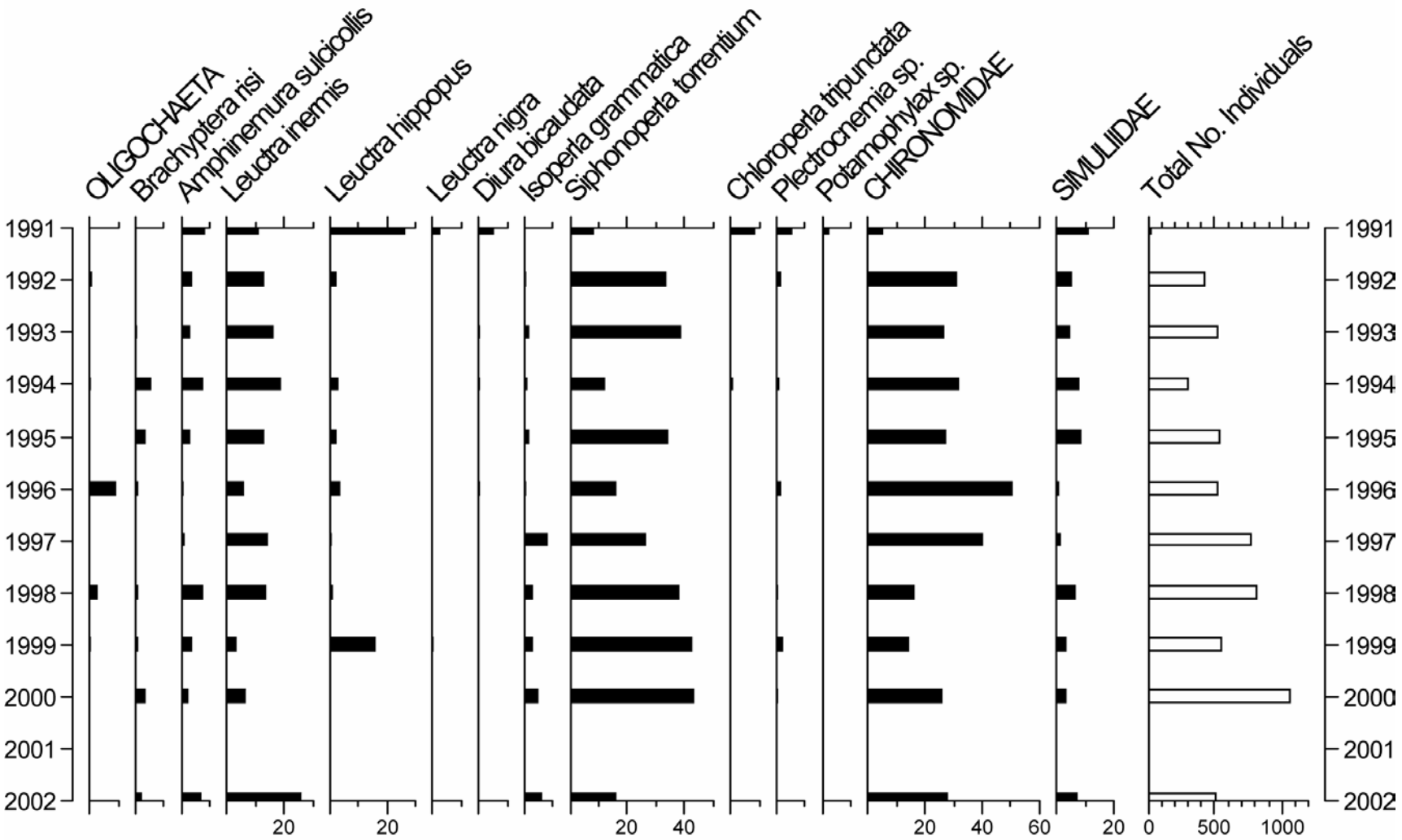
	mean 4/1991-3/1996	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1991-3/2003	p* 4/1991-3/2003
pH	5.51	5.63	0.54	**0.03**	**0.05**
ANC	14.03	22.77	32.71	**1.48**	**0.02**
Ca	40.57	39.08	6.18	-0.01	0.09
Mg	54.08	63.26	9.59	0.00	0.94
Na	147.5	173.9	40.79	-0.02	0.37
K	3.24	3.46	2.18	0.00	0.24
Sol.Al	3.93	4.11	2.36	-0.33	0.83

	mean 4/1991-3/1996	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1991-3/2003	p* 4/1991-3/2003
Sol.lab.Al	1.98	1.91	2.15	-1.82	0.13
Cl	159.7	208.7	70.73	-0.04	0.34
SO_4	65.90	51.70	8.83	**-0.09**	**0.00**
XSO_4	49.13	29.79	7.34	**-0.08**	**0.00**
NO_3	8.87	8.32	6.31	0.00	0.55
Si	69.88	64.88	19.03	-0.01	0.18
DOC	163.5	192.6	75.00	**0.07**	**0.01**

* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq\,l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol\,l^{-1}$)

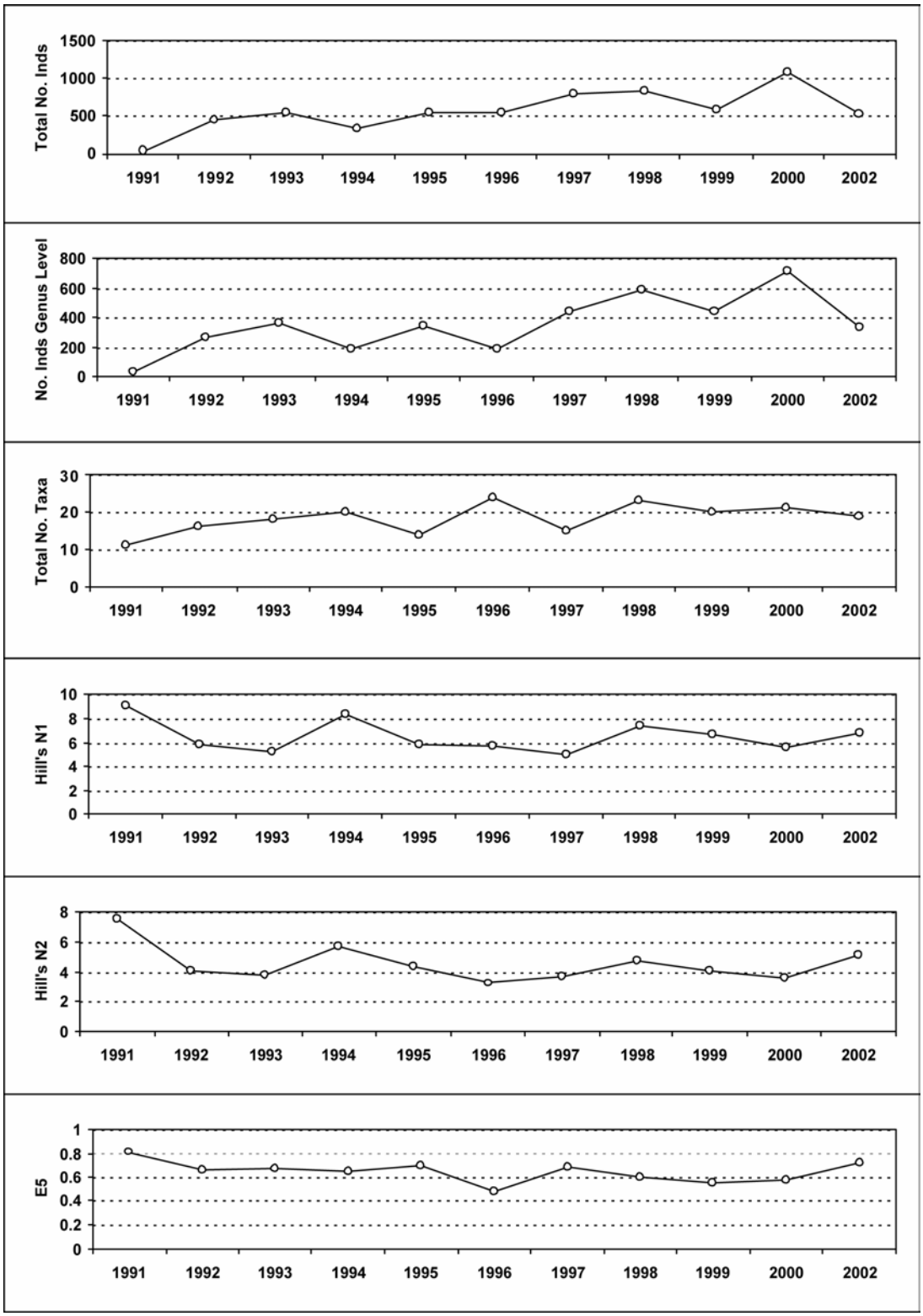
18.2. Macroinvertebrate data

18.2.1. Percentage abundance summary, Afon Gwy



No sampling in 2001 due to Foot and Mouth restrictions.

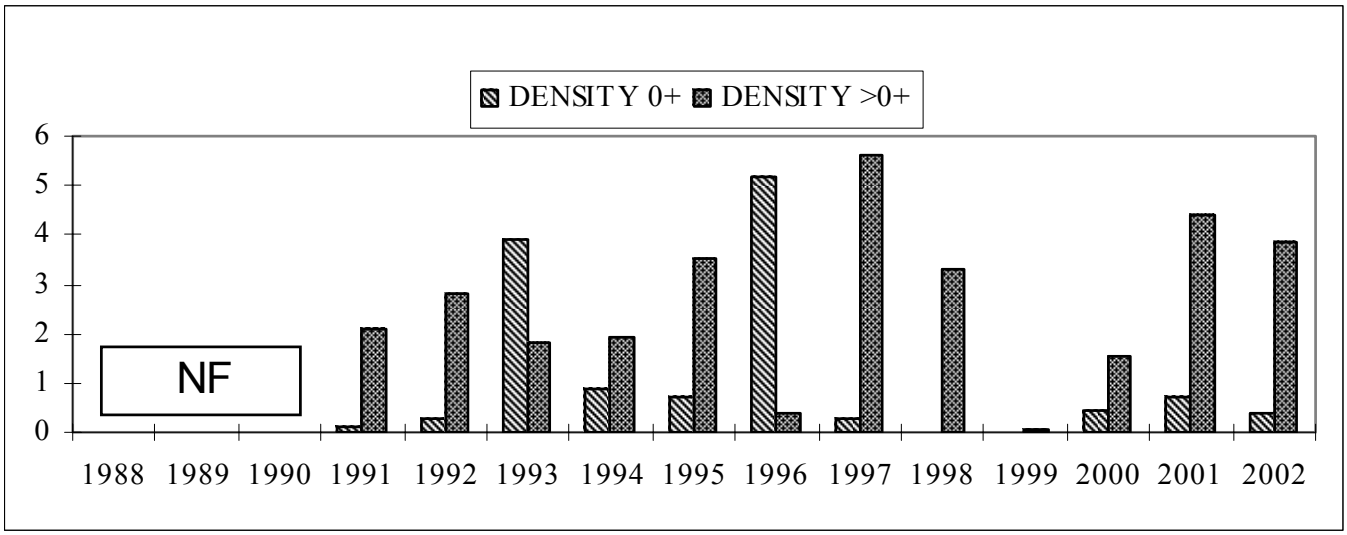
18.2.2. Summary statistics, Afon Gwy



No sampling in 2001 due to Foot and Mouth restrictions.

18.3. Fish data

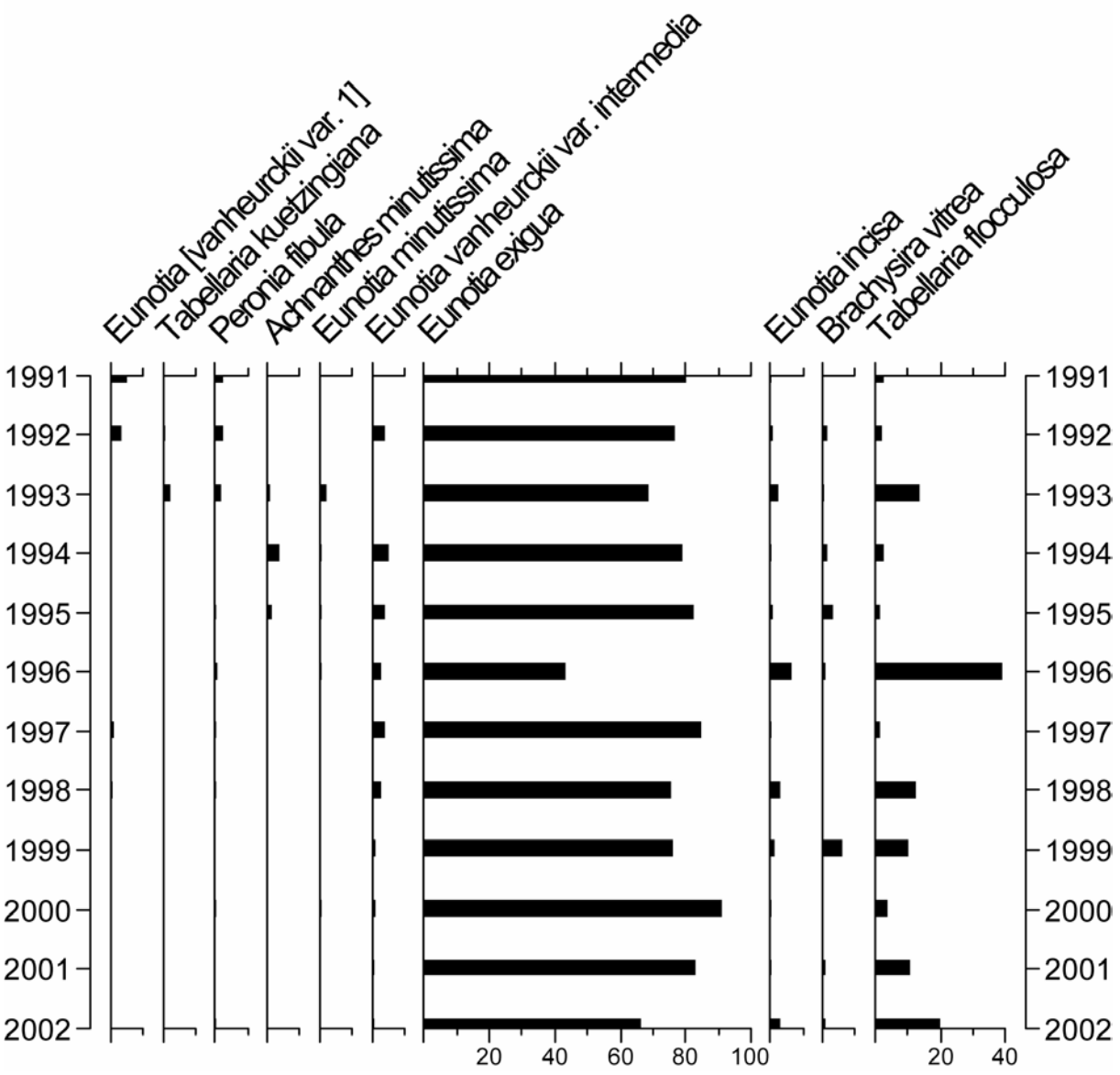
18.3.1. Summary of mean Trout density (numbers $100m^{-2}$), Afon Gwy



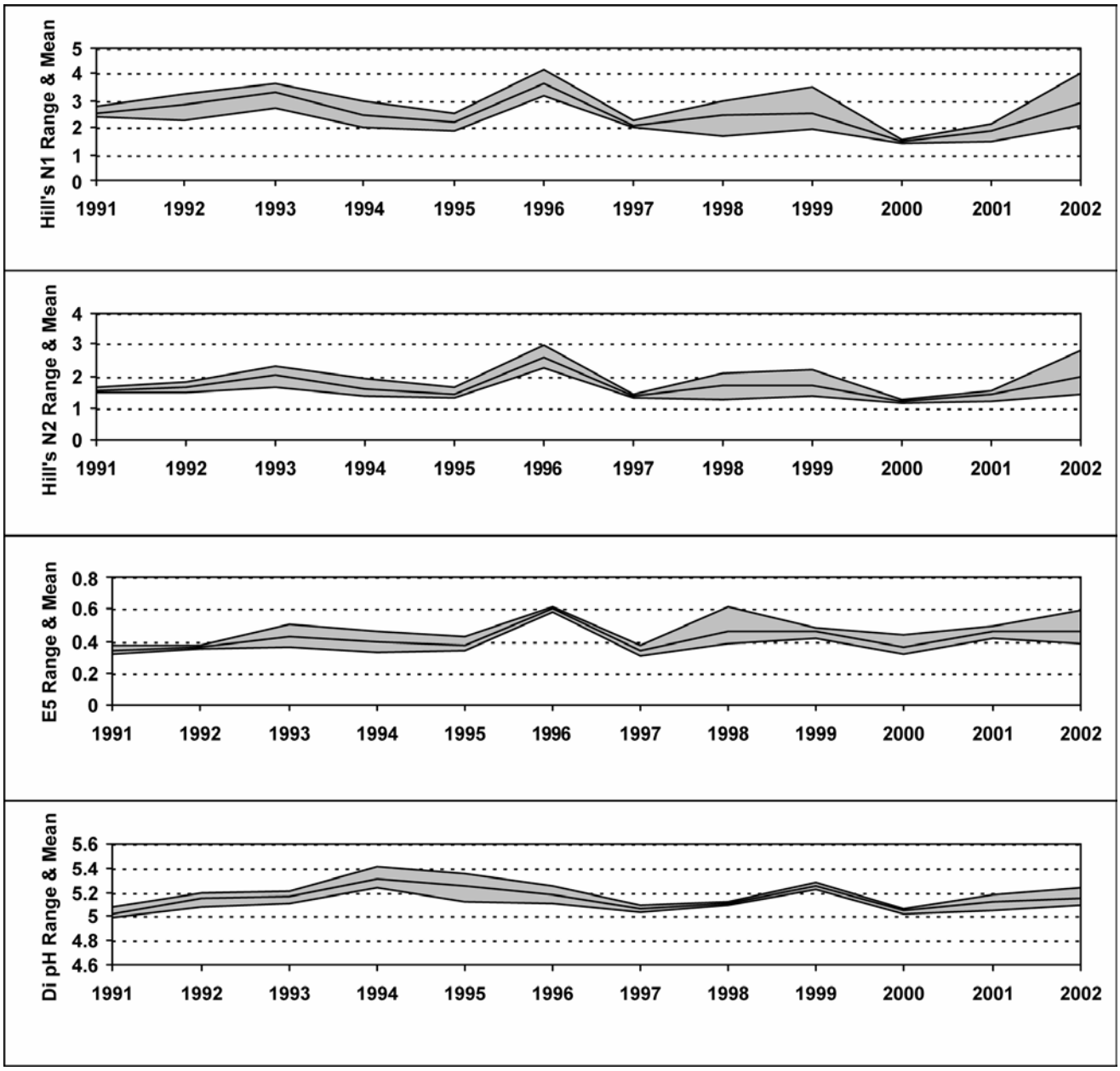
NF = Not fished

18.4. Epilithic diatom data

18.4.1. Percentage abundance summary, Afon Gwy



18.4.2. Summary statistics, Afon Gwy



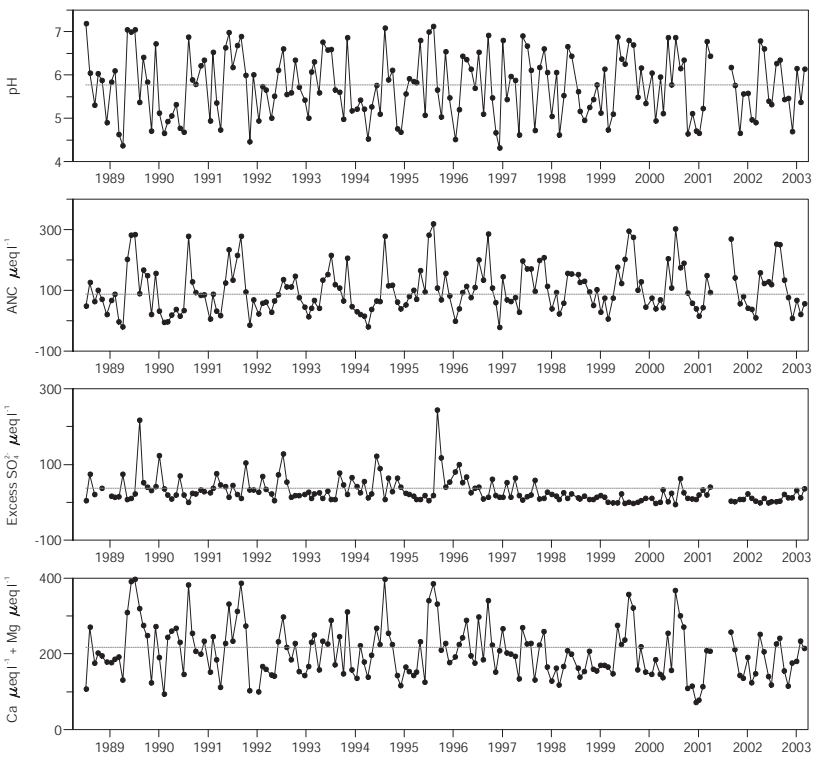
18.5. Aquatic macrophyte data, Afon Gwy

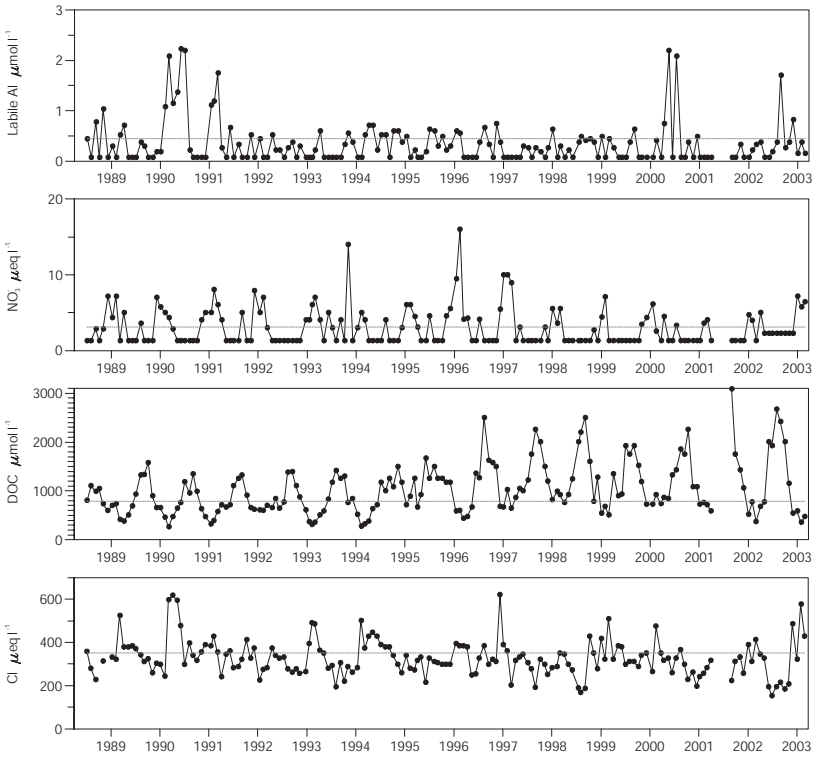
Percentage Species Cover

+ Represents <0.1% abundance

19. Beaghs Burn

19.1. Spot sampled chemistry data





Determinand statistics

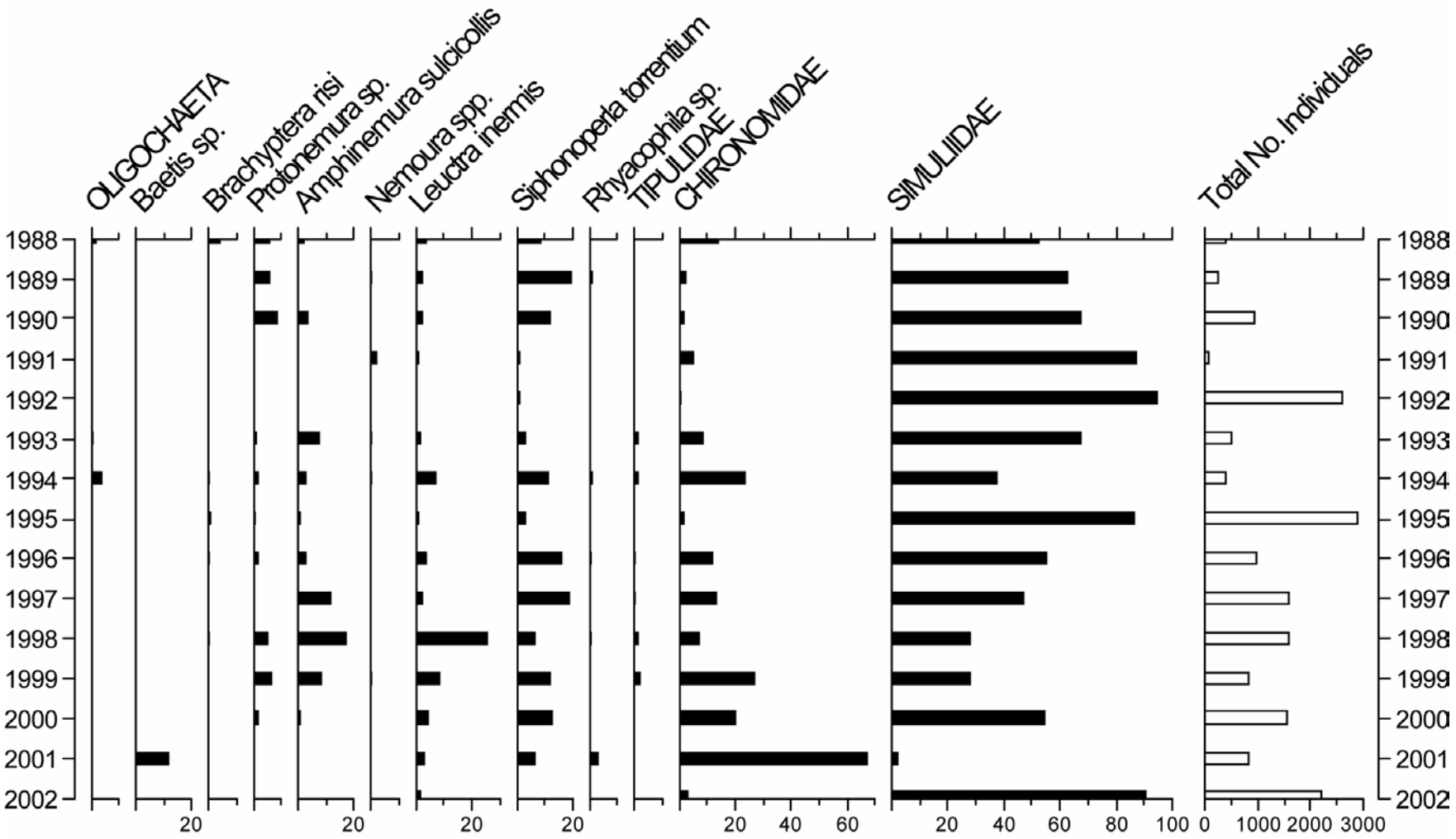
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	5.76	5.82	0.63	0.00	0.95
ANC	87.32	114.3	78.40	2.44	0.07
Ca	103.2	89.62	25.88	-0.02	0.13
Mg	113.9	97.15	25.57	-0.02	0.06
Na	306.7	260.1	65.46	**-0.07**	**0.04**
K	11.31	10.77	4.87	0.00	0.28
Sol.Al	2.14	1.62	0.79	-0.50	0.29

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	0.44	0.41	0.46	0.00	0.63
Cl	350.5	301.9	135.9	**-0.13**	**0.05**
SO_4	73.68	42.36	21.78	**-0.10**	**0.01**
XSO_4	37.39	10.66	12.29	**-0.09**	**0.01**
NO_3	3.11	3.50	1.96	0.00	0.59
Si	68.92	63.21	30.68	-0.01	0.28
DOC	783.8	1294.4	845.1	**0.48**	**0.00**

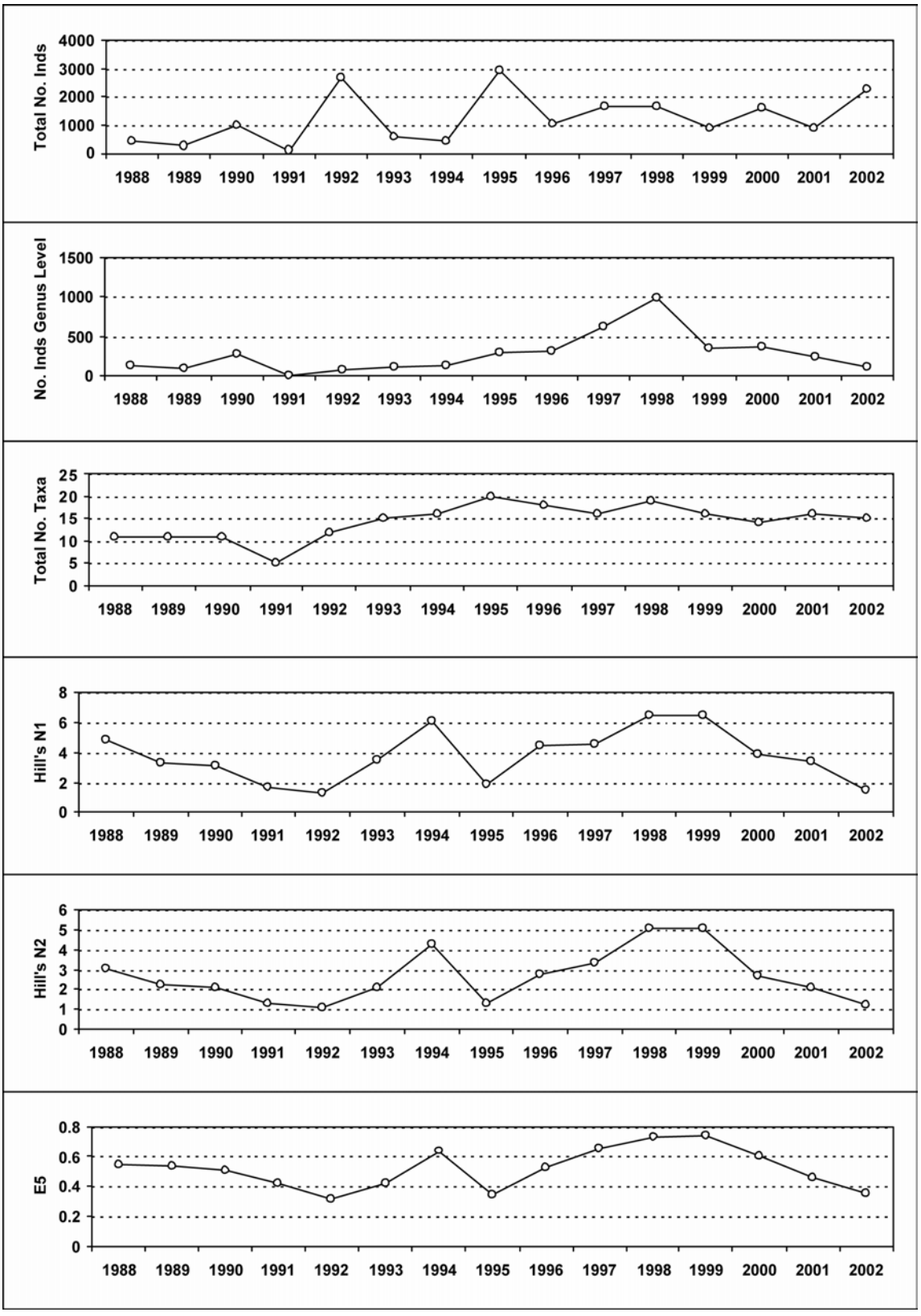
* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq\,l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol\,l^{-1}$)

19.2. Macroinvertebrate data

19.2.1. Percentage abundance summary, Beaghs Burn

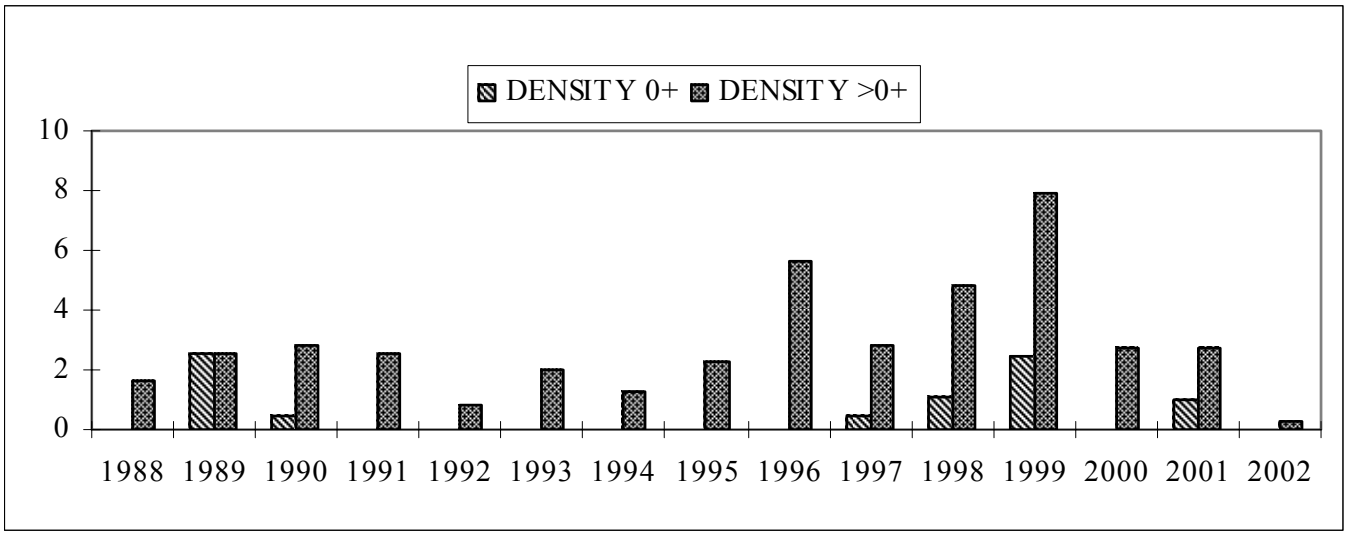


19.2.2. Summary statistics, Beaghs Burn



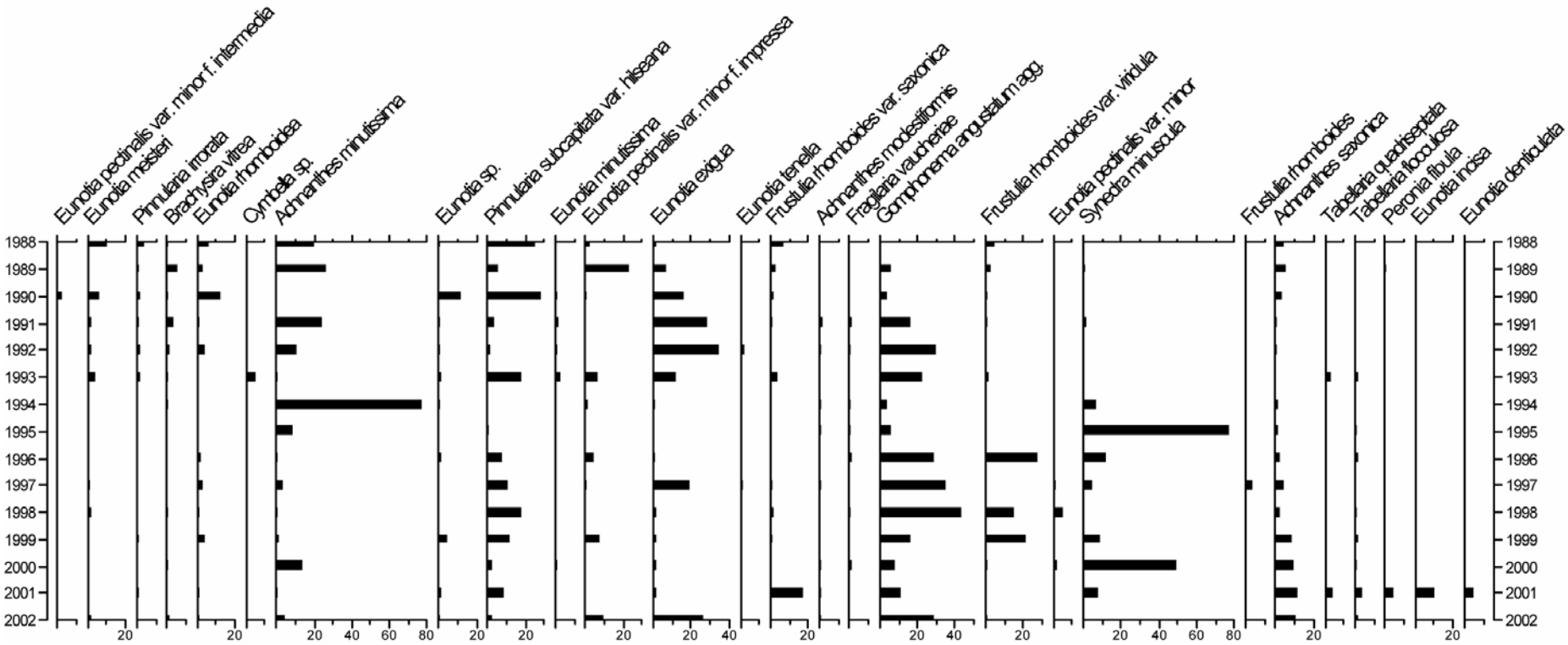
19.3. Fish data

19.3.1. Summary of mean Trout density (numbers $100m^{-2}$), Beaghs Burn

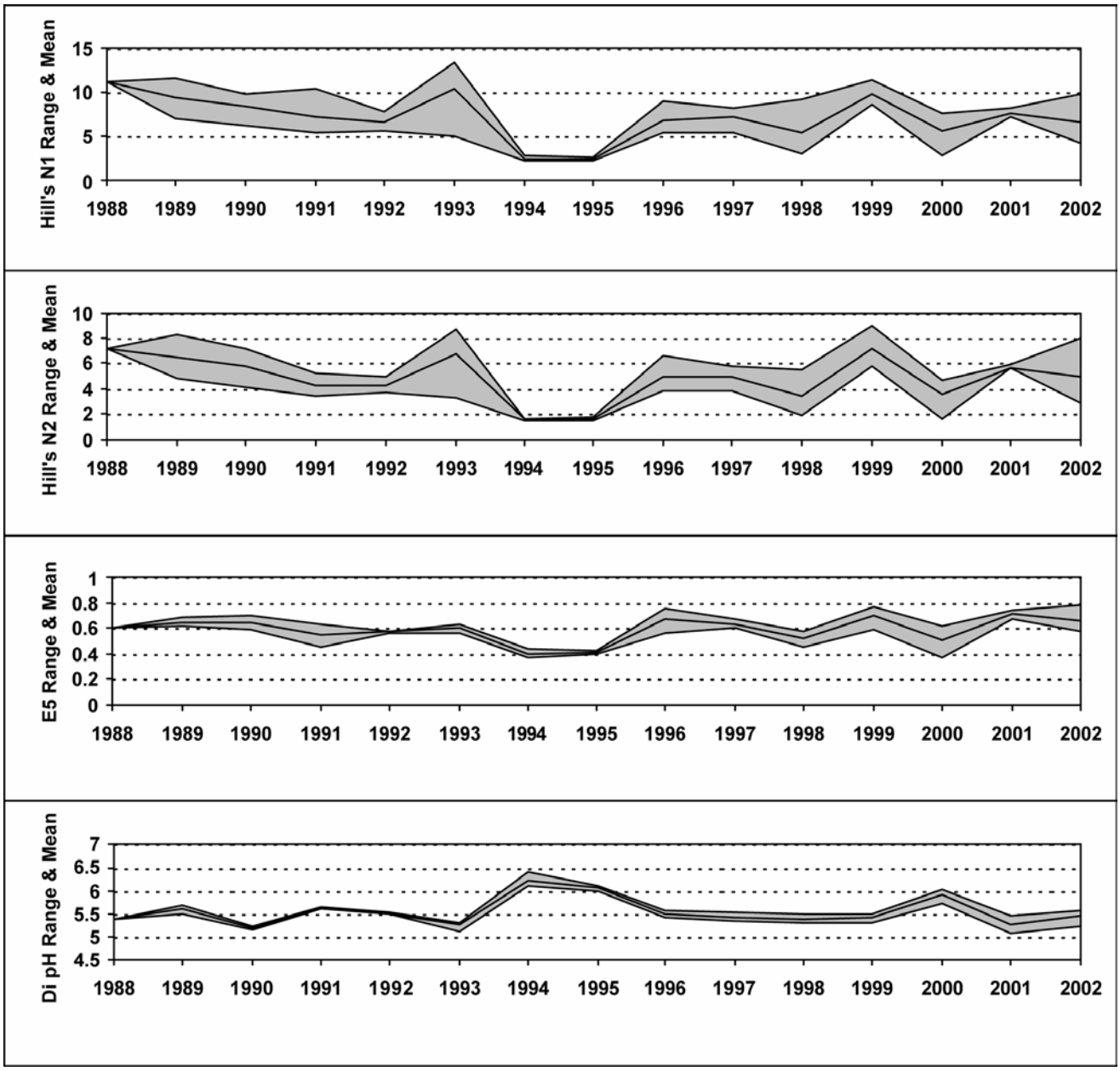


19.4. Epilithic diatom data

19.4.1. Percentage abundance summary, Beaghs Burn

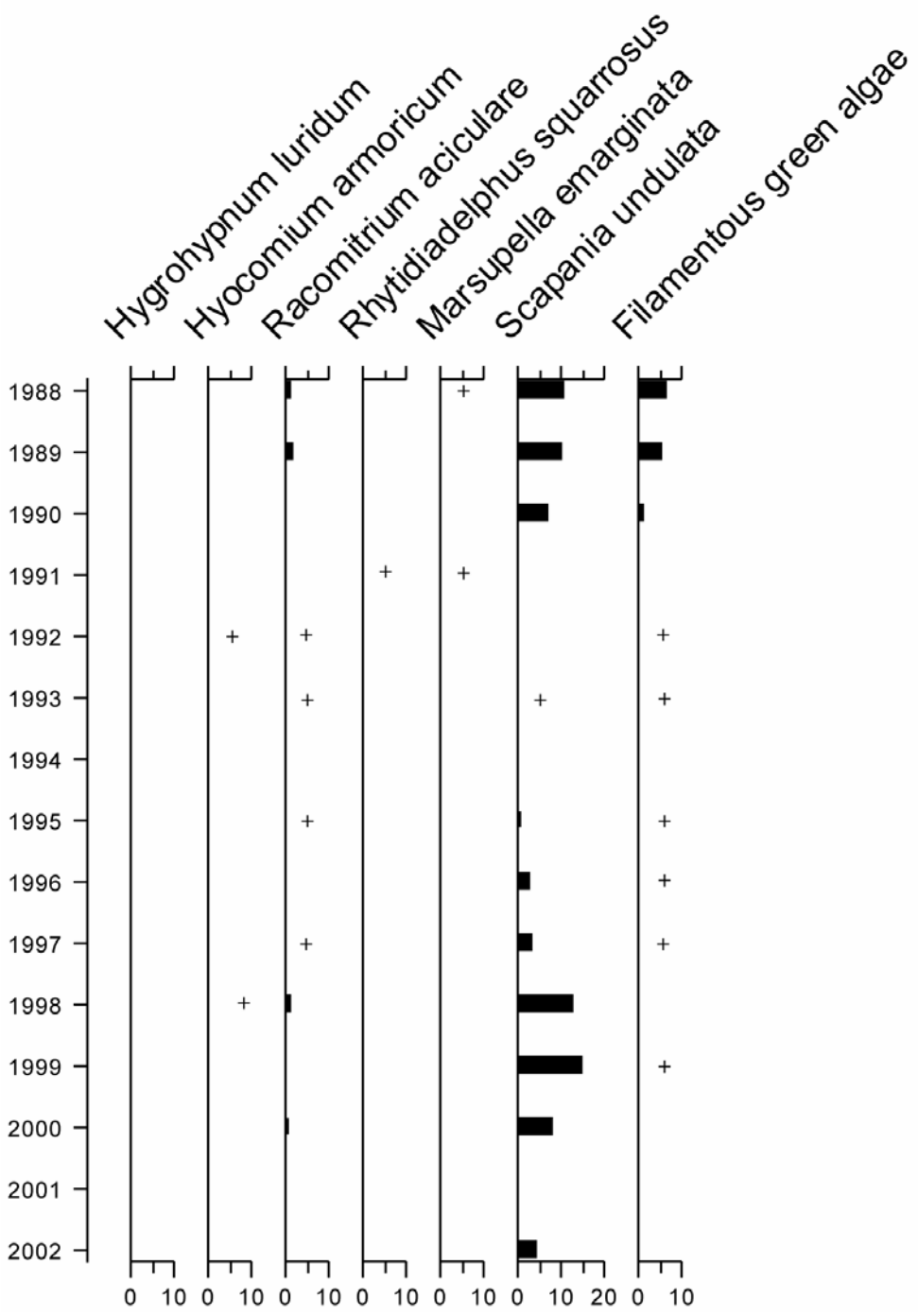


19.4.2. Summary statistics, Beaghs Burn



19.5. Aquatic macrophyte data, Beaghs Burn

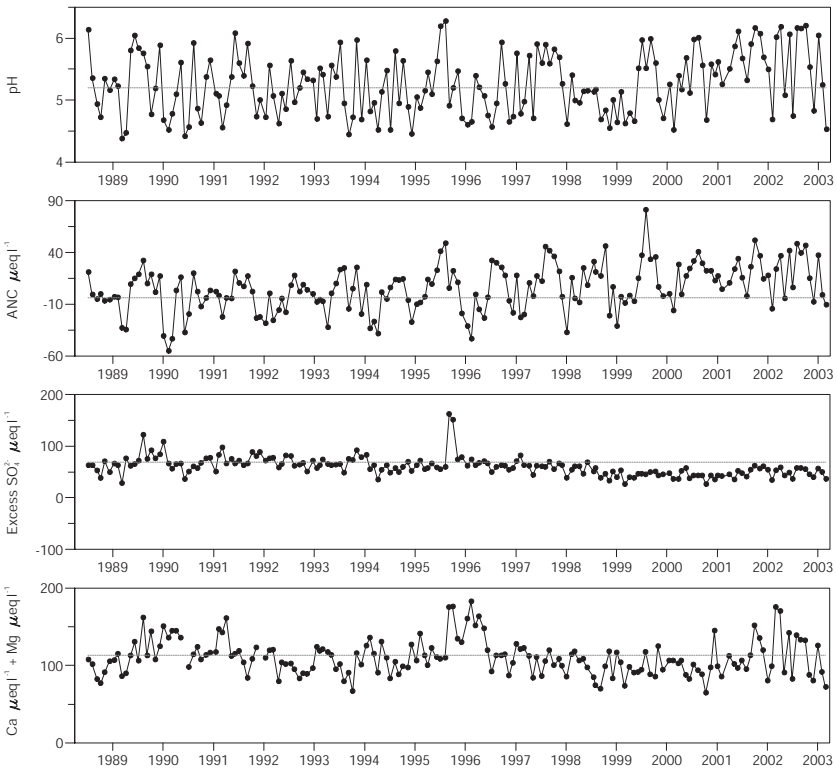
Percentage Species Cover

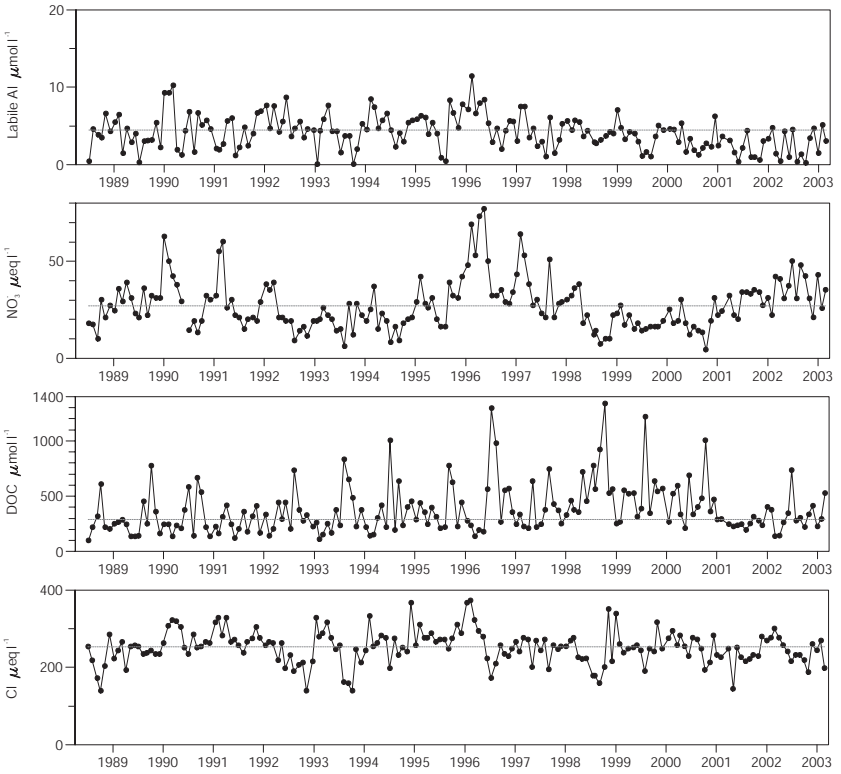


+ Represents <0.1% abundance

20. Bencrom River

20.1. Spot sampled chemistry data





Determinand statistics

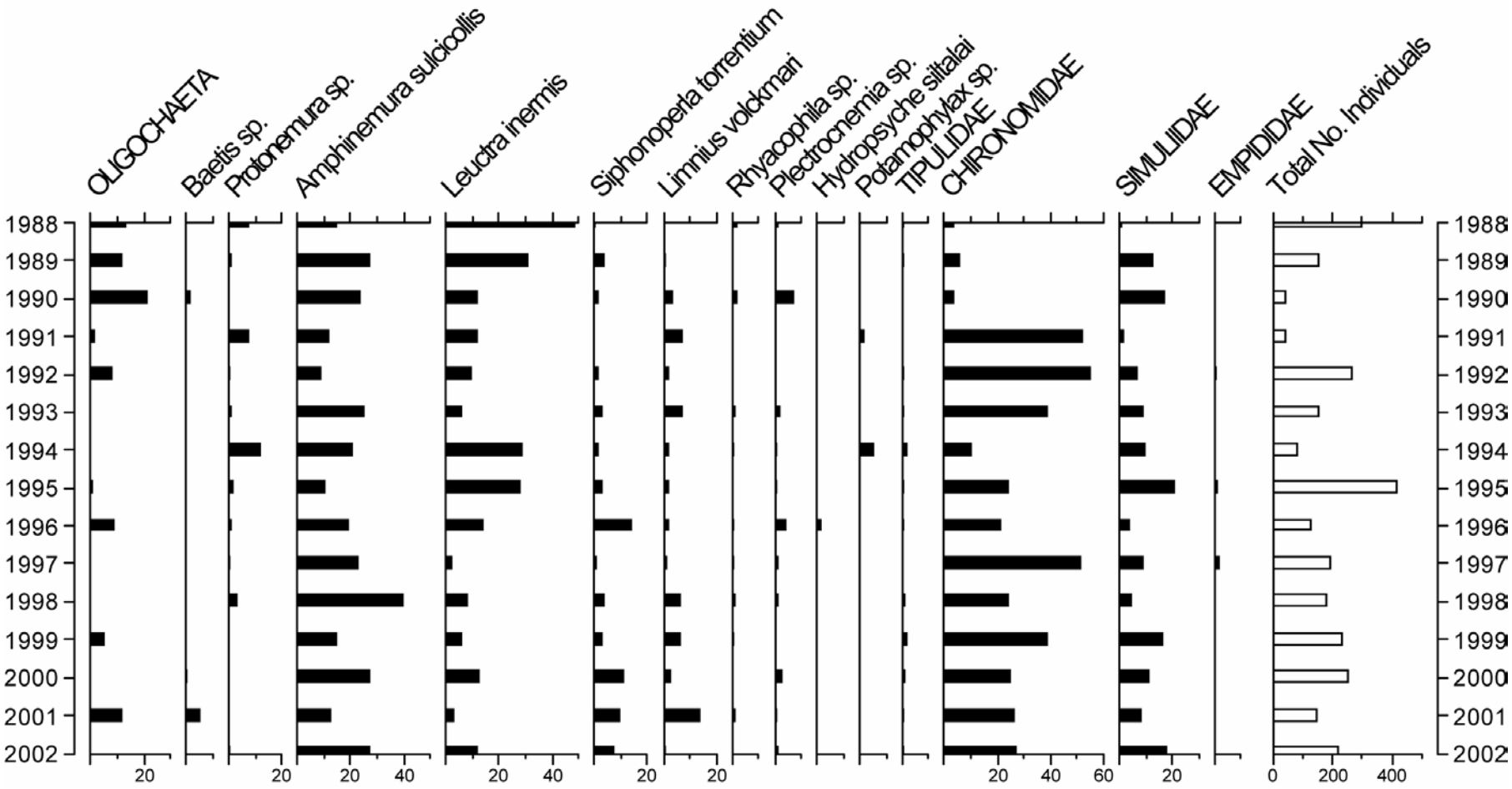
	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
pH	5.20	5.56	0.65	0.02	0.07
ANC	-3.82	20.39	23.19	**2.25**	**0.00**
Ca	52.21	58.33	23.77	-0.01	0.27
Mg	62.05	53.40	8.88	-0.01	0.06
Na	259.70	233.7	34.24	-0.03	0.20
K	11.66	10.96	2.31	-0.01	0.08
Sol.Al	7.40	4.23	2.39	**-6.00**	**0.03**

	mean 4/1988-3/1993	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1988-3/2003	p* 4/1988-3/2003
Sol.lab.Al	4.43	2.47	1.88	**-4.04**	**0.02**
Cl	252.3	234.7	27.79	-0.04	0.33
SO_4	94.96	72.74	9.87	**-0.10**	**0.00**
XSO_4	68.45	48.09	8.51	**-0.09**	**0.00**
NO_3	26.86	36.19	8.89	0.00	0.77
Si	214.7	199.8	60.70	-0.02	0.22
DOC	287.7	337.5	158.5	**0.10**	**0.04**

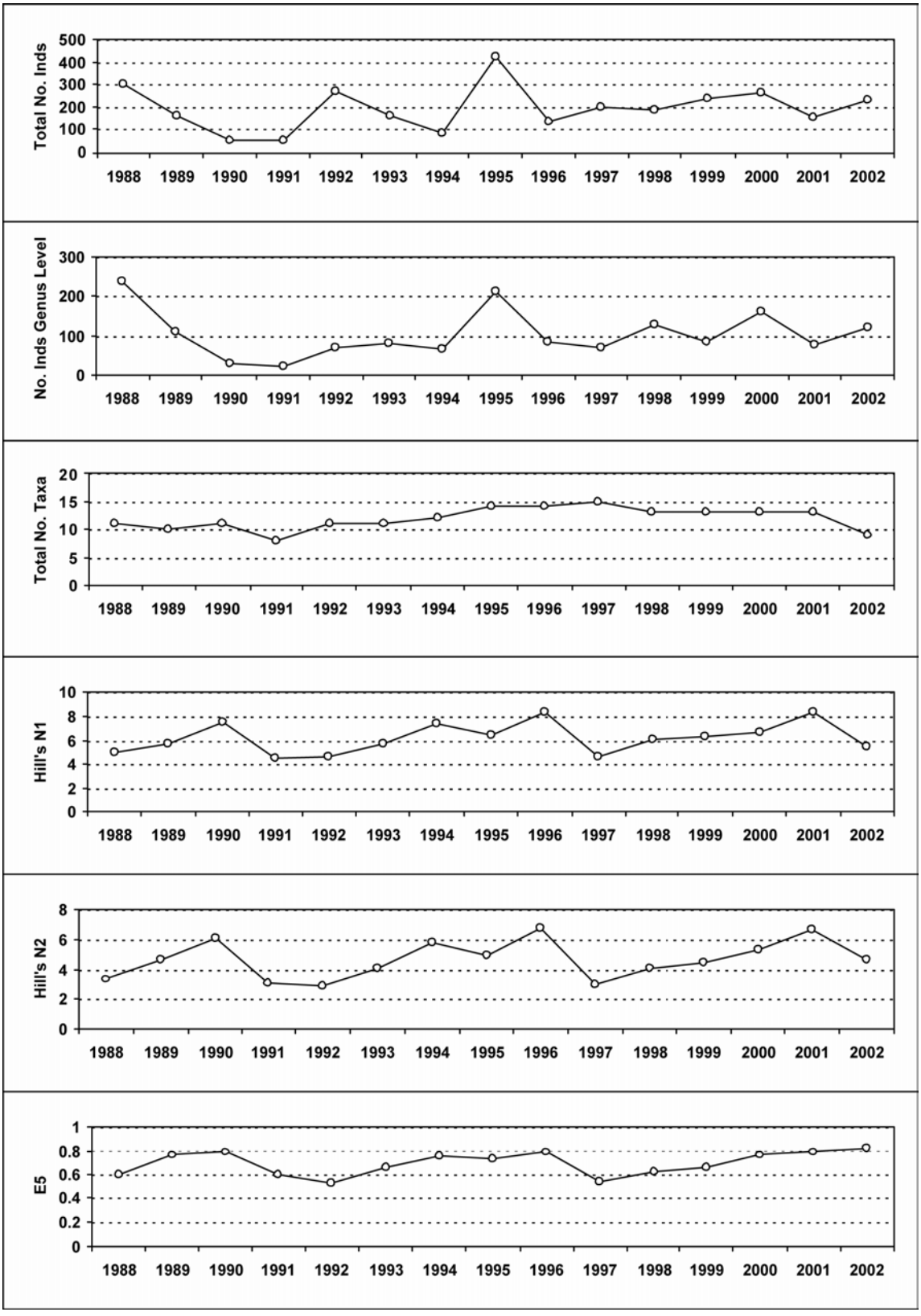
* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol\ l^{-1}$)

20.2. Macroinvertebrate data

20.2.1. Percentage abundance summary, Bencrom River

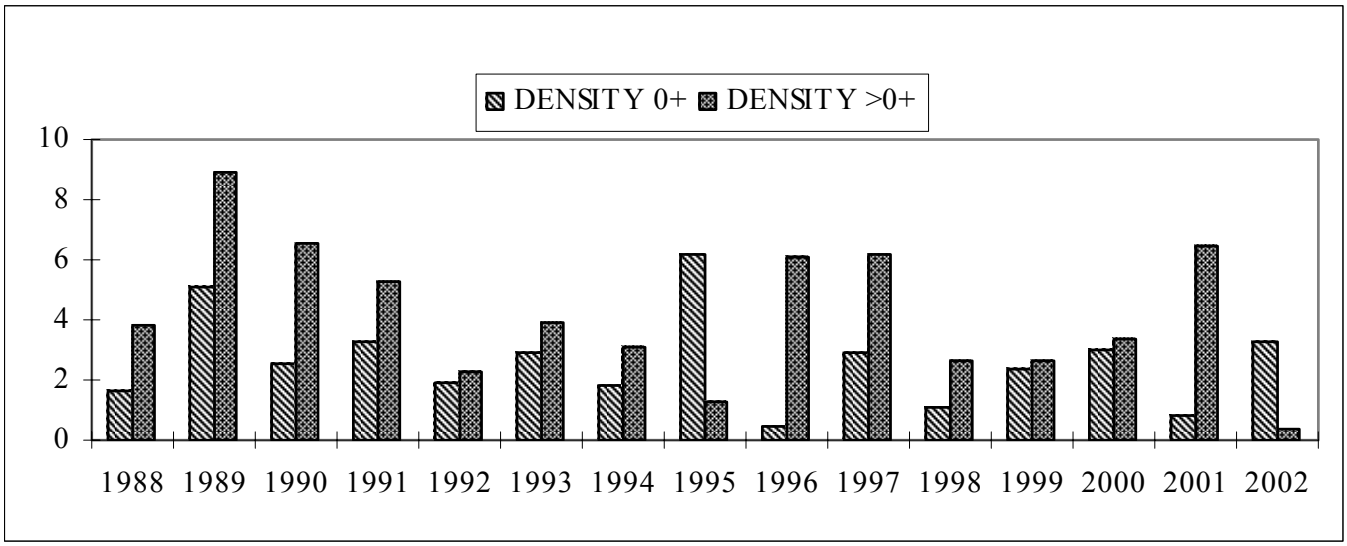


20.2.2. Summary statistics, Bencrom River



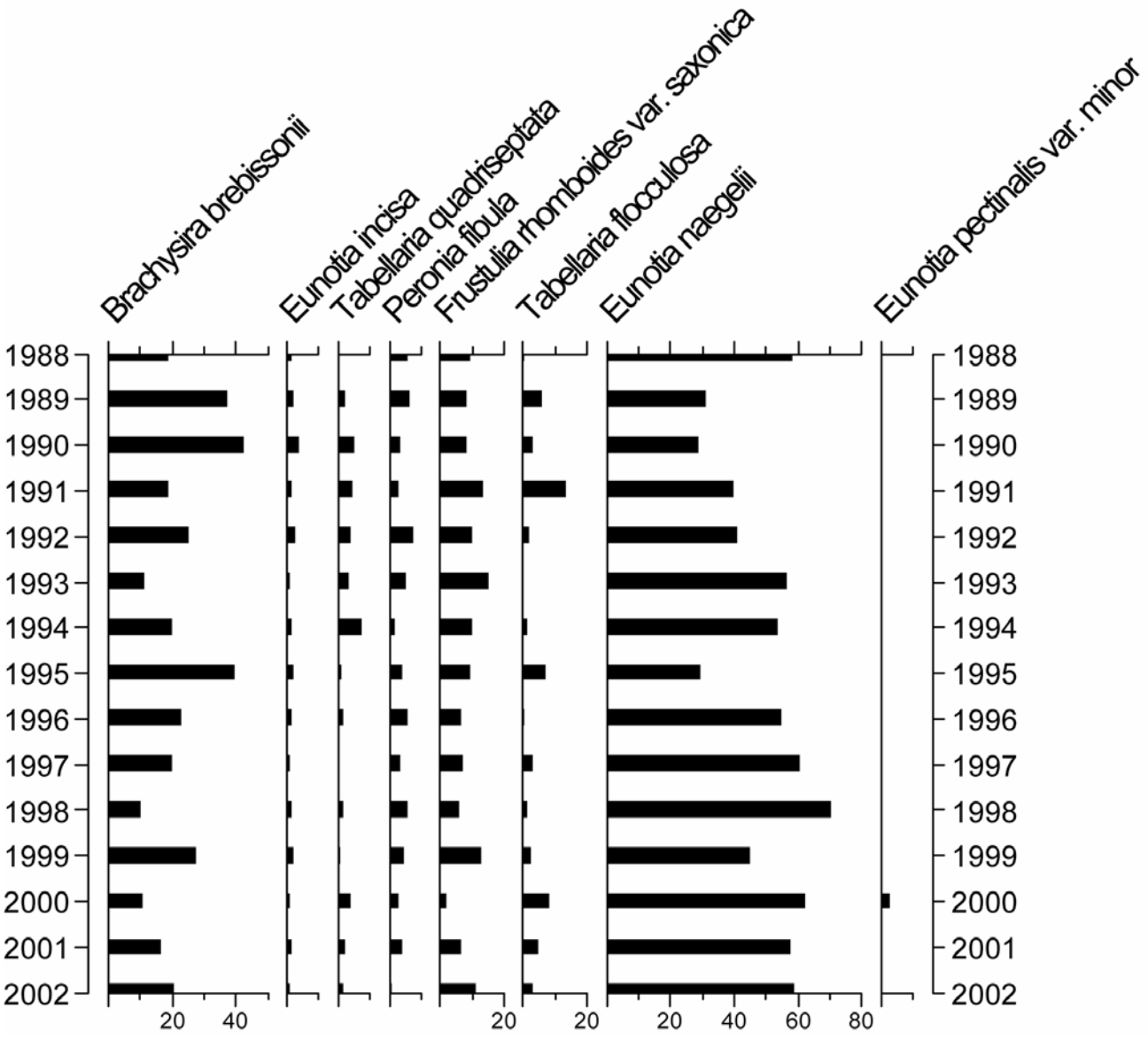
20.3. Fish data

20.3.1. Summary of mean Trout density (numbers $100m^{-2}$), Bencrom River

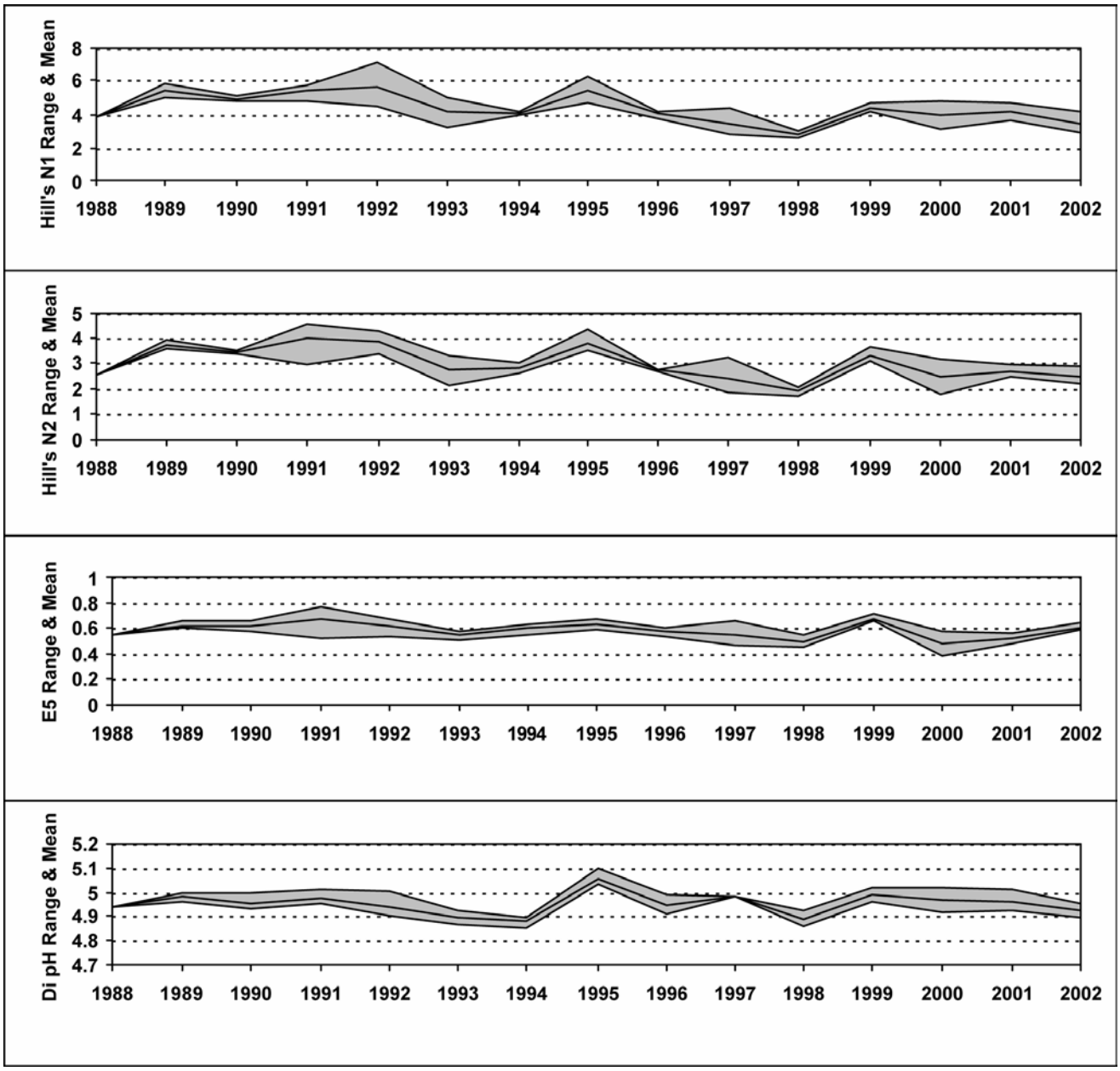


20.4. Epilithic diatom data

20.4.1. Percentage abundance summary, Bencrom River

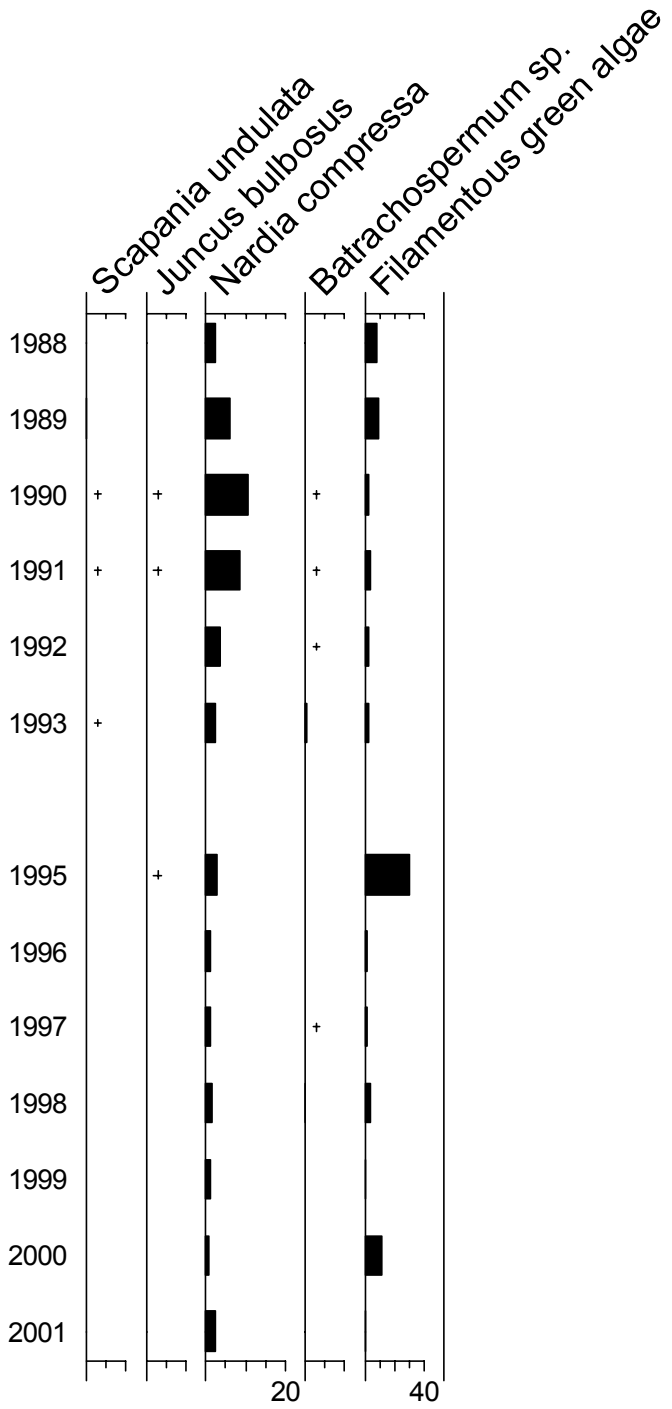


20.4.2. Summary statistics, Bencrom River



20.5. Aquatic macrophyte data, Bencrom River

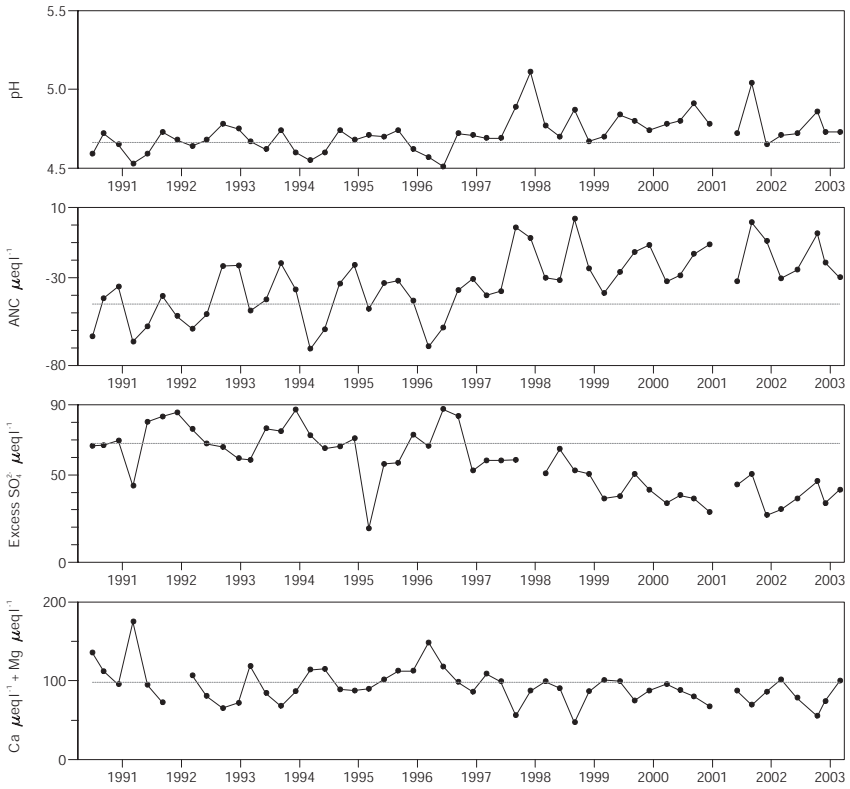
Percentage Species Cover

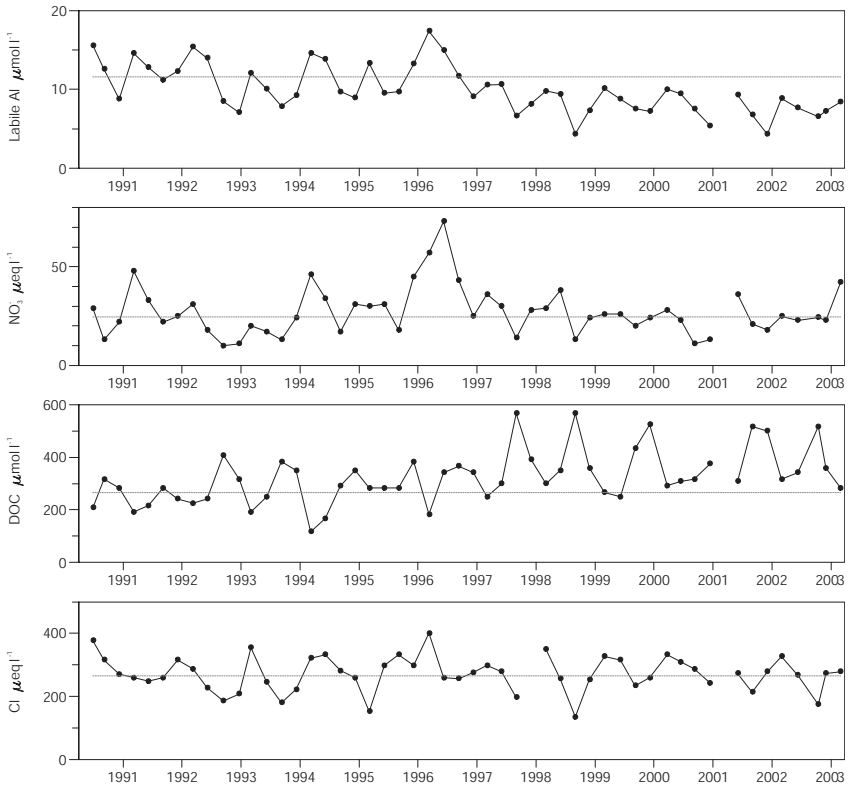


\+ Represents <0.1% abundance
No survey undertaken in 2002 due to spate conditions.

21. Blue Lough

21.1. Spot sampled chemistry data





Determinand statistics

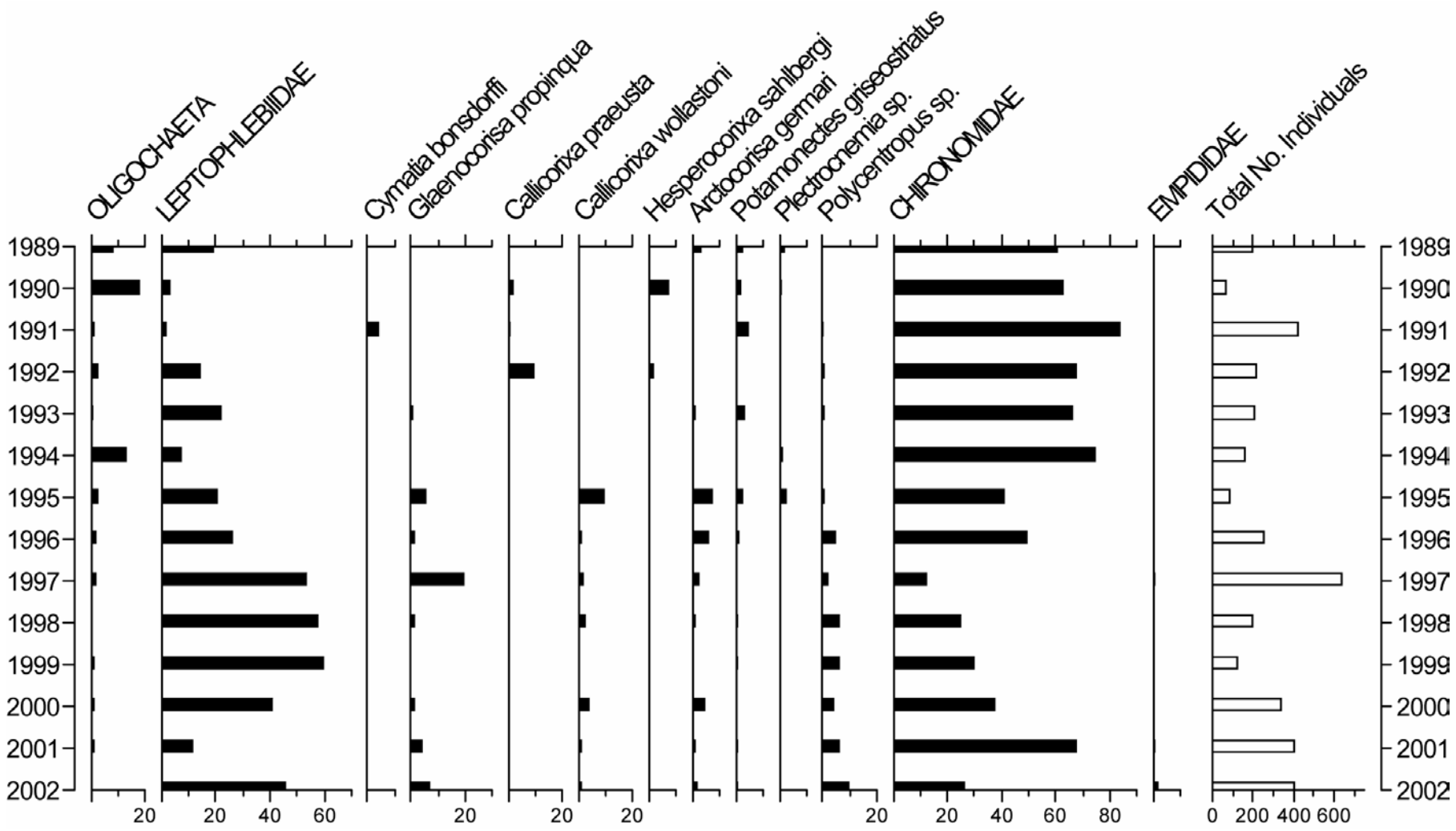
	mean 4/1990-3/1995	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1990-3/2003	p* 4/1990-3/2003
pH	4.66	4.76	0.07	**0.01**	**0.00**
ANC	-44.87	-20.42	10.99	**2.85**	**0.00**
Ca	40.74	27.25	6.44	**-0.02**	**0.01**
Mg	57.42	49.38	11.93	-0.01	0.12
Na	245.0	223.9	30.43	-0.04	0.47
K	11.38	11.47	0.99	0.00	0.18
Sol.Al	14.13	9.94	0.39	**-11.82**	**0.00**

	mean 4/1990-3/1995	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1990-3/2003	p* 4/1990-3/2003
Sol.lab.Al	11.63	7.47	0.77	**-11.68**	**0.00**
Cl	265.2	248.6	49.51	-0.02	0.88
SO_4	95.62	65.62	3.61	**-0.17**	**0.00**
XSO_4	67.77	39.52	5.51	**-0.16**	**0.00**
NO_3	24.69	28.04	9.43	0.00	0.84
Si	71.25	72.86	12.55	0.00	0.44
DOC	265.8	375.0	99.8	**0.14**	**0.00**

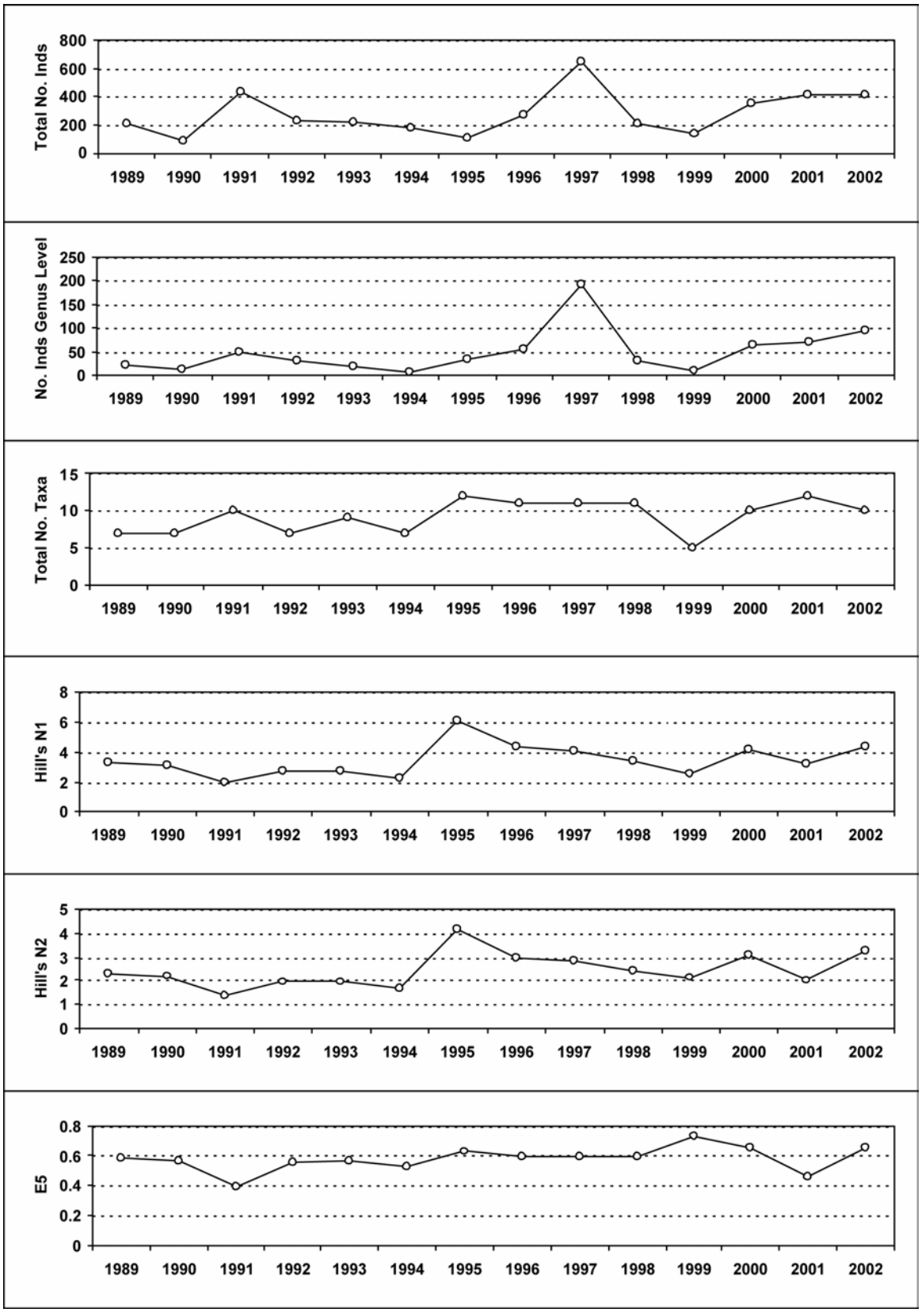
* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units $\mu eq\,l^{-1}$, except Sol.Al, Sol.lab.Al and DOC ($\mu mol\,l^{-1}$)

21.2. Macroinvertebrate data

21.2.1. Percentage abundance summary, Blue Lough

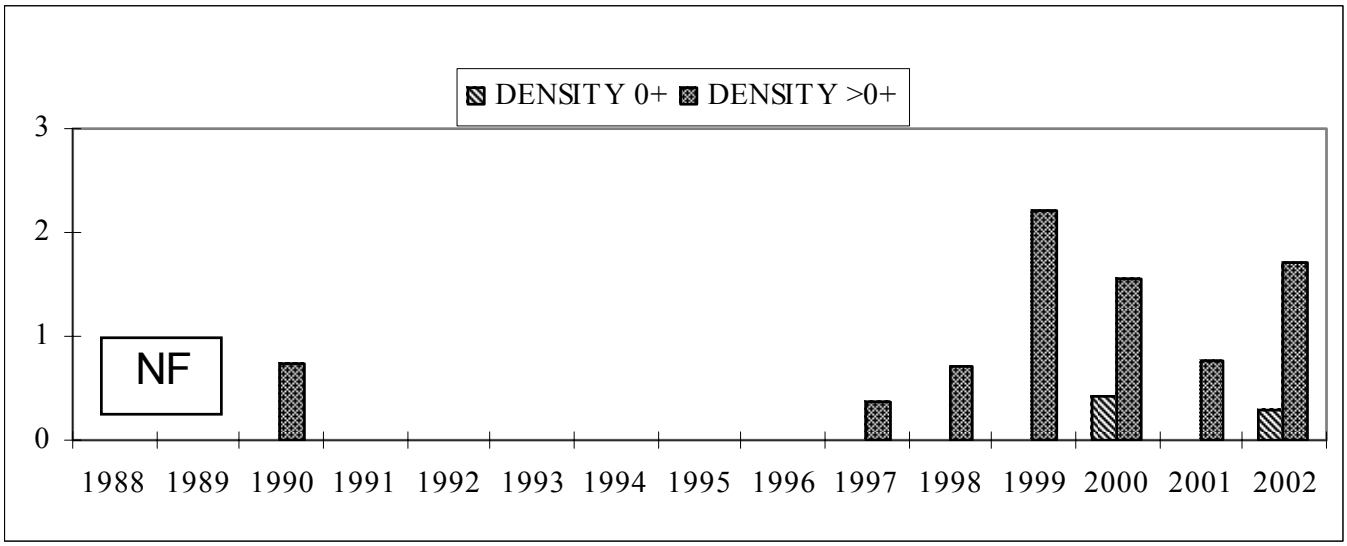


21.2.2. Summary statistics, Blue Lough



21.3. Fish data (for outflow stream)

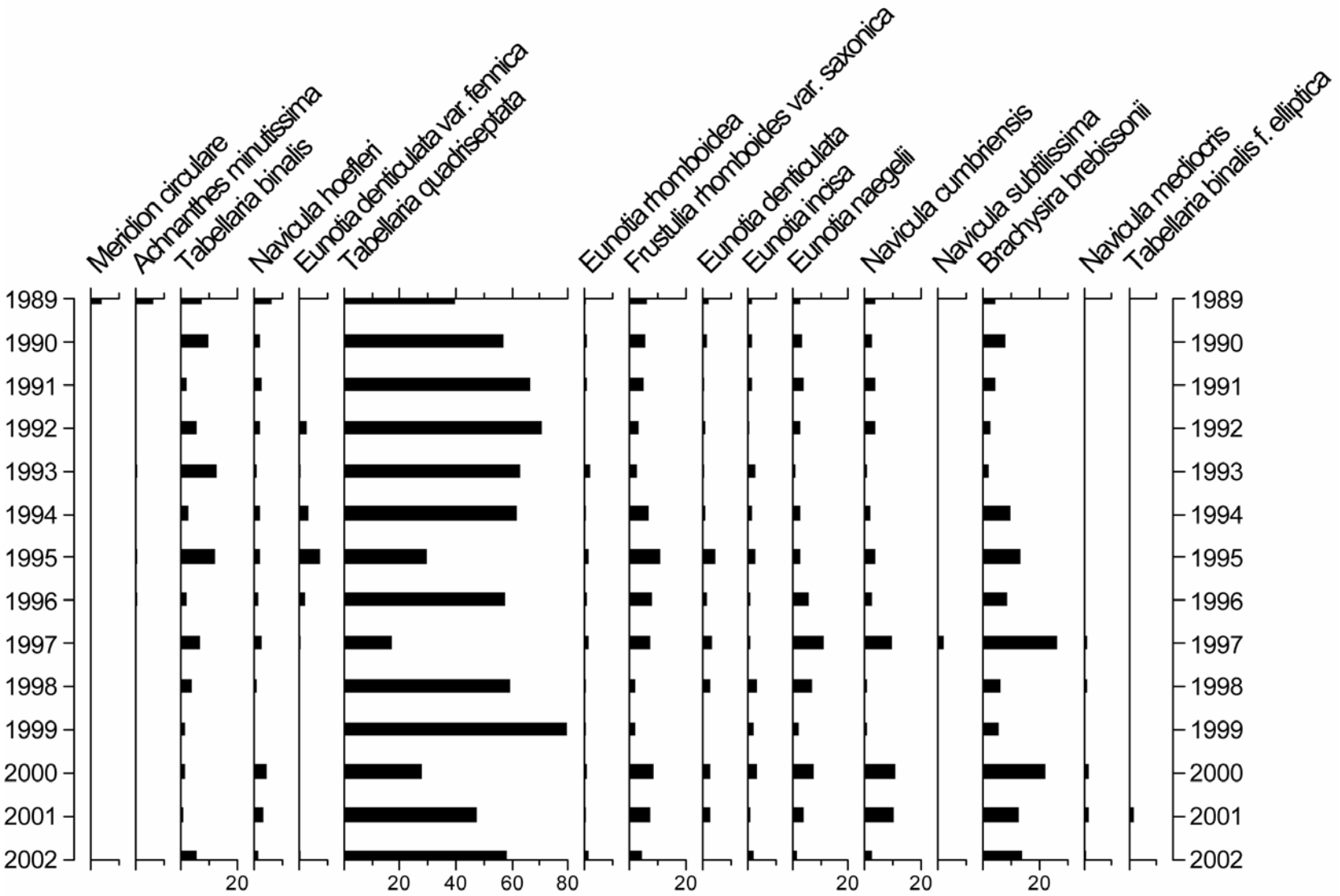
21.3.1. Summary of mean Trout density (numbers $100m^{-2}$), Blue Lough



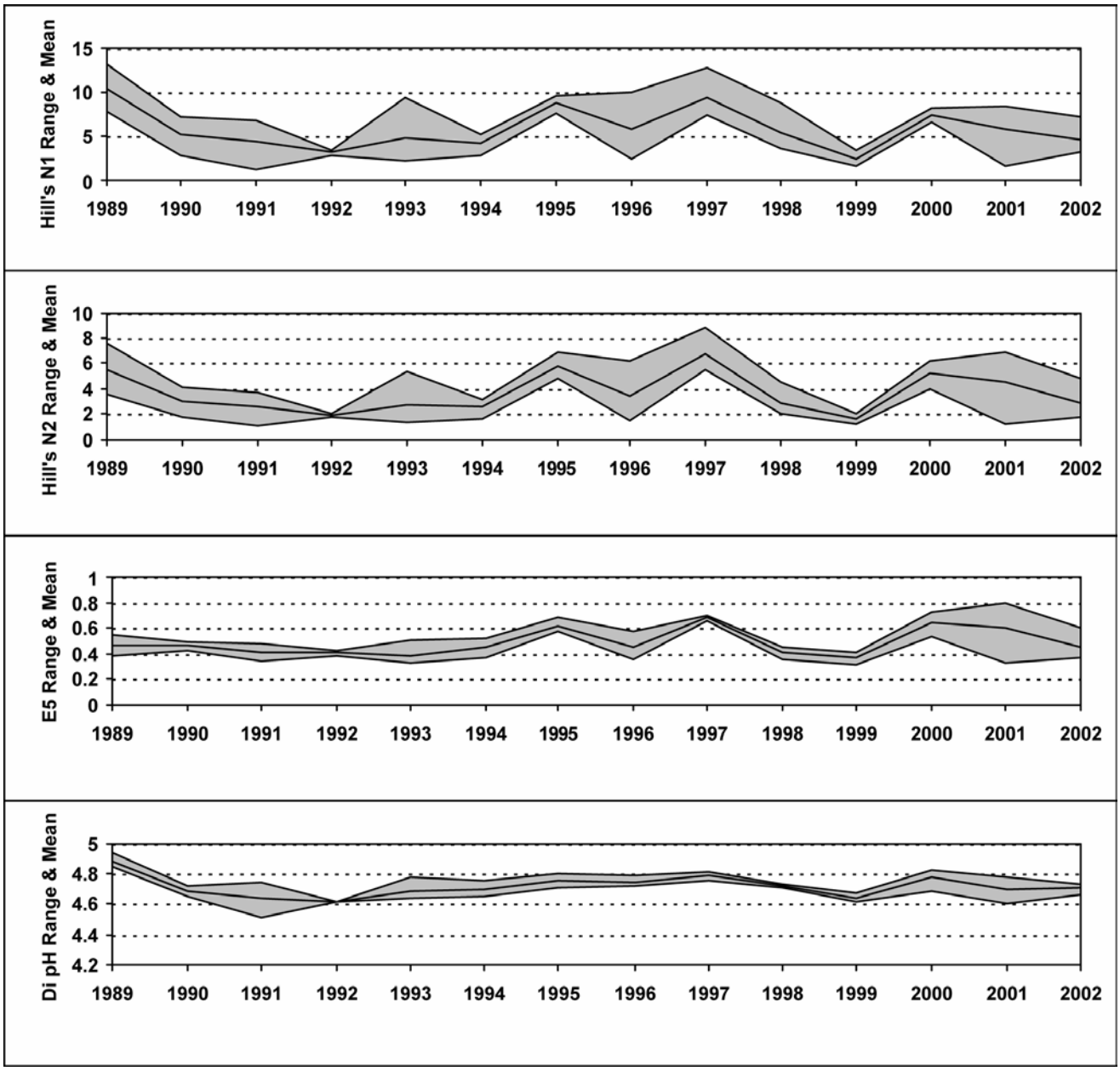
NF = Not fished

21.4. Epilithic diatom data

21.4.1. Percentage abundance summary, Blue Lough

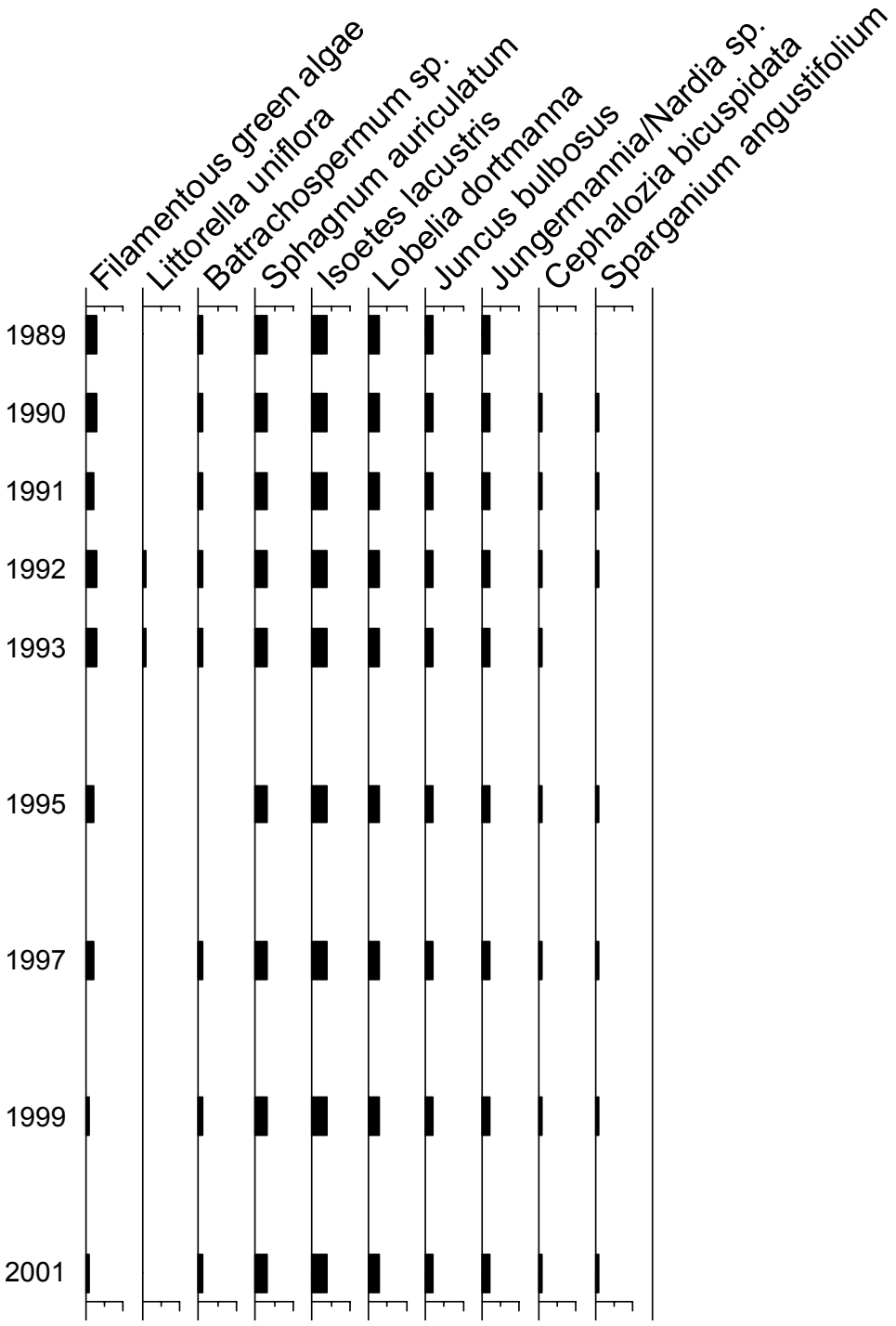


21.4.2. Summary statistics, Blue Lough



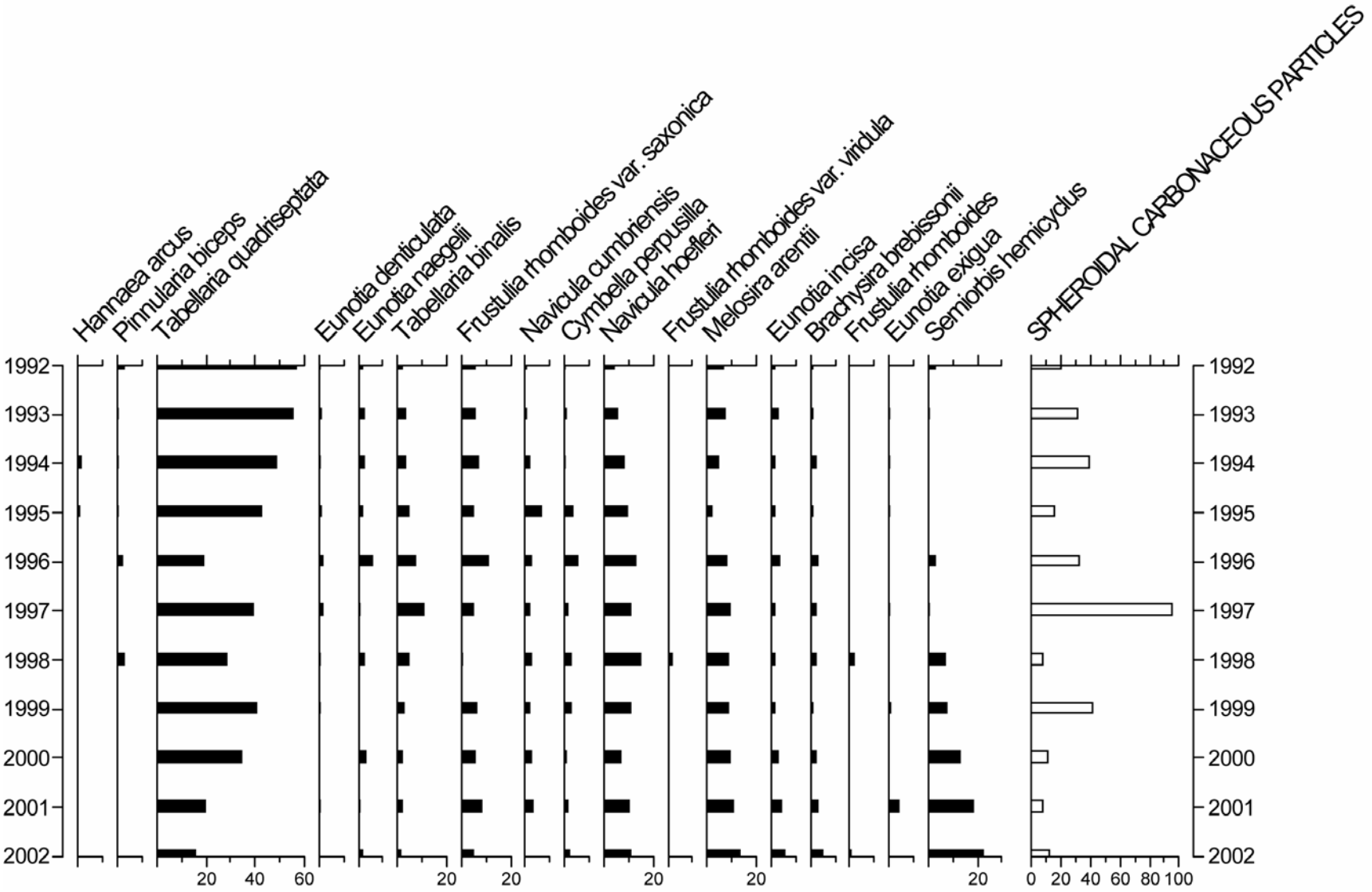
21.5. Aquatic macrophyte data, Blue Lough

Species Scores (1-5)



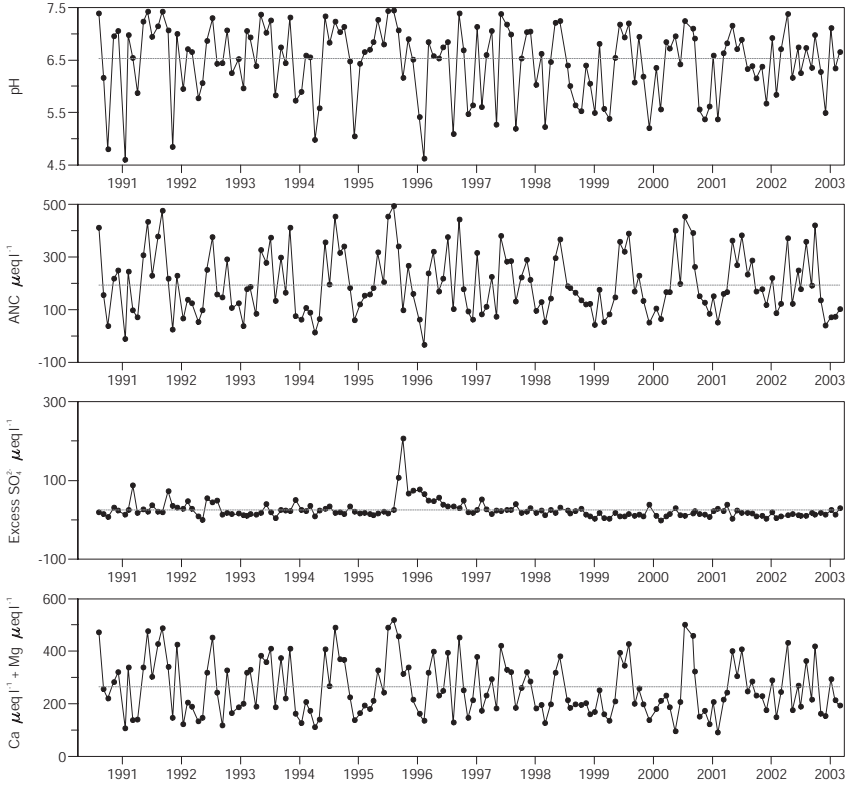
21.6. Sediment trap data, Blue Lough

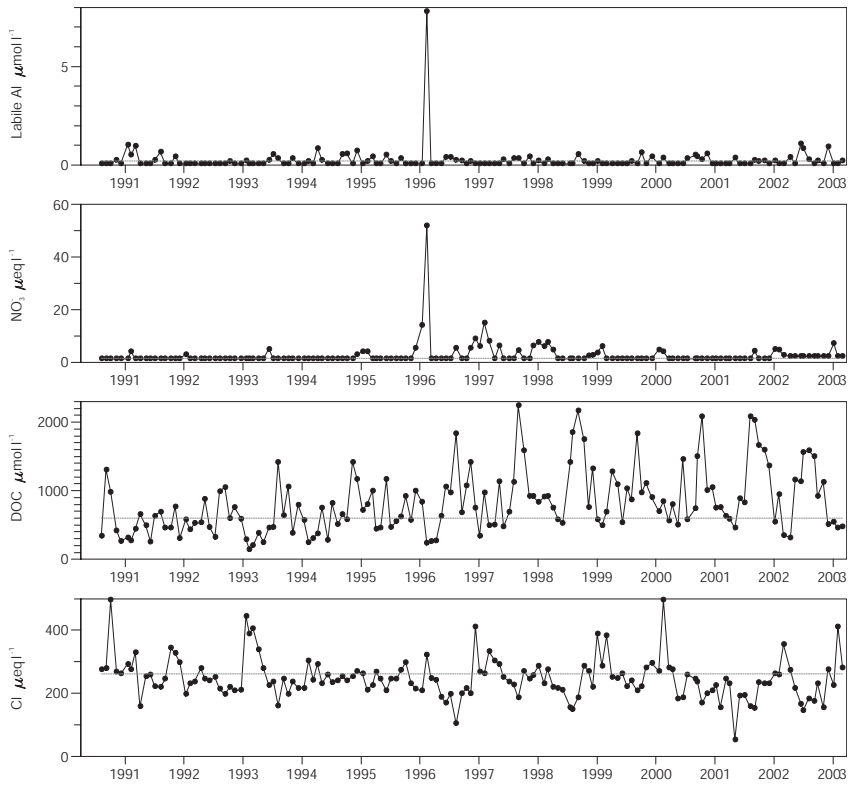
Relative percentage frequency of diatom taxa and carbonaceous particle flux (no. trap^{-1} day^{-1}).



22. Coneyglen Burn

22.1. Spot sampled chemistry data





Determinand statistics

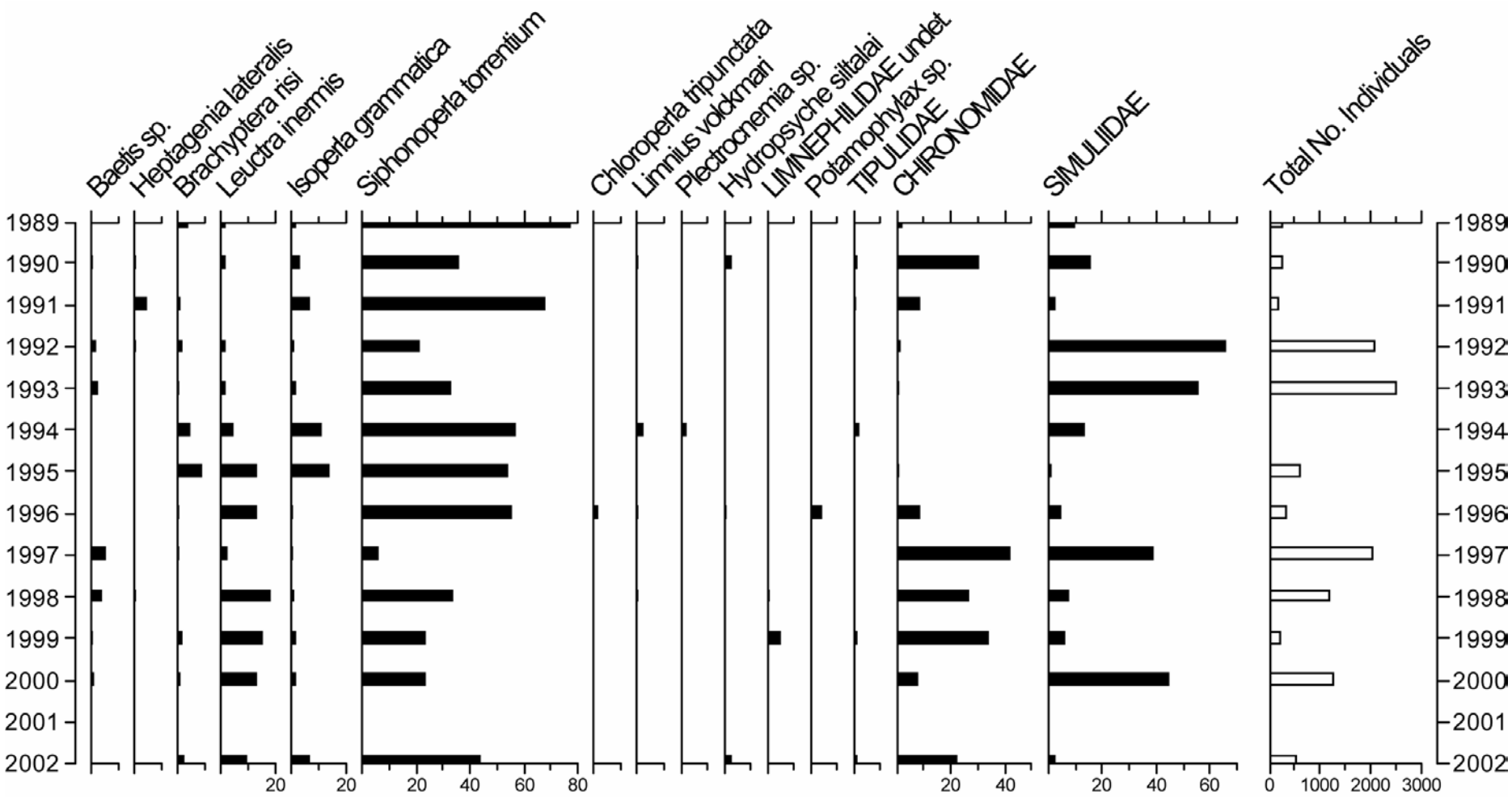
	mean 4/1990-3/1995	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1990-3/2003	p* 4/1990-3/2003
pH	6.53	6.53	0.50	-0.02	0.13
ANC	193.9	191.6	129.0	-0.44	0.76
Ca	146.8	140.2	61.67	-0.03	0.31
Mg	118.7	115.4	38.02	-0.01	0.30
Na	241.1	205.8	35.44	**-0.08**	**0.03**
K	8.91	8.53	3.17	0.00	0.59
Sol.Al	1.35	1.20	0.46	0.50	0.44

	mean 4/1990-3/1995	mean 4/2002-3/2003	std.dev. 4/2002-3/2003	S K* 4/1990-3/2003	p* 4/1990-3/2003
Sol.lab.Al	0.22	0.36	0.37	0.00	0.29
Cl	261.5	228.4	74.85	-0.13	0.08
SO_4	52.05	39.24	10.43	**-0.07**	**0.02**
XSO_4	24.58	15.25	5.85	**-0.05**	**0.05**
NO_3	1.56	2.62	1.42	0.00	0.10
Si	89.29	92.74	44.50	-0.02	0.14
DOC	597.8	940.3	468.2	**0.51**	**0.01**

* Seasonal Kendall trend analysis: slope estimate (SK) and significance level (p)
Most units μeq l^{-1}, except Sol.Al, Sol.lab.Al and DOC (μmol l^{-1})

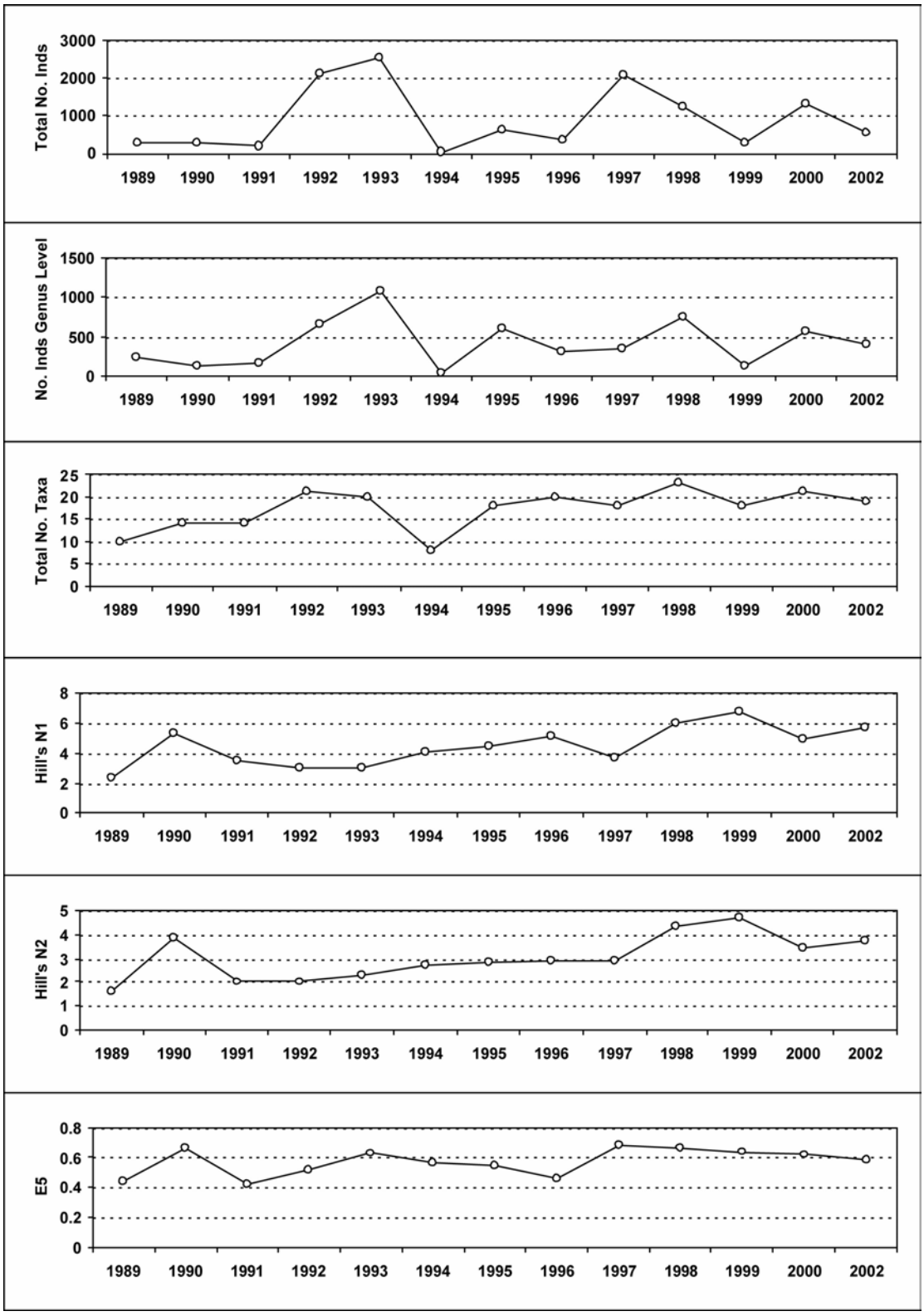
22.2. Macroinvertebrate data

22.2.1. Percentage abundance summary, Coneyglen Burn



No sampling in 2001 due to Foot and Mouth restrictions.

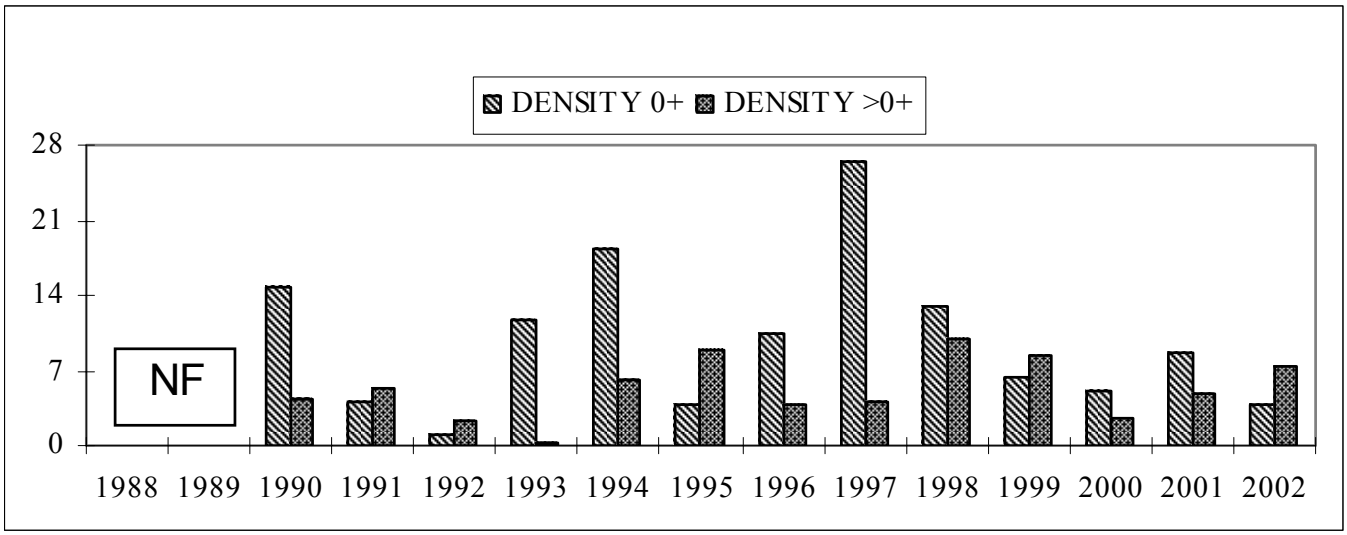
22.2.2. Summary statistics, Coneyglen Burn



No sampling in 2001 due to Foot and Mouth restrictions.

22.3. Fish data

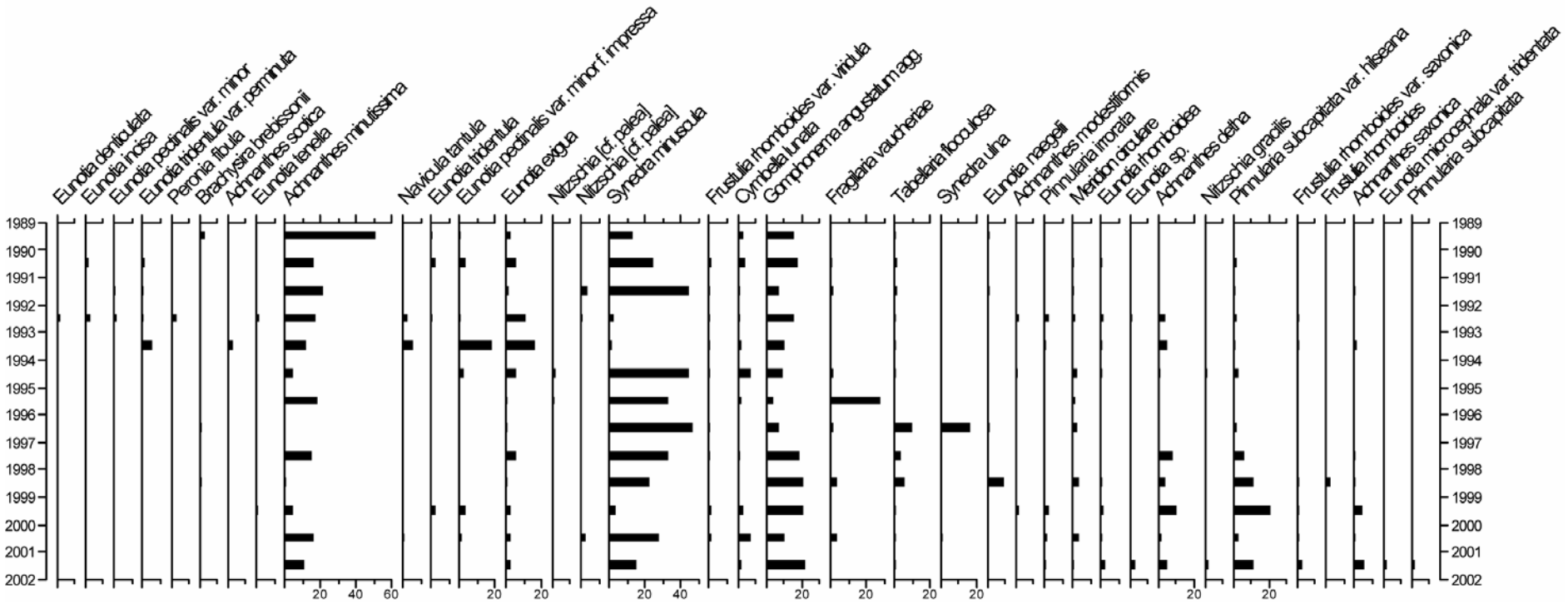
22.3.1. Summary of mean Trout density (numbers $100m^{-2}$), Coneyglen Burn



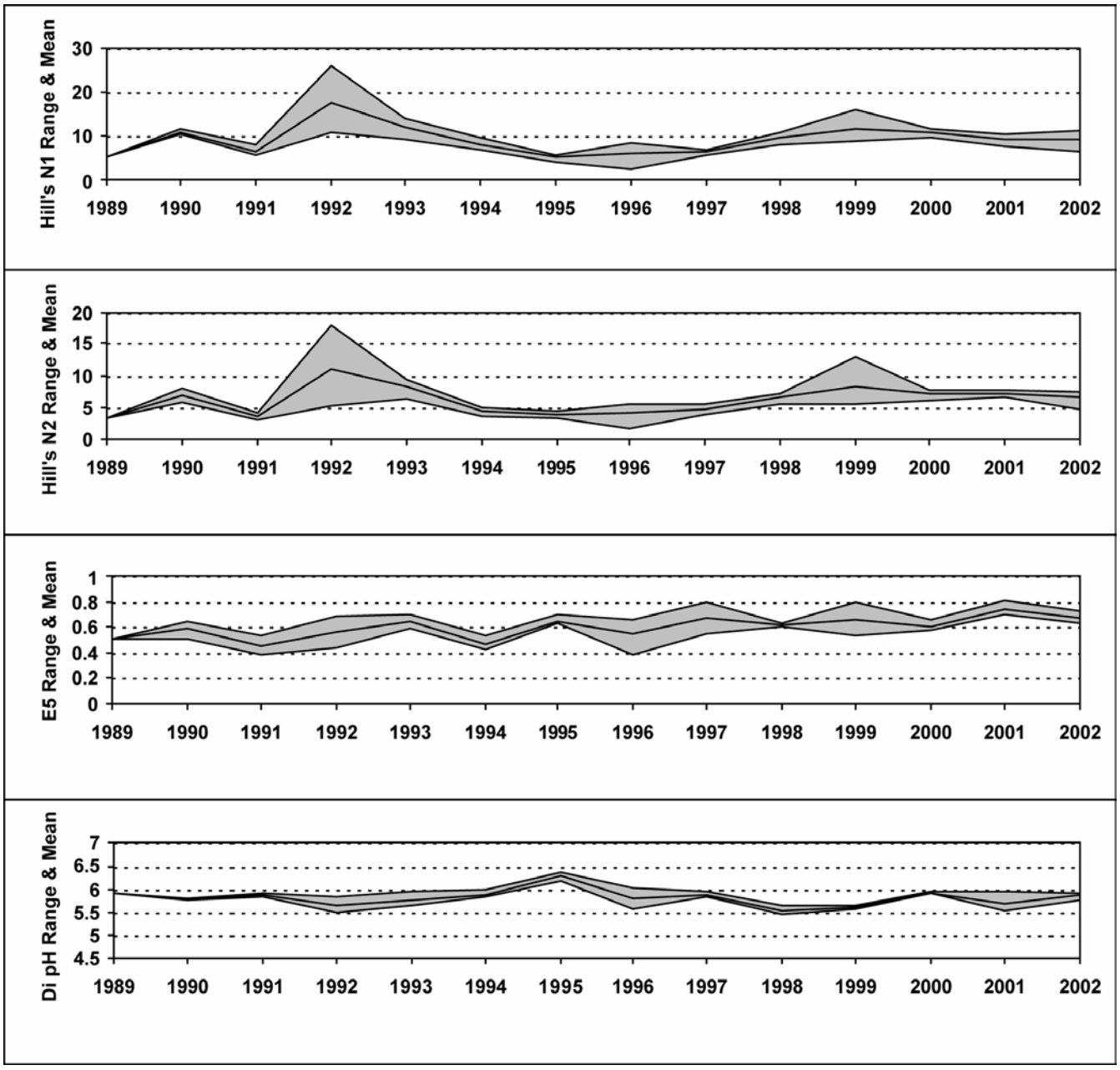
NF = Not fished

22.4. Epilithic diatom data

22.4.1. Percentage abundance summary, Coneyglen Burn

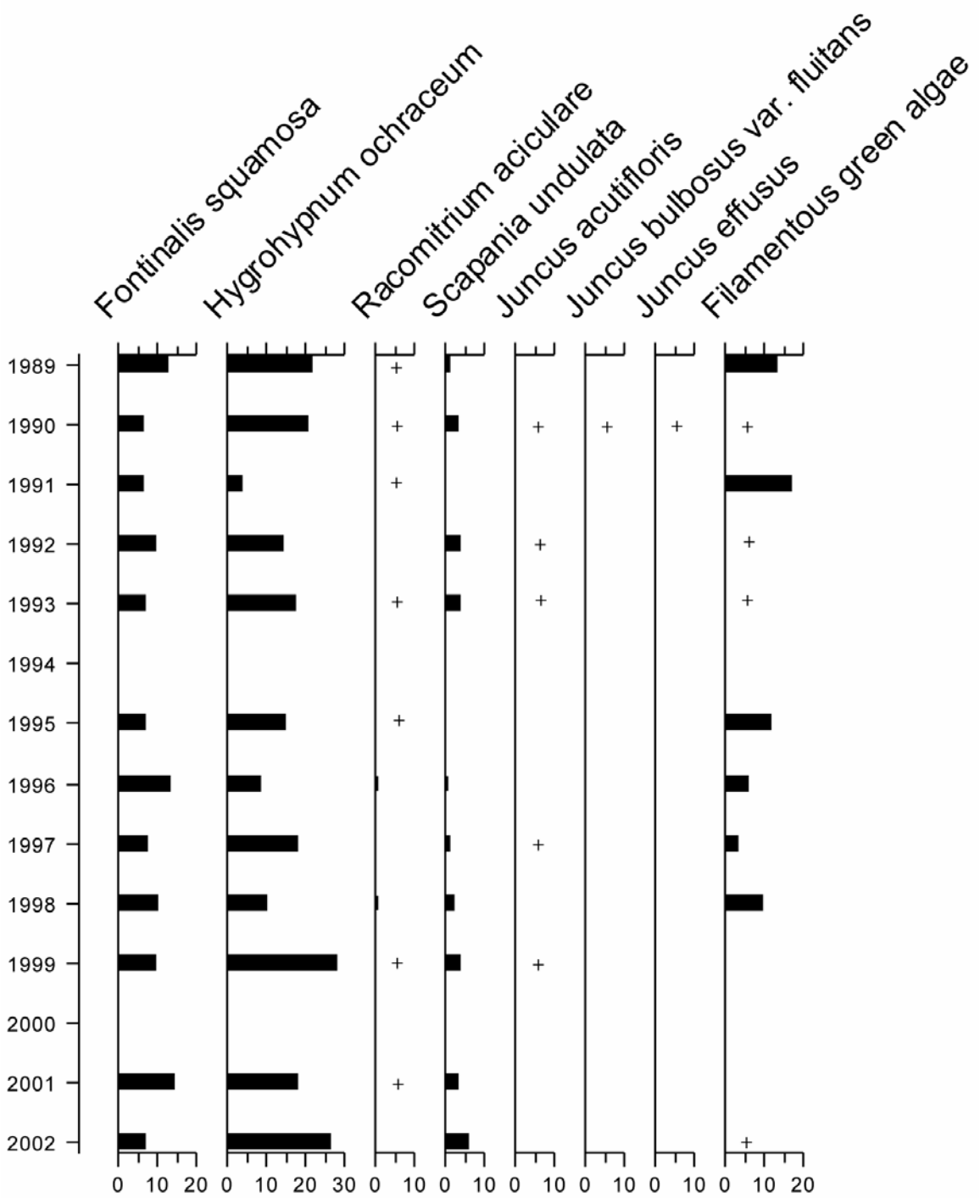


22.4.2. Summary statistics, Coneyglen Burn



22.5. Aquatic macrophyte data, Coneyglen Burn

Percentage Species Cover



+ Represents <0.1% abundance