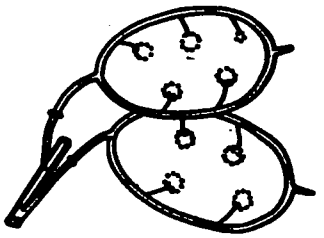
807

Tim Rich
BOTANICAL
CONSULTANCY



Coleshill River Restoration Project

Detailed flood plain vegetation monitoring

A report for Pond Action by

T. C. G. Rich
B.Sc., Ph.D., MIEEM

1995

CONTENTS

1.0 Introduction

2.0 Methods

3.0 Baseline data

4.0 Discussion

5.0 References

Figure 1. Location of transects in main meadow

Figure 2. Location of transects in Fritillary meadow

Figure 3. Details of transect 1

Figure 4. Details of transect 2

Figure 5. Details of transect 3

Figure 6. Details of transects 4 and 5

Figure 7. Details of transects 6 and 7

Figure 8. Twinspan classification

Figure 9. Deconara plot

T. C. G. Rich
The Annex
Newgale Farm
Priory Road
Forest Row
East Sussex RH18 5JD
Phone/FAX 01342 826239

file = \pondact\Colemon.doc 13/9/1995

1.0 INTRODUCTION

Coleshill is one of three sites included in the River Restoration Project, which aims to assess the benefits for integrated catchment management with funding from the European Union LIFE fund. The work to 1994 has been summarised in Biggs (1995). The botanical work includes detailed studies on the river (Biggs 1995), and more general descriptions of the vegetation of the flood plains (Rich 1994, 1995).

In Summer 1995 new channels were constructed in the flood plains. It was decided that to monitor the vegetation on the flood plains in more detail a series of transects with permanent quadrats should be established. Three transects which would be expected to change in water table height and flooding were set up on the new channel, one 'control' where water tables would not be expected to change significantly, and another in the Fritillary meadow where very minor changes might be expected.

The aim of this report is to present that baseline data from the first monitoring of the vegetation after construction of the new channels when no changes in vegetation would be expected. Some preliminary analyses were carried out to help characterise the changes to be expected.

2.0 METHODS

2.1 Vegetation

The vegetation quadrats were recorded on 18 and 19 August 1995 by T. C. G. Rich in fine, very hot weather. Five pairs of transects were set up (Figure 1 and 2); three perpendicular across the new channel (transects 1, 2 and 3; Figures 3-5), another pair at the top of the same meadow where no changes in water table would be expected (transects 4 and 5; Figure 6), and another pair on the Fritillary meadow downstream (transects 6 and 7; Figure 7).

The transects were marked with permanent ground markers (three per transect) at measured distances and on noted bearings. They were located as close as possible to notable features to make relocation as quick and simple as possible (a metal detector may help locate them in longer grass in future years). Photographs were also taken to help with relocation as far as possible.

Sets of five 2 m x 2 m quadrats were recorded, consistently on the south or east side of the transects. Species present were listed as percentage cover (note that a 0.01% cover represents a square 2 cm x 2 cm and thus probably one plant of a herb). As always, estimating cover for linear-leaved grasses is much harder than broad-leaved herbs.

The heavily grazed, mown grassland which was suffering badly in the major summer drought of 1995 was very difficult to record for some species, since they were virtually unrecognisable from a few tattered, dried up leaves and sheaths. Whilst identification and cover estimates of the herbs is probably quite accurate, the estimates for the grasses are less so. Species probably

Permanent markers

reliably recorded were *Dactylis glomerata, Deschampsia cespitosa, Elytrigia repens, Festuca rubra, Holcus lanatus* and *Lolium perenne*; data for the other species should be treated with caution. *Agrostis* was only recorded to genus. *Bromus*, noted in the grassland earlier in the year (Rich 1995), was scarcely seen at all.

The data were compiled into tables for each transect and are presented below. Data on management (e.g. grazed, mown) were noted. Constancy's are given at the end of the data as follows: V = 81-100%, IV = 61-80%, III = 41-60%, II = 21-40% and I = 1-20% of quadrats.

2.2 Match

Summary constancy data for each set of transects were compared against the NVC diagnoses for swamps and tall-herb fens and mesotrophic grasslands using MATCH version 1.42. The similarity co-efficient gives a baseline starting point for monitoring so that changes in co-efficient for certain communities can be followed with time.

2.3 TWINSPAN and DECORANA

The quadrat data were analysed using VESPAN II (Malloch 1988). Percentages less than 1% were converted to 1%. Quadrat 15 was not included as it had no plants. VESPAN is a software package specifically designed to handle vegetation data, and uses standard techniques such as TWINSPAN and DECORANA. TWINSPAN is a program designed to perform a divisive cluster analysis on multivariate data (Malloch 1988); in simple terms, the program looks at sets of data with many variables and progressively splits them into groups of similar samples. DECORANA is a program which ordinates multivariate data. Ordination is a process by which a spatial representation of a set of data is produced to show their relationships, and the program scales samples along axes according to their similarity. The first axis accounts for the maximum amount of variation, and then the data are re-scaled to take into account the next most important sources of variation and so forth.

3.0 BASELINE DATA

3.1 Transect 1 (Figures 1, 3)

3.1.1 Vegetation

Transect 1 was located perpendicular to the new channel at the upstream end. The grassland was dry MG7 rye grass pasture. The construction area had been mown, and the areas near the new channel had in many cases been damaged by vehicles constructing the channel, but quadrats were recorded none-the-less. The areas to the west of the construction area had been fenced and were grazed by cattle and had also been topped.

Quadrat number	1	2	3	4	5	6	7	8	9	10	0
Herb height, centimetres	2	2	5	5	5	2	5	10	10	10	
Herb cover (%)	100	100	100	80	40	80	99	100	100	95	
Mown	+	+	+	+	+	+					
Damaged	+			+	+						
Grazed							+	+	+	+	
Lolium perenne	100	100	90	75	40	70	50	60	30	20	V
Holcus lanatus			10	1		10	30	10	15	50	IV
Agrostis sp.				5	1		20	30	60	30	III
Taraxacum sp.		.01	.01							.01	I
Ranunculus repens						.1		.1	5		II
Cirsium arvense									1	.1	I
Ranunculus acris				.01	.01						I
Arrhenatherum elatius										1	I
Dactylis glomerata										1	I
Festuca rubra										1	I
Rumex acetosa										.01	I
Number of species per sample	1	2	3	4	3	3	3	4	5	8	0

Mean number of species per releve = 3.60 (standard error = 0.600)
Herb height, centimetres mean = 5.60 (s.e. = 1.05)
Herb cover (%) mean = 89.40 (s.e. = 6.06)

3.1.2 MATCH output Transect 1

Community code	co-efficient	
MG 7A	35.6	0 sub-communities.
MG 7B	18.9	0 sub-communities.
MG 7D	17.7	0 sub-communities.
MG 7F	16.2	0 sub-communities.
MG 7E	15.5	0 sub-communities.
MG 6	13.7	3 sub-communities.
MG11	12.0	3 sub-communities.
MG 7C	11.8	0 sub-communities.
MG10	6.7	3 sub-communities.
MG 9	6.0	2 sub-communities.

Matches against sub-communities.

Community code	co-efficient
MG 7A	35.6
MG11a	19.3
MG 7B	18.9
MG 7D	17.7
MG 7F	16.2
MG 7E	15.5
MG 6a	14.1
MG 6	13.7
MG 6c	13.4
MG11	12.0

All matches recorded between test data and N.V.C. diagnoses.

S 1	.0	S 2	.0	S 3	.0	S 4	.0	S 5	.0	S 6	.0
S 7	.0	S 8	.0	S 9	.0	S10	.0	S11	.0	S12	.0
S13	.0	S14	.0	S15	.0	S16	.0	S17	.0	S18	.0
S19	.0	S20	.0	S21	.0	S22	.0	S24	.0	S25	.0
S26	.0	S27	.0	S28	.0	MG 1	5.0	MG 2	.0	MG 3	3.1
MG 4	5.2	MG 5	4.6	MG 6	13.7	MG 7A	35.6	MG 7B	18.9	MG 7C	11.8
MG 7D	17.7	MG 7E	15.5	MG 7F	16.2	MG 8	3.7	MG 9	6.0	MG10	6.7
MG11	12.0	MG12	5.5	MG13	.0	MG 6a	14.1	MG 6b	11.5	MG 6c	13.4
MG10a	9.1	MG10b	6.4	MG10c	6.0	MG11a	19.3	MG11b	4.1	MG11c	3.6

3.2 Transect 2 (Figures 1, 4)

3.2.1 Vegetation

Transect 2 was located perpendicular to the new channel at the middle of the new channel. As for Transect 1, the grassland was dry MG7 rye grass pasture. The construction area had been mown, and the areas near the new channel had in many cases been damaged by vehicles constructing the channel, but quadrats were recorded none-the-less. The areas to the west of the construction area had been fenced and were grazed by cattle and had also been topped.

Quadrat number	11	12	13	14	15	16	17	18	19	20	0
Herb height, centimetres	2	5	5	5	5	5	10	5	5	5	
Herb cover (%)	100	100	60	40	0	90	100	99	99	98	
Mown	+	+	+	+		+	+				
Damaged	+			+	+	+					
Grazed								+	+	+	
Lolium perenne	100	90	50	25		90	30	50	50	35	V
Holcus lanatus		10	5	5		10	30	15	40	15	IV
Agrostis sp.		2		1			1	30	10	50	III
Ranunculus repens			.01			.01	5	1	1	.5	III
Taraxacum sp.	.01	.01	.01	.01					.01	.01	III
Cirsium arvense		.01	.01	.01				1			II
Phleum pratense							.1		.1	.1	II
Arrhenatherum elatius				.01			5				I
Deschampsia cespitosa								.1		1	I
Festuca rubra						1	20				I
Ranunculus acris						.01				.01	I
Dactylis glomerata								2			I
Festuca arundinacea							10				I
Rumex acetosa									.1		I
Number of species per sample	2	5	5	6	0	5	8	7	7	8	0

Mean number of species per releve = 5.30 (standard error = 0.817)
Herb height, centimetres mean = 6.20 (s.e. = 0.61)
Herb cover (%) mean = 78.60 (s.e. = 10.92)

3.2.2 MATCH output Transect 2

Community code	co-efficient	
MG 7A	35.6	0 sub-communities.
MG 7B	18.9	0 sub-communities.
MG 7D	17.7	0 sub-communities.
MG 7F	16.2	0 sub-communities.
MG 7E	15.5	0 sub-communities.
MG 6	13.7	3 sub-communities.
MG11	12.0	3 sub-communities.
MG 7C	11.8	0 sub-communities.
MG10	6.7	3 sub-communities.
MG 9	6.0	2 sub-communities.

Matches against sub-communities.

Community code	co-efficient
MG 7A	35.6
MG11a	19.3
MG 7B	18.9
MG 7D	17.7
MG 7F	16.2
MG 7E	15.5
MG 6a	14.1
MG 6	13.7
MG 6c	13.4
MG11	12.0

All matches recorded between test data and N.V.C. diagnoses.

S 1	.0	S 2	.0	S 3	.0	S 4	.0	S 5	.0	S 6	.0
S 7	.0	S 8	.0	S 9	.0	S10	.0	S11	.0	S12	.0
S13	.0	S14	.0	S15	.0	S16	.0	S17	.0	S18	.0
S19	.0	S20	.0	S21	.0	S22	.0	S24	.0	S25	.0
S26	.0	S27	.0	S28	.0	MG 1	5.0	MG 2	.0	MG 3	3.1
MG 4	5.2	MG 5	4.6	MG 6	13.7	MG 7A	35.6	MG 7B	18.9	MG 7C	11.8
MG 7D	17.7	MG 7E	15.5	MG 7F	16.2	MG 8	3.7	MG 9	6.0	MG10	6.7
MG11	12.0	MG12	5.5	MG13	.0	MG 6a	14.1	MG 6b	11.5	MG 6c	13.4
MG10a	9.1	MG10b	6.4	MG10c	6.0	MG11a	19.3	MG11b	4.1	MG11c	3.6

3.3 Transect 3 (Figures 1, 5)

3.3.1 Vegetation

Transect 3 was located perpendicular to the new channel at the lower end of the new channel. The grassland was noticeably different to transect 1 and 2, possibly being at a lower level and damper, but was till the MG7 rye grass pasture. The construction area had been mown, and the areas near the new channel had in many cases been severely damaged by vehicles constructing the channel, but quadrats were recorded none-the-less. The areas to the west of the construction area had been fenced and were grazed by cattle and had also been topped.

Quadrat number	21	22	23	24	25	26	27	28	29	30	0
Herb height, centimetres	10	10	15	10	1	7	5	5	5	5	
Herb cover (%)	100	100	100	100	60	90	100	100	100	100	
Mown	+	+	+	+	+	+	+	+	+	+	
Damaged					+	+	+				
Grazed								+	+	+	
Cowpat (%)		1	1					.5			
Lolium perenne	50	50	60	50	50	50	50	30	40	40	V
Agrostis sp.	1	5	5	20		10	20	30	20	10	V
Holcus lanatus	10	20	5	2		10	25	40	25	50	V
Taraxacum sp.	.01	.05	.01	1				.01	.01	.01	IV
Cirsium arvense		1	.02	1	.1	.01				.01	III
Dactylis glomerata		5	10	20	10	5				1	III
Hordeum secalinum	2	20	20	1		15	5				III
Arrhenatherum elatius		5	1			10			10	1	III
Phleum pratense		1	1				1	.1		.05	III
Festuca rubra		1	1					.1		1	II
Plantago major								.01	.01	.01	II
Ranunculus acris				1			.01			.03	II
Ranunculus repens	10							.5		1	II
Elytrigia repens	1										I
Alopecurus geniculatus	1										I
Cerastium fontanum									.01		I
Deschampsia cespitosa									.05		I
Festuca arundinacea				5							I
Rumex obtusifolius							.01				I
Rumex acetosa										.01	I
Number of species per sample	8	10	10	9	3	7	7	8	8	13	0

Mean number of species per releve = 8.20 (standard error = 0.757)
Herb height, centimetres mean = 7.30 (s.e. = 1.26)
Herb cover (%) mean = 95.00 (s.e. = 4.01)

3.3.1 MATCH output Transect 3

Community code	co-efficient	
MG11	50.0	3 sub-communities.
MG 9	49.4	2 sub-communities.
MG 7B	48.3	0 sub-communities.
MG 7A	47.1	0 sub-communities.
MG 7D	46.5	0 sub-communities.
MG 7E	45.7	0 sub-communities.
MG 6	45.4	3 sub-communities.
MG 7C	43.6	0 sub-communities.
MG 7F	43.5	0 sub-communities.
MG10	42.8	3 sub-communities.

Matches against sub-communities.

Community code	co-efficient
MG11a	59.4
MG11	50.0
MG 9b	49.9
MG 9	49.4
MG 6a	48.6
MG 7B	48.3
MG 7A	47.1
MG 7D	46.5
MG 7E	45.7
MG 6	45.4

All matches recorded between test data and N.V.C. diagnoses.

S 1	1.9	S 2	.0	S 3	.0	S 4	12.0	S 5	13.1	S 6	5.4
S 7	16.0	S 8	.0	S 9	3.2	S10	.0	S11	4.7	S12	5.9
S13	3.5	S14	2.9	S15	5.8	S16	3.4	S17	16.3	S18	20.2
S19	20.1	S20	6.5	S21	17.3	S22	6.5	S24	3.6	S25	2.0
S26	24.0	S27	7.9	S28	18.4	MG 1	35.6	MG 2	13.1	MG 3	20.4
MG 4	26.2	MG 5	26.2	MG 6	45.4	MG 7A	47.1	MG 7B	48.3	MG 7C	43.6
MG 7D	46.5	MG 7E	45.7	MG 7F	43.5	MG 8	22.6	MG 9	49.4	MG10	42.8
MG11	50.0	MG12	36.8	MG13	37.2	MG 6a	48.6	MG 9a	43.0	MG 9b	49.9
MG11a	59.4	MG11b	36.5	MG11c	27.8						

3.4 Coleshill Transects 4 and 5 (Figures 1, 6)

3.4.1 Vegetation

These transects were set up at the top of the meadow where no changes in water table would be expected from the channel works. The grassland was grazed by cattle and had been topped earlier in the year, and was MG7 rye grass pasture. The grassland was also very dried up and short with the drought, and identification of some of the grasses was very difficult with a few dead sheaths and no proper leaves to go on.

Quadrat number	31	32	33	34	35	36	37	38	39	40	0
Herb height, centimetres	5	5	5	5	5	5	5	5	10	10	
Herb cover (%)	99	99	99	98	98	99	95	99	99	100	
Mown	+	+	+	+	+	+	+	+	+	+	
Damaged											
Grazed	+	+	+	+	+	+	+	+	+	+	
Cowpat											
Holcus lanatus	2	1	1	1	10	50	50	50	20	70	V
Lolium perenne	80	85	90	90	70	40	35	20	45	10	V
Agrostis sp.	5			5	25	1	10	20	30	5	IV
Arrhenatherum elatius	5	10	10	5		5	1	5		1	IV
Dactylis glomerata	2	2		1	1	2	2	10		10	IV
Taraxacum sp.		.02	.01	.01	.02		.01				III
Cirsium arvense	.01	1	.01				.5				II
Phleum pratense							1	.5	5	1	II
Heracleum sphondylium			.1		.1						I
Rumex obtusifolius								.5			I
Number of species per sample	6	6	6	6	6	5	8	7	4	6	0

Mean number of species per releve = 6.00 (standard error = 0.333)
Herb height, centimetres mean = 6.00 (s.e. 0.67)
Herb cover (%) mean = 98.50 (s.e. 0.43)

3.4.2 MATCH output Transects 4 and 5

Community code	co-efficient	
MG 7B	45.2	0 sub-communities.
MG 7A	42.9	0 sub-communities.
MG 7D	39.9	0 sub-communities.
MG 9	39.8	2 sub-communities.
MG 7E	37.9	0 sub-communities.
MG11	37.8	3 sub-communities.
MG 7C	35.2	0 sub-communities.
MG 6	35.0	3 sub-communities.
MG 7F	35.0	0 sub-communities.
MG 1	34.7	5 sub-communities.

Matches against sub-communities.

Community code	co-efficient
MG 7B	45.2
MG 1a	42.9
MG 7A	42.9
MG 7D	39.9
MG 9	39.8
MG 7E	37.9
MG11	37.8
MG 7C	35.2
MG 6	35.0
MG 7F	35.0

All matches recorded between test data and N.V.C. diagnoses.

S 1	2.2	S 2	.0	S 3	.0	S 4	8.4	S 5	9.5	S 6	7.0
S 7	10.9	S 8	.0	S 9	4.3	S10	.0	S11	.0	S12	4.0
S13	5.0	S14	3.8	S15	3.9	S16	.0	S17	17.4	S18	16.1
S19	12.2	S20	9.0	S21	12.0	S22	4.5	S24	4.0	S25	2.5
S26	22.0	S27	7.3	S28	13.2	MG 1	34.7	MG 2	11.2	MG 3	16.5
MG 4	19.8	MG 5	22.9	MG 6	35.0	MG 7A	42.9	MG 7B	45.2	MG 7C	35.2
MG 7D	39.9	MG 7E	37.9	MG 7F	35.0	MG 8	15.0	MG 9	39.8	MG10	33.9
MG11	37.8	MG12	25.8	MG13	28.3	MG 1a	42.9				

3.5 Coleshill Transect 6 and 7 (Fritillary Meadow; Figures 2, 7)

3.5.1 Vegetation

The Fritillary meadow had been cut earlier in the year and the grassland was re-growing, with mostly the herbs being prominent. The grassland type was MG5 knapweed - Crested dog's-tail grassland, although being close to the edge of the field was also close to the MG1 false oat-grass grassland; recording before mowing should show closer affinities to MG5.

Quadrat number	41	42	43	44	45	46	47	48	49	50	0
Herb height, centimetres	10	10	10	10	10	10	10	10	10	10	
Herb cover (%)	100	99	100	100	100	99	99	99	99	99	
Mown	+	+	+	+	+	+	+	+	+	+	
Dactylis glomerata	10	20	3	20	25	15	25	20	10	15	V
Festuca rubra	50	40	50	30	20	30	10	40	40	30	V
Holcus lanatus	5	15	5	20	10	10	2	20	5	15	V
Rumex acetosa	.5	1	1	.1	.5	.5	1	1	1	2	V
Arrhenatherum elatius	10	5	5	20	10	1	10	5		5	V
Heracleum sphondylium	5	15	3	3	.5	1	1	1		1	V
Lolium perenne		1	1	10	25	10	20	10	20	10	V
Ranunculus acris	3	2	.1	1		.5	.1	1	2	2	V
Plantago lanceolata	1	1	1	.1	.5	.01			.01	1	IV
Trisetum flavescens	1	1	1	1	1	1		1		1	IV
Galium verum		.05	20	1			.1	1	20	10	IV
Lathyrus pratensis	.5	.5	.5			.5		.01	1	2	IV
Taraxacum sp	.01	.01	.02			.01	1	.1		.1	IV
Anthriscus sylvestris	.5	1	.1	.1	1		.1				III
Centaurea nigra	4			1	1				1	15	III
Filipendula ulmaria	.5					1	30	5	20		III
Achillea millefolium	10	1		1	1						II
Agrostis capillaris	2			1	10		5				II
Tragopogon pratensis	.01		.01	.01	.01						II
Trifolium pratense	.5		.5	.1							II
Anthoxanthum odoratum		1		1							I
Cynosurus cristatus						1			1		I
Phleum pratense				1			1				I
Bromus hordeaceus					.01						I
Cardamine pratensis	.01										I
Cerastium fontanum										.01	I
Festuca arundinacea	10										I
Filipendula vulgaris									1		I
Leontodon autumnalis			.05								I
Lotus corniculatus									.1		I
Ranunculus repens								1			I
Number of species per sample	20	16	17	19	15	15	14	14	14	15	0

Mean number of species per releve = 15.90 (standard error = 0.674)
Herb height, centimetres mean = 10.00 (s.e. = 0.00)
Herb cover (%) mean = 99.40 (s.e. = 0.52)

3.5.2 MATCH output Transects 6 and 7

Community code	co-efficient	
MG 1	54.9	5 sub-communities.
MG 6	52.1	3 sub-communities.
MG 9	51.7	2 sub-communities.
MG 5	50.8	3 sub-communities.
MG 4	48.5	0 sub-communities.
MG 3	45.8	2 sub-communities.
MG 7E	45.1	0 sub-communities.
MG 7D	43.4	0 sub-communities.
MG 7C	42.3	0 sub-communities.
MG 7F	41.6	0 sub-communities.

Matches against sub-communities.

Community code	co-efficient
MG 1e	59.3
MG 9b	56.8
MG 1a	55.2
MG 1	54.9
MG 1c	53.6
MG 1b	53.4
MG 6	52.1
MG 9	51.7
MG 5a	50.9
MG 5	50.8

All matches recorded between test data and N.V.C. diagnoses.

S 1	4.2	S 2	.0	S 3	5.0	S 4	7.9	S 5	6.3	S 6	5.5
S 7	16.0	S 8	1.9	S 9	2.0	S10	.0	S11	5.0	S12	2.0
S13	.0	S14	3.8	S15	3.8	S16	2.1	S17	6.7	S18	9.6
S19	11.4	S20	.0	S21	3.9	S22	.0	S24	5.9	S25	5.9
S26	16.9	S27	4.9	S28	6.2	MG 1	54.9	MG 2	29.4	MG 3	45.8
MG 4	48.5	MG 5	50.8	MG 6	52.1	MG 7A	38.2	MG 7B	32.7	MG 7C	42.3
MG 7D	43.4	MG 7E	45.1	MG 7F	41.6	MG 8	38.0	MG 9	51.7	MG10	31.7
MG11	33.8	MG12	33.0	MG13	14.4	MG 1a	55.2	MG 1b	53.4	MG 1c	53.6
MG 1d	49.3	MG 1e	59.3	MG 3a	48.2	MG 3b	39.2	MG 5a	50.9	MG 5b	49.3
MG 5c	43.8	MG 6a	48.4	MG 6b	49.1	MG 6c	45.8	MG 9a	45.7	MG 9b	56.8

3.6 TWINSPAN and DECORANA

The Twinspan classification of the quadrats is shown in Figure 8. As expected, the divisions are mainly on the basis of the transects as their vegetation is most similar to each other. The first split is the Fritillary Meadow from the rest of the data. The second split is mainly transects 4 and 5 at the top of the field from transects 1-3, but with some overlap due to similarity of the grasslands under the same management.

The DECORANA plot (Figure 9) distinguishes the Fritillary Meadow in the first axis which accounts for the major source of variation, and this is assumed to be related to management. The second axis is not easy to interpret, But quadrats at the top of the main meadow are at least partially distinguished from those nearer the channel. Changes in the ordination positions of these quadrats and axes may help interpret changes.

4.0 DISCUSSION

The baseline monitoring in 1995 was not carried out under ideal conditions due to the heavy grazing, late time and especially the severe drought, and some caution will need to be exercised in interpreting the results. None-the-less, the baseline data will provide a yardstick against which to measure change. It is recommended that monitoring is carried out earlier in the year in the future, preferably before the hay is cut (i.e. early June 1996).

The interesting changes will be in the vegetation of the quadrats nearest the new river channel. Those nearest the channels are likely to gain wetland species and become more like wet mesotrophic grassland or swamp communities. Much of the change will depend on management and degree of change of water table.

Under conditions of no grazing, the channel sides would be expected to become like the existing swamp communities along the margins of the Cole where they are ungrazed (i.e. S5 reed sweet-grass swamp, possibly S6 Greater pond-sedge swamp/S7 Lesser pond-sedge swamp, and S28 reed canary-grass swamp; Rich 1994).

If the banks are maintained in their current grazing conditions the vegetation is more likely to become the MG 9 Yorkshire fog - tufted hair-grass grassland, MG10 Yorkshire fog - soft rush pasture or the MG13 creeping bent - marsh foxtail grassland.

Quadrats significantly above the water table away from the channel are unlikely to change. Similarly, it is unlikely that, without changes in management, the vegetation of transect 4-7 will change significantly with time.

5.0 REFERENCES

Biggs, J. (1995). *River restoration: Benefits for integrated catchment management. UK Monitoring Programme Year 1 (1994) Interim Report. Draft.* River Restoration project, Huntingdon.

Malloch, A. J. C. (1988). VESPAN II. A computer package to handle and analyse multivariate species data and handle and display species distribution data. University of Lancaster, Lancaster.

Malloch, A. J. C. (1992). MATCH. A computer package to aid the assignment of vegetation data to the communities and sub-communities of the National Vegetation Classification. University of Lancaster, Lancaster.

Rich, T. C. G. (1994). *Coleshill River Restoration Project. Botanical survey.* Unpublished report to Pond Action.

Rich, T. C. G. (1995). *Coleshill River Restoration Project. Botanical survey.* Unpublished report to Pond Action.

Figure 1. Location of transects in main meadow

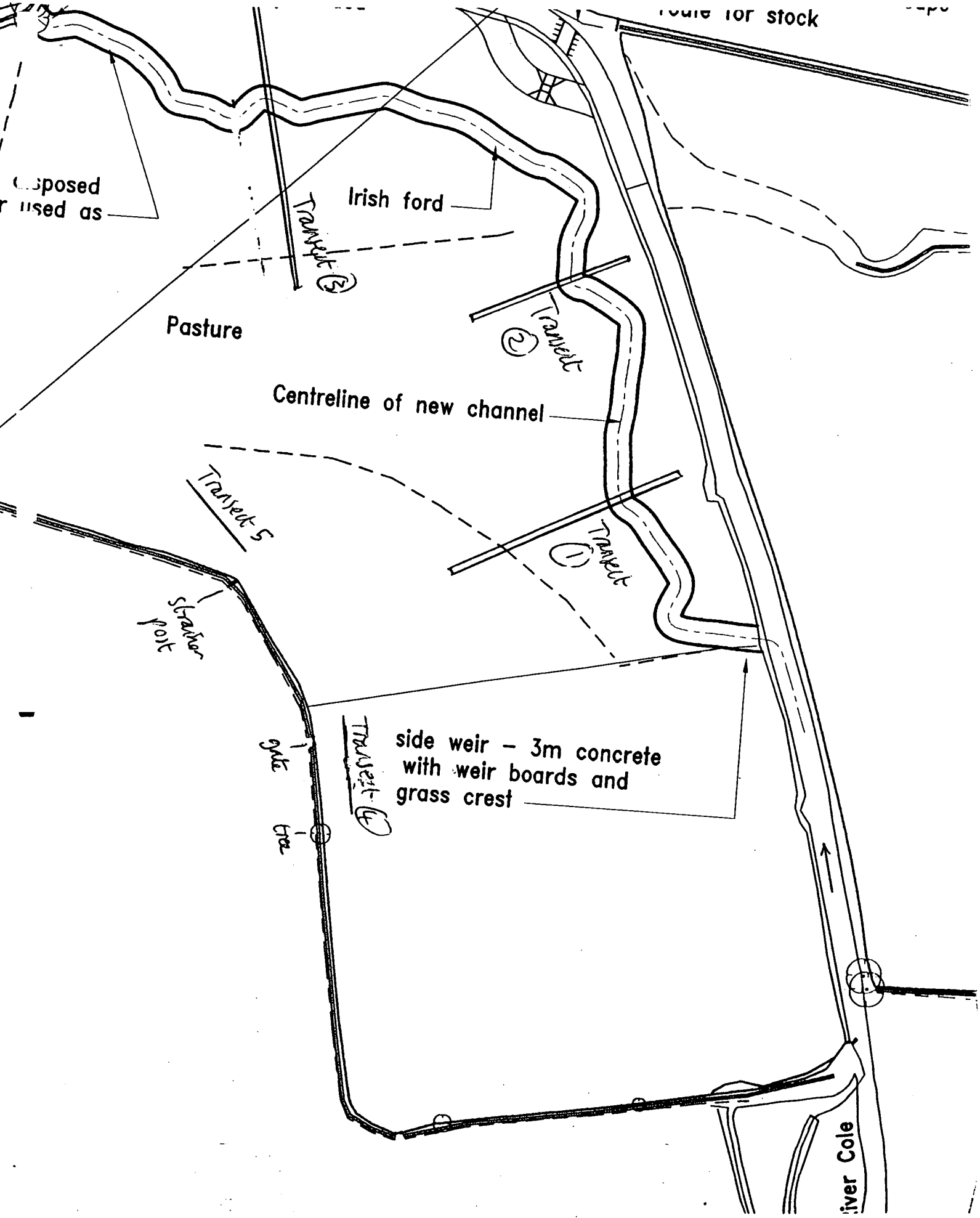


Figure 2. Location of transects in Fritillary meadow

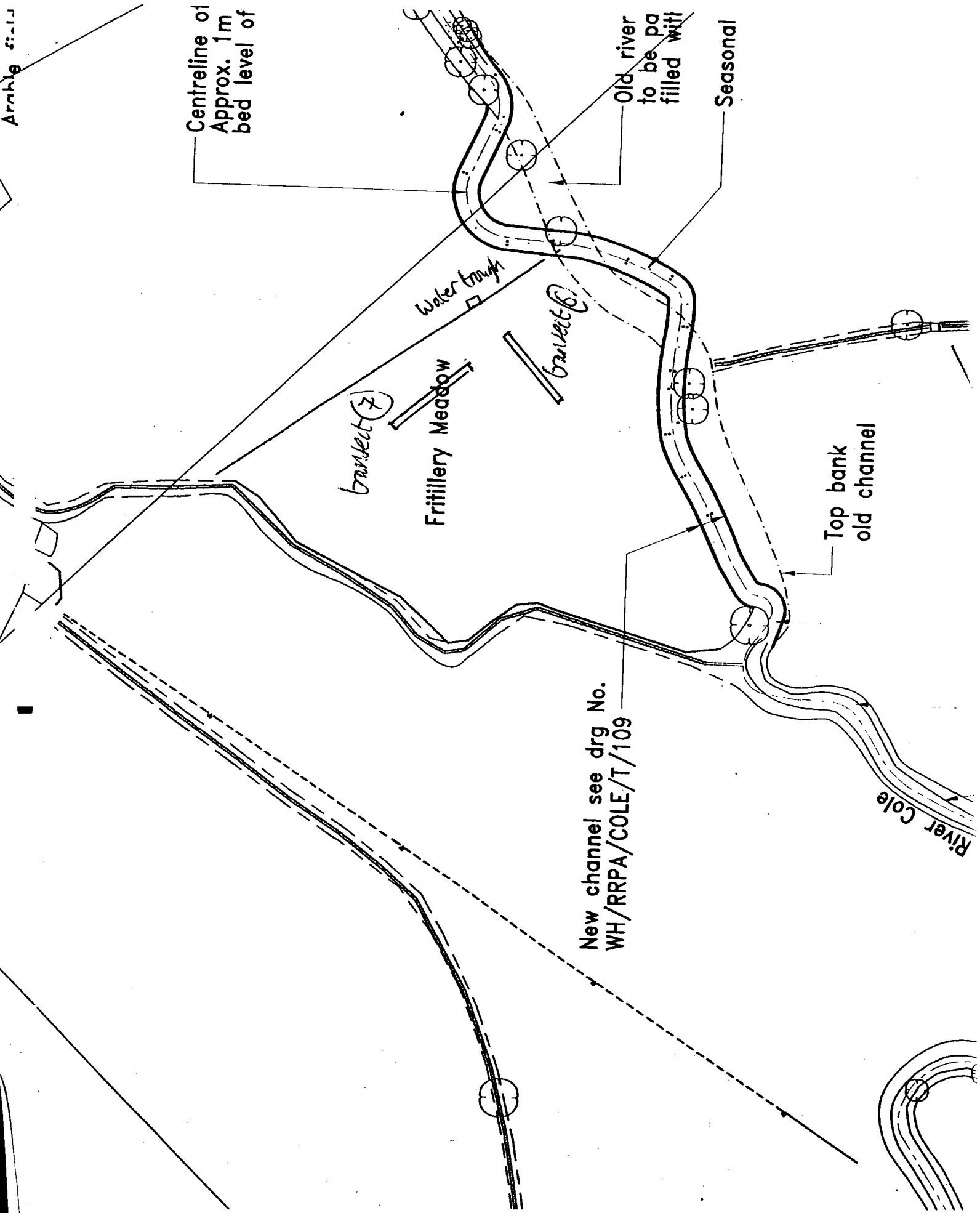
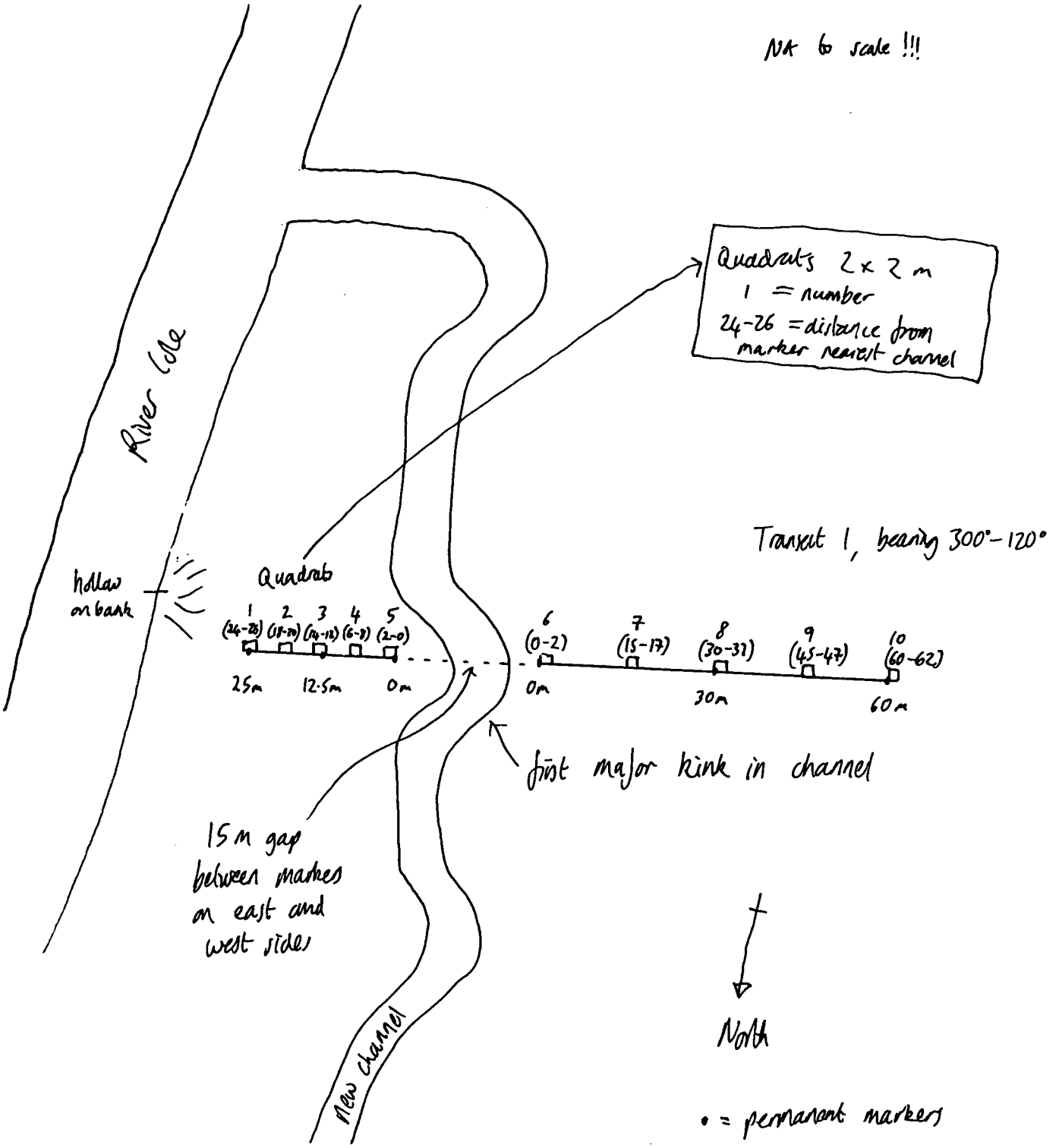


Figure 3. Details of transect 1



Main meadow, Transect 1

East side

looking west

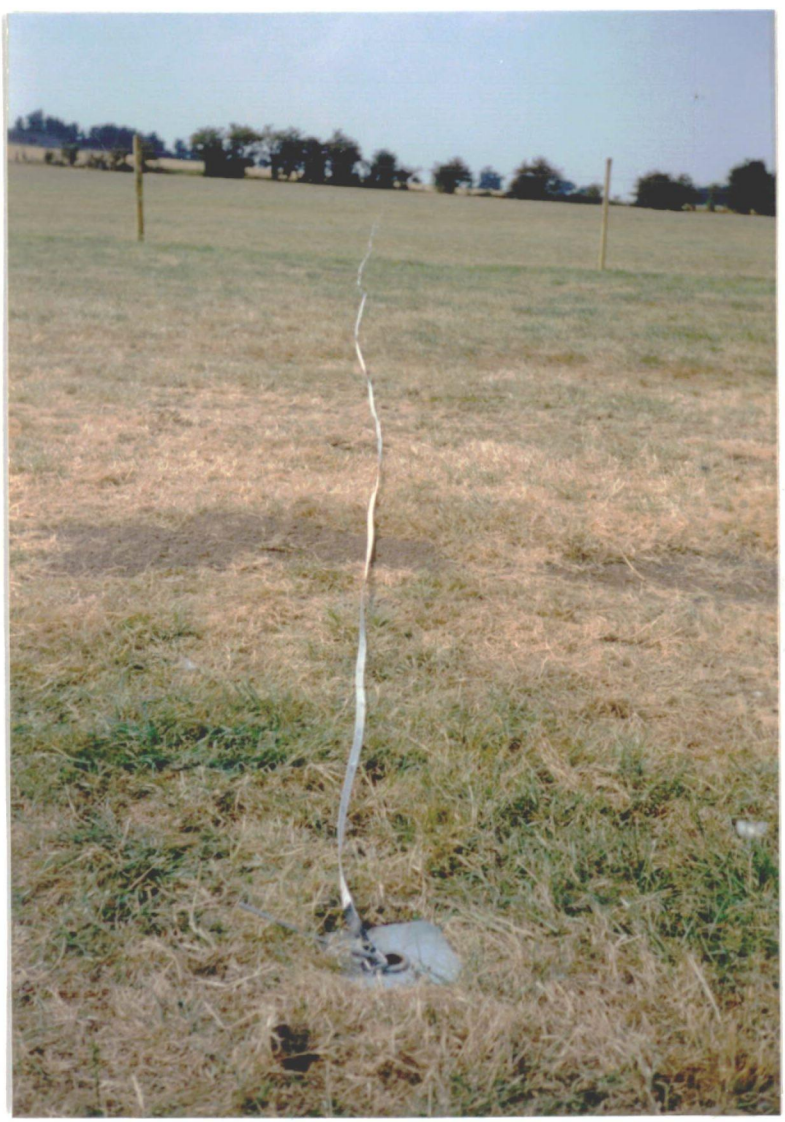
East side

↑

showing approximate alignment with straight part of channel

Main meadow, Transect 1

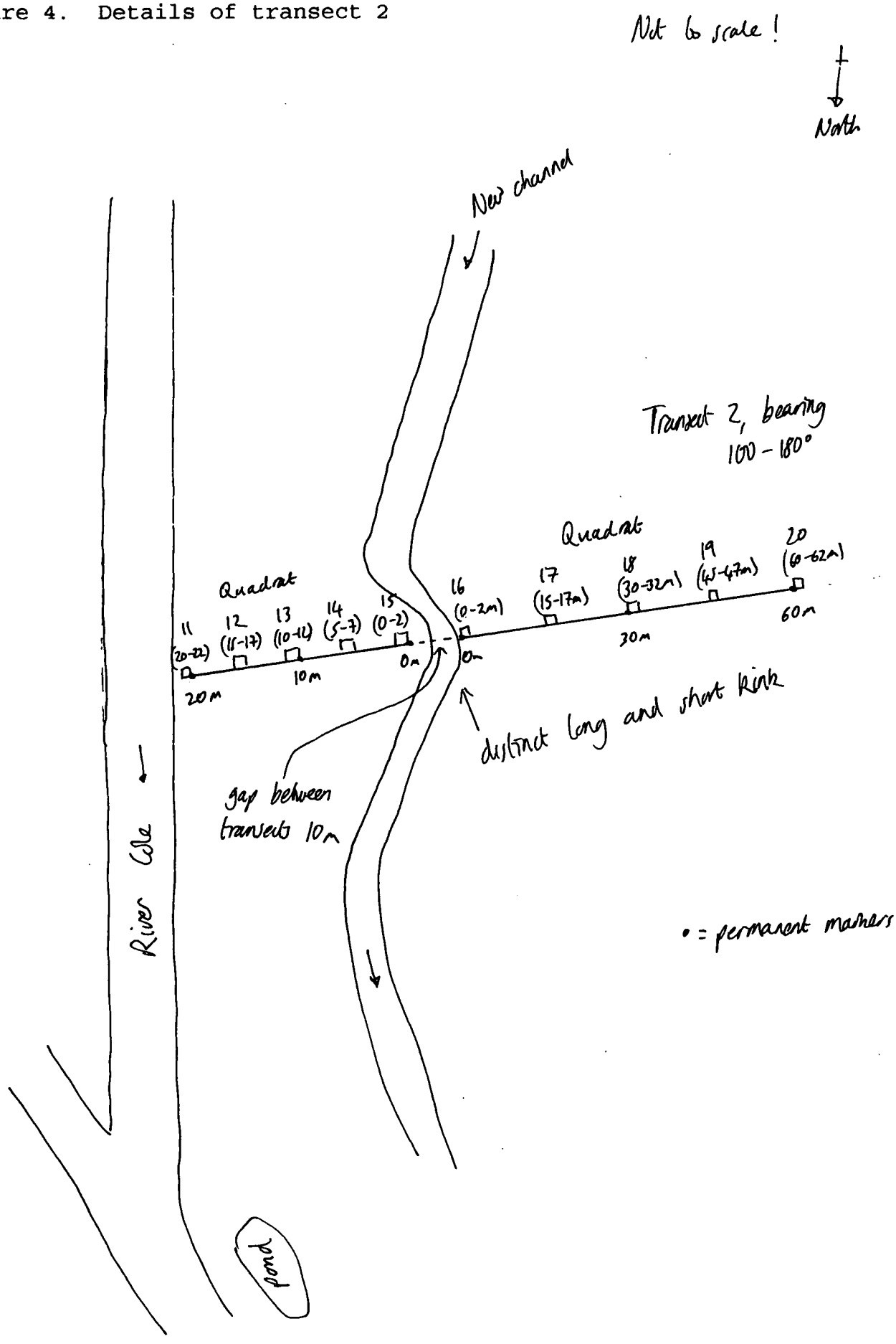
looking east towards river



West side

looking west up hill

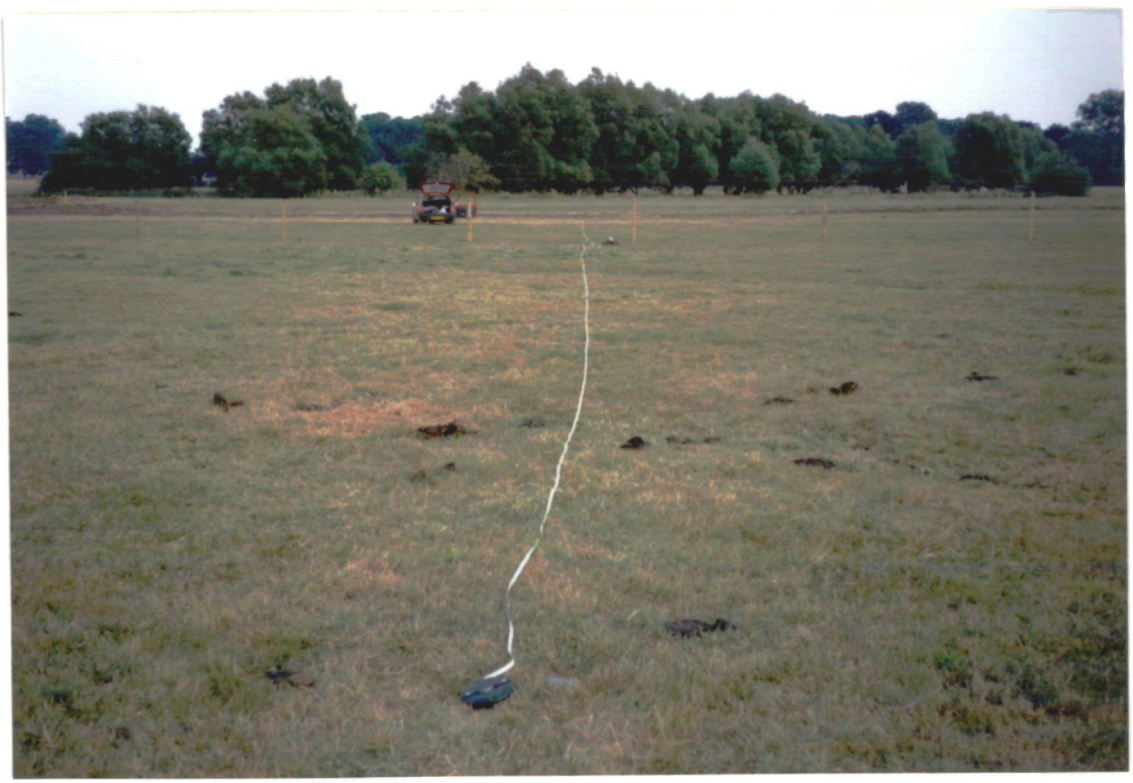
Figure 4. Details of transect 2



Main meadow, Transect 2

East side

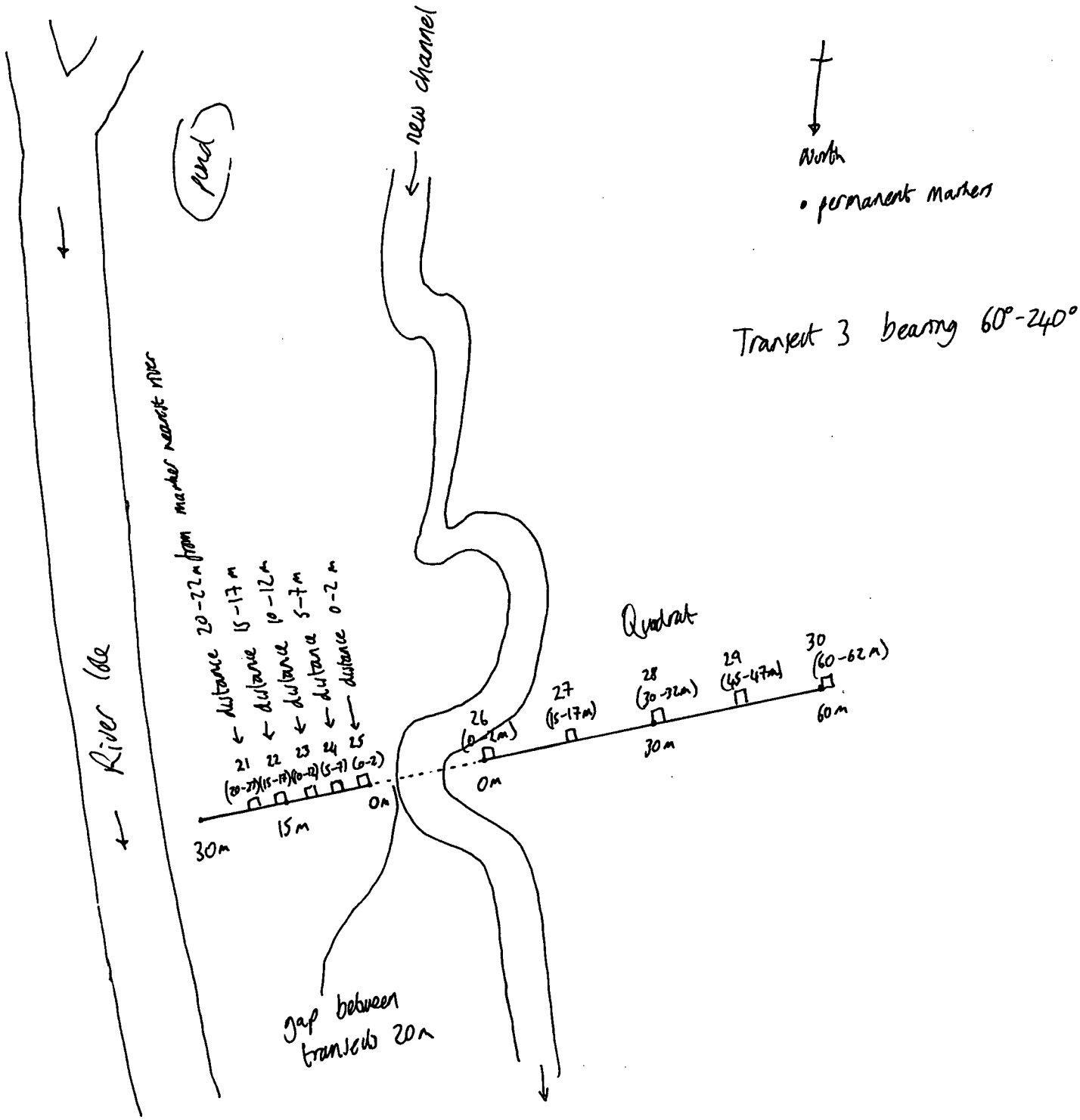
looking west



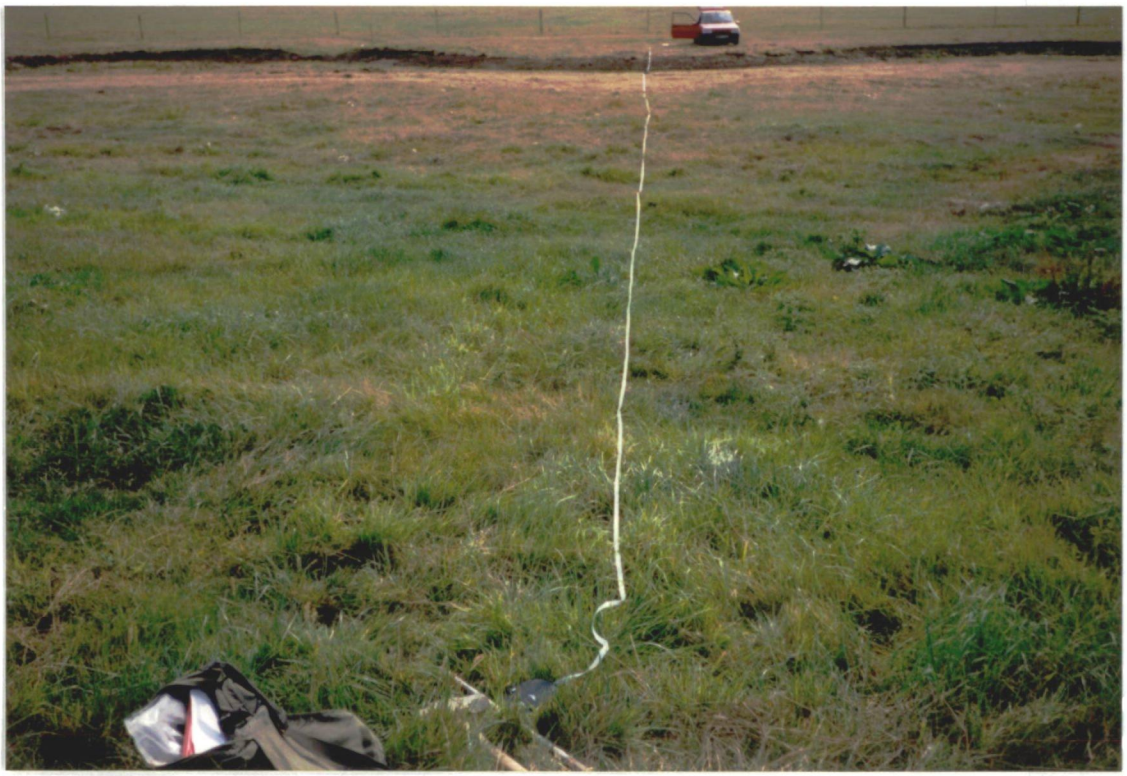
West side

looking east to River

Figure 5. Details of transect 3



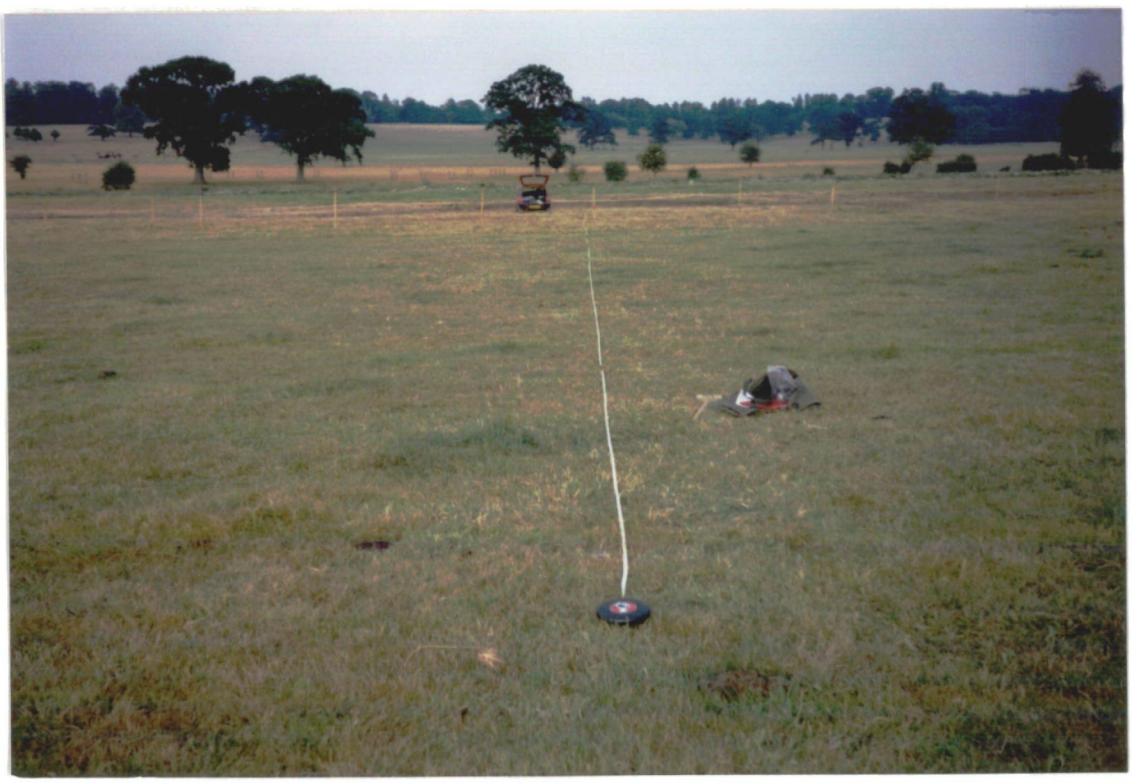
Main meadow, Transect 3



East side

- looking west

- this areas is more disturbed

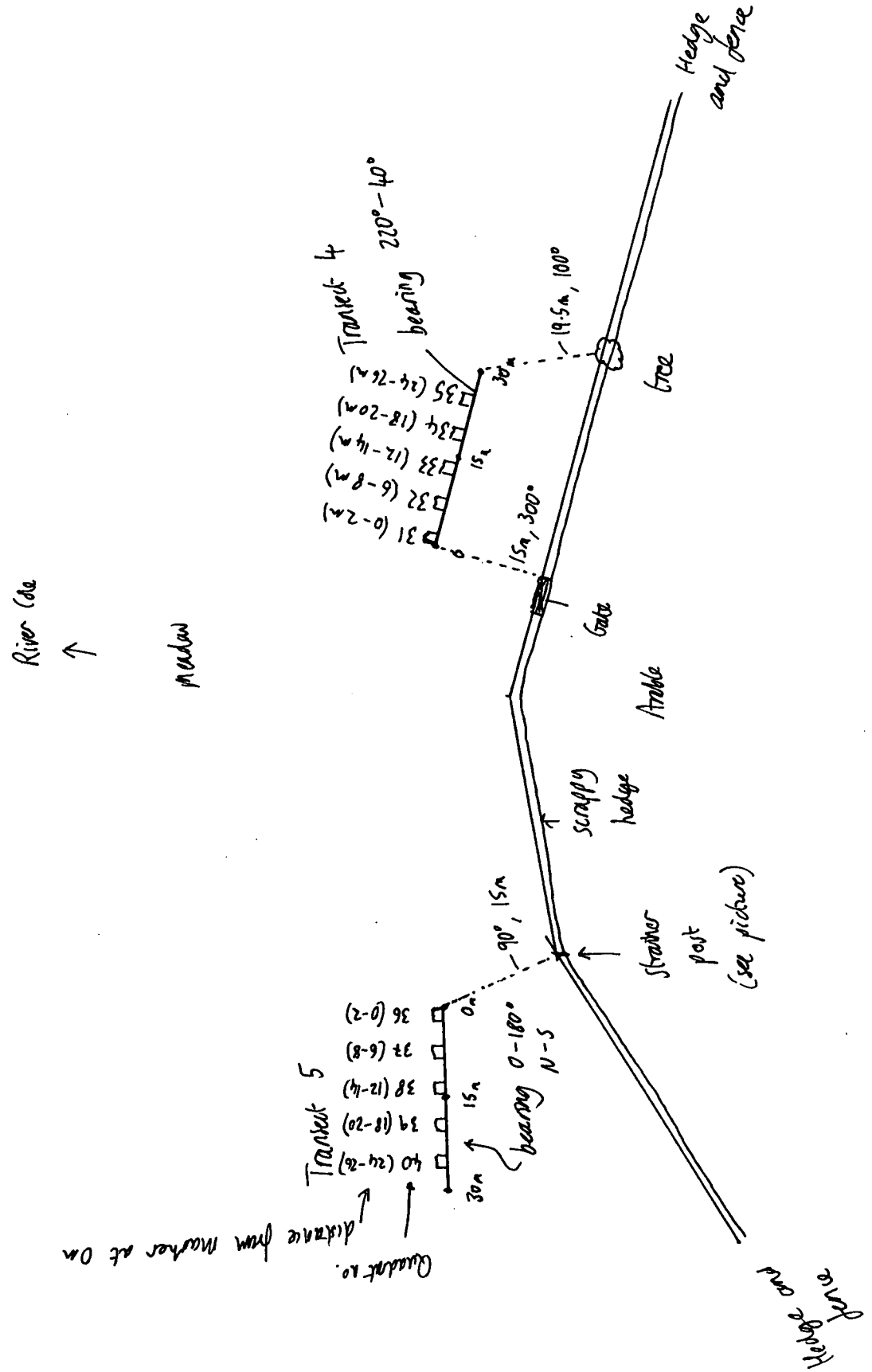


West side

Main meadow, Transect 3

trying to show location of marker related to channel

Figure 6. Details of transects 4 and 5



Main meadow, Transect 4

looking west showing southern end of transect

Showing gate (measure to left post)

Main meadow, Transect 4

Northern end of transect,
- measure to base of tree

looking north-ish along transect

Main meadow, Transect 5

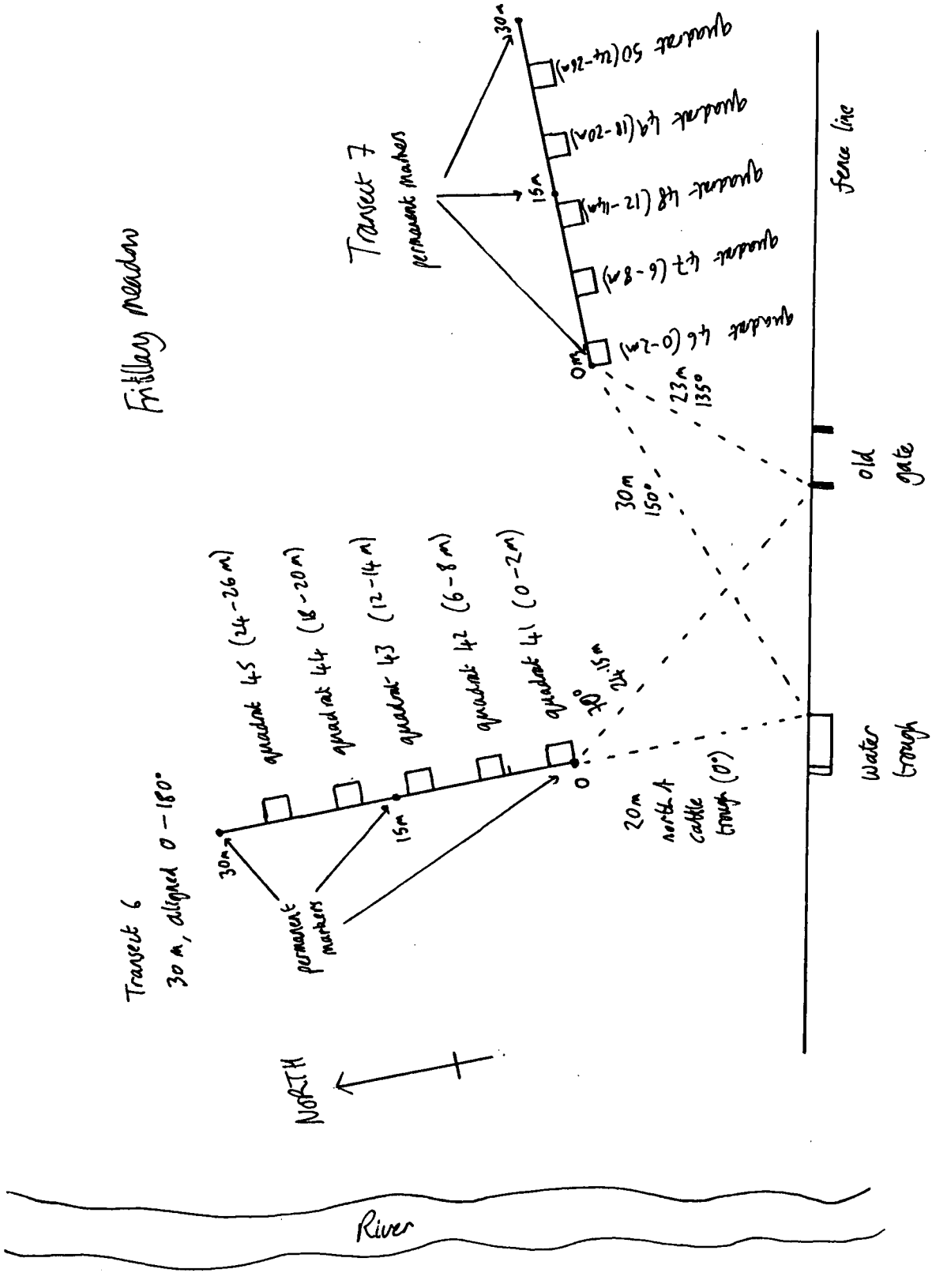
Shooting view towards strainer post

looking north along transect

Main meadow, Transect 5

View east over transect

Figure 7. Details of transects 6 and 7



Fritillary Meadow, Transect 6

↓ gate post

cattle trough ↓

looking south along transect to gate and cattle trough

looking north along transect towards river on left

Fritillary Meadow, Transect 6

2x2m quadrat in place

Fritillary Meadow, Transect 7

↓ cattle brough

showing measurement to base of gate post

Fritillary Meadow, Transect 7

looking east along transect

↓gate ↓cattle Grough

looking west along transect

Figure 8. Twinspan classification. Quadrats are grouped by Twinspan in to most similar clusters, and these (in this case) largely reflect the different transects. Transect 1 = Quadrats 1-10. Transect 2 = Quadrats 11-20. Transect 3 = Quadrats 21-30. Transect 4 = Quadrats 31-35. Transect 5 = Quadrats 36-40. Transect 6 = Quadrats 41-45. Transect 7 = Quadrats 46-50.

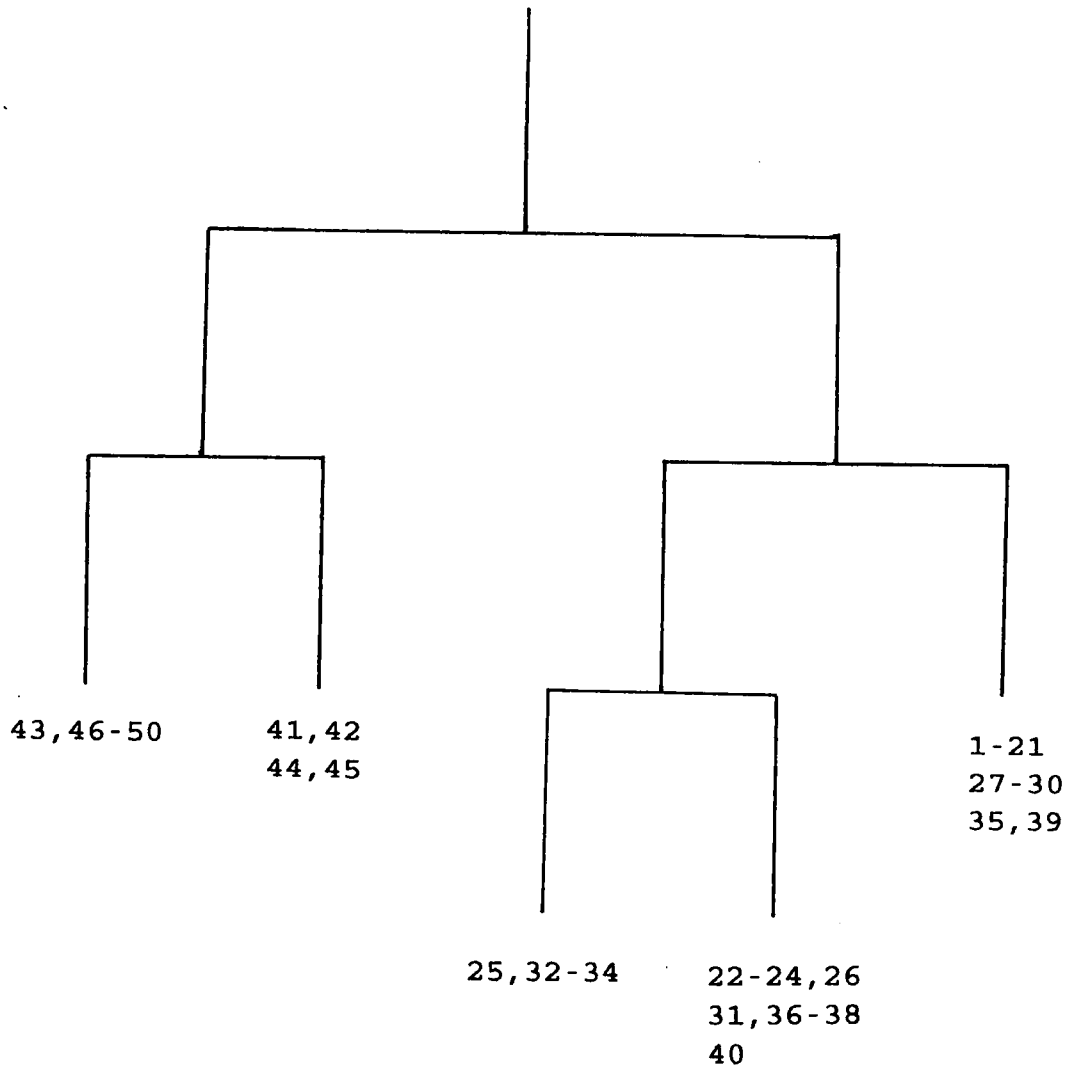


Figure 9. Deconara plot