

**CATCHMENT MANAGEMENT PLANS  
MARSH DYKES  
ECOLOGY SURVEY  
APPRAISAL REPORT**

**February 1991**



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RIVER CATCHMENT MANAGEMENT PLANS

MARSH DYKES ECOLOGY SURVEY

APPRAISAL REPORT

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## SUMMARY

A vegetation survey was carried out over the wetland habitats of the Marsh Dykes in summer/autumn 1990. This area comprises the foreshore, dykes and adjacent wetlands of Thamesmead, Erith, Belvedere and Crayford.

The catchment is of high value in the context of the London Area and Erith and Crayford Marshes especially are of regional significance. In both of these areas, almost all main dykes and marshes examined were rated as critically important habitat. Thamesmead and Belvedere are more variable but both contain critically important habitats and illustrate how sites surrounded by built development can still retain significant wildlife populations.

The area contains a large number of critical species (those occurring in less than 12.5% of the 850 London Tetrads). Crayford has 40 notables, Erith 36, Thamesmead 28 and Belvedere 6. These comprise riparian, grassland and saltmarsh species. When taken separately, the Foreshore has 14.

The ornithological survey is confirming that the area is of high interest for a wider range of wildlife. The undeveloped foreshore is the single most important habitat for birds but the grazing marsh, reedswamp and, in winter, the lakes are also of particular note. Other fauna has been poorly studied but good numbers of Lepidoptera and Odonata were seen in the current study and a further survey of these and other groups is likely to be lucrative.

Each dyke section and field has been studied in detail, its interest evaluated and management recommendations provided. General management guidelines are given and these include a policy of dredging smaller stretches of dyke at a time, a reduction in reed cutting, especially in summer and a cessation in the use of algicides. The desirability of widening rather than deepening of bank profiles is discussed as is the importance of traditional grazing marsh management at Erith and Crayford.

The catchment faces many threats to the integrity of its wildlife resource, by no means all of them under the control of the National Rivers Authority Thames Region (NRA TR). Imminent development threats are a primary concern since the value of the watercourses will be greatly reduced by the loss of adjacent habitats. Pollution also continues to be a problem in some areas as do various forms of inappropriate management.

## 1. INTRODUCTION

### 1.1. AIMS

The National Rivers Authority Thames Region (NRA TR) are currently preparing a number of Catchment Management Plans for several significant river catchments in their area. The Marsh Dykes is one of these catchments. Completion of the Catchment Management Plan for the Marsh Dykes is programmed for July 1991.

The need for a range of investigations was identified in the Marsh Dykes Evaluation Report (NRA TR, 1990). One of the key issues identified in this report is to:

"integrate NRA activities and interests so as to conserve and enhance valuable habitats, particularly in the Crayford Marshes and to counter degradation by unconsented works and discharges, through ecological surveys of dykes and adjacent habitats."

The Kent Trust for Nature Conservation (KTNC) was commissioned by the NRA TR to carry out the survey work required for this aim to be achieved.

### 1.2. OBJECTIVES

- (a) To collate and review information on known areas of conservation importance in the Marsh Dykes Catchment.
- (b) To carry out river corridor field surveys on 17.8km of main river watercourse and associated floodplain (approx 90ha) and 55ha of tidal frontage.
- (c) To prepare reports detailing the results of the above investigations and to assess constraints and opportunities for enhancement associated with the water environment in the Marsh Dykes Catchment.

### 1.3. IMPLEMENTATION OF THE OBJECTIVES

The Desk Study prepared in accordance with the first objective has been completed and submitted as a separate document. It was used as a guide in the current surveys and its constituent reports are referred to in the Marsh Dykes Ecology Survey.

The field surveys included an ornithological study in addition to a general habitat survey. Interim results of the first have been presented separately and a final report will be prepared in July 1991 after a full year of results has been obtained.



This Appraisal Report accompanies the Field Survey Report and therefore is largely based on the results and conclusions of that survey and of the interim ornithological report.

The field survey was undertaken using modified NCC habitat survey methodology. Previous surveys carried out on the Beverley Brook and the Rivers Crane, Ravensbourne and Wandle (by the London Wildlife Trust) were used as a reference in the present task. However, the Marsh Dykes survey is wider in its scope because it includes all the fields and tributary dykes on the Erith and Crayford Marshes (but only the watercourses in Thamesmead). In addition, drainage dykes differ from rivers as there is no regular flow and consequent scour. The management which is necessary to prevent flooding creates an everchanging cycle of vegetation.

#### 1.4. LIMITATIONS OF THE FIELD SURVEY

##### 1.4.1. Ephemeral nature of some evaluations

Critical/Important rating has been awarded to some areas scheduled for development as Thamesmead Town spreads. In particular, mature wasteland which at present enhances, eg Thamesmere East, is highly likely to be developed soon or managed in such a way that its interest is lost.

Some Belvedere wasteland sites are zoned for development eg the field adjacent to Picardy Ditch Section 2.

It is very unlikely that Twin Tumps will retain much interest under current proposals.

Evidence of losses in Thamesmead does not bode well for what little remains.

##### 1.4.2. Biological red herrings

The survey is habitat and botany based. While this is the best available, some vital disciplines are not covered.

To use reed beds as an example:

The presence of good reed beds is recorded in new Thamesmead sites (in berms in some canals, fringing certain lakes), raising the evaluation rating. However, the wildlife of a new berm with reeds may be limited for a long time. An invertebrate study was commenced but only the Erith and Belvedere dykes were completed. Consequently, it cannot be used for making comparisons between areas.

In other words, under the present scheme, a reed bed with a range of long established invertebrates will receive the same rating as a new reedbed with rapid colonisers only. This could lead to the assumption that a habitat can be planted. Although planting will almost certainly enhance an otherwise sterile site, it should not

be equated with retaining a long established habitat.

It is inevitable that there are some omissions in a survey carried out in the late summer of a dry year. Some earlier plants and insects will have been missed while grazing patterns and water levels fluctuate during the year. Evaluation ratings and management proposals should ideally have been based on knowledge of the botany of the catchment over a full twelve month period and after a full bird and invertebrate survey.

A spring survey of the adjacent habitats in particular is therefore recommended. The bird survey may show some areas to be of greater interest than is suggested by the botanical survey.



## 2. MARSH DYKES CATCHMENT: AN OVERALL DESCRIPTION

### 2.1. LOCATION AND GEOGRAPHY

The Marsh Dykes Catchment covers an area of some 37 sq km, bounded by Woolwich to the west, Shooters Hill, West Heath and Crayford to the south, the Rivers Cray and Darent to the east and the River Thames to the north (downstream of the Thames Barrier). The reclaimed marsh land north of a line between Woolwich and Erith, covering an area of some 15 sq km, lies between 0m and 5m AOD and is thus below the level of a normal spring high tide. South of this line the ground rises sharply to a level of at least 60m AOD. To the west of the catchment Shooters Hill rises to a height of 132m AOD and includes Oxleas Wood SSSI. The most easterly part of the catchment, Crayford Marshes, is also reclaimed land. These low lying areas are protected from flooding from the River Thames by the tidal defences. All the waterways in the survey are therefore managed as drainage dykes. The tidal frontage extends from the Gallions Lake Outfalls in the west to the jetty just east of Great Breach Outfalls and from the Yacht Club to the west of Crayford Marshes to the River Darent.

That part of the catchment which is being surveyed falls naturally into several separate parts, Thamesmead in the west, the Belvedere dykes and Erith Marshes in the centre and Crayford Marshes in the east. The Thames foreshore which forms part of Thamesmead, Erith Marshes and Crayford Marshes is treated as a separate entity for purposes of the report.

### 2.2. WATERCOURSE ORIGINS

The true sources of nearly all the main river watercourses are no longer visible. The beginning of Eastern Way Dyke alone is apparent.

The surface drainage water culverted from the Shooter's Hill and Bostall woods areas flows through the canals and lakes in Thamesmead to the Thames via Tripcock Pumping Station and Abbey Sluice. More local water finds its way into Gallions Lake and Twin Tumps which are isolated at present from the main canal system but there are plans to integrate them.

The source of the water in the other main river and tributary dykes (except Eastern Way Dyke which appears to consist of natural seepage) is not known but it is thought to consist of surface drainage from the roads and factory sites in Abbey Wood, Belvedere and Slade Green. This reaches the Thames via Great Breach Outfalls, Green Level Pumping Station and Crayford Sluice. On the Erith Marshes a changed drainage pattern has led to the loss of the tributary Cross Dykes 1 and 3, representing 50% of the non main river drainage south of Eastern Way. On the other hand, there is an extensive network of functioning tributary dykes on the Crayford Marshes.

### 2.3. WATERCOURSE CHARACTER

All the main river watercourses continued to hold water despite near drought conditions in the summer of 1990.

None of the dykes has a natural course.

In Thamesmead, the canals and the older lakes are concrete lined but the Twin Tumps and the newer lakes near the Thames appear to be earth lined.

The remaining main river water courses often have natural earth banks. Some reaches of the Belvedere Dykes and Crayford Dyke where it flows through the industrial site have gabions, toeboarding, other forms of revetment or are culverted.

A long stretch of the foreshore in front of the developed part of Thamesmead Town has a vertical revetment and virtually no shoreline at low tide. Elsewhere the bank is lined with a sloping boulder wall in varying stages of repair in front of which there may be loose boulders, shingle or mud.

Observations based on the flora, in particular the submerged aquatic and small emergent flora, indicate that water quality varies. Apart from Twin Tumps and Tump 53, no submerged aquatic flora was recorded from the Thamesmead lakes and canals. Development proposals indicate that the Twin Tumps is to be integrated with the canal system with a resultant loss in interest and importance. Similarly, virtually no submerged aquatic or small emergent flora was recorded from the Belvedere Dykes. For full details it is necessary to refer to the Biological Assessment and the Section Descriptions.

Nowhere in the catchment are the waterways shaded by trees or scrub for any distance. In Thamesmead there is relic mature hawthorn and a scrub mosaic on the tumps, and occasional sallow scrub and birch woodland beside the lakes and canals. In Belvedere, apart from the mature white willows beside Keats Road Dyke and Corinthian Dyke Section 2, there is little tree or scrub cover. All the main river sections on Erith Marshes are totally unshaded but there is an important blackthorn hedge over Allders tributary dyke. In Crayford, there are scattered blackthorn or hawthorn thickets and relic fringing willows to the southwest.

### 2.4. MANAGEMENT REGIMES

In Thamesmead the concrete channels are scoured each year and algicide is applied. Of the Belvedere dykes reed clearance and/or desilting has been carried out on the more accessible reaches only and the remaining reaches are heavily silted. The Great Breach sections, Lower Farm Dyke and Crayford Dyke receive regular maintenance.

On the Erith Marshes the Eastern Way Dyke receives minimal management on an *ad hoc* basis from the individual lessees of the paddocks through which it passes. None of the other tributary

dykes receives any management. On the Crayford Marshes, Howbury Dyke has been recently dredged. Other dykes south of Wallhouse Road show signs of fairly recent maintenance but north of the road there are areas where there seems less evidence of clearance or desilting in recent times. NCC 20 East which is beside the road is a striking exception and appears to have been drastically managed.

## 2.5. SURROUNDING HABITAT

In the catchment as a whole, there are two substantially different land/water relationships. The Thamesmead lakes and canals and nearly all the Belvedere dykes (except Horse Head Dyke Section 2) form a drainage system unrelated to the surrounding land whereas on the Erith and Crayford Marshes the dykes and grazing marshes are essentially interdependent.

The surrounding habitat varies from one side of the catchment to the other. In Thamesmead most of the lakes and canals are associated with housing, shopping areas and amenity parkland. To the west, Twin Tumps, Thamesmere West and Tripcock Park (the latter excluded from the study) have important and valuable surrounding trees, scrub and rough grassland which are threatened by development. Even in the industrial areas of Belvedere, there are sometimes wide corridors or undeveloped areas nearby. Erith and Crayford have extensive areas of grazing marsh of high intrinsic value and an increasingly rare wildlife habitat. Since 1935, 85% of the grazing marsh in Greater London has been lost (Thornton and Kite 1990) with Erith, Crayford and Rainham as the only remaining sites.

## 2.6. VEGETATION CHARACTERISTICS OF AQUATIC HABITATS

The nature and quantity of riparian plants varies throughout the catchment. In Thamesmead the canals and southern lakes are characterised by the total absence of all naturally occurring vegetation except algae. The situation arises from three factors: concrete channel construction, regular "cleansing" and the use of algicide which also kills submerged aquatic plant species. It is the loss of these submerged species which encourages the growth of algae. The situation has been partly mitigated by creating some berms along the canals and some short reaches of semi-natural shoreline on the southern lakes where emergent species can grow. The northern lakes have fringing reed beds of varying extent.

The Belvedere Dykes support often extensive reed beds. Erith and Crayford main river and tributary dykes have a full range of riparian plants.

Along the foreshore, depending upon the angle of the wall and upon the depositional characteristics of the particular reach, there may be a thin or a well developed upper saltmarsh community.

### 3. METHODOLOGY AND EVALUATION CRITERIA

#### 3.1. METHODOLOGY

##### 3.1.1. Method of survey

The entire extent of the catchment was surveyed on foot by the two surveyors working together from July to early September 1990. Some areas or reaches were visited twice. Information was collected from the banks of the lakes, canals and dykes. The islands in the Thamesmead lakes were surveyed with binoculars. Supplementary information was extracted from the Desk Study which forms part of the ecological survey. By the time the survey began, there had been a prolonged period of dry weather. Grassland in particular was difficult to assess as some species had already matured and died down. Difficulty was also encountered in comparing fields which were "resting" with those cropped almost bare by stock.

##### 3.1.2. Identification of Main River Sections and other sites

The main rivers are divided into sections approximately 500m in length corresponding to logical physical or biological units. The sections are numbered from source. Each Thamesmead lake is described as a whole. On the Foreshore, sections are numbered from west to east. (See Figures 1 and 2.) In addition, all other tributary dykes in the catchment have been surveyed in detail. In the case of Crayford Marsh, they are identified by the numbers used in the NCC Survey of 1985 and some have also been given names. All five tributary dykes on the Erith Marshes have been given names. Fields on the Erith and Crayford Marshes have been numbered by the surveyors. (See Figures 3 and 4.)

##### 3.1.3. Description of Main River Sections

Survey Descriptions for each main river section and for significant named tributary dykes (Eastern Way Dyke and Triglochin Dyke) include physical details of the channel (width, depth, substrate); water clarity; banks (slope, height, composition); adjacent habitats and land uses; vegetation (aquatic species in channel, marginal vegetation on banks) with a special note of dominant, characteristic and rare species; observations on fauna of note. Birds are the subject of a separate report. This data is followed by an appraisal of the intrinsic conservation value of the site and its potential vulnerability to engineering works. Finally, practical suggestions for enhancement are offered.

(Nature of flow is normally included in the data but as dykes do not "flow" in the normally accepted sense, this has not been noted. There was no movement in the canals or dykes during the

survey period and it is typical of a dyke system to have long periods of stagnancy.)

Descriptions provided for the Foreshore Sections, the Thamesmead Lakes and canals and the Southwest Marsh, Erith contain ecological details and physical data where relevant.

Each Section Description is accompanied by a map (except F3 and F4) and a species tick list.

Each Section Map illustrates an approximate 500m section. If the reach is longer than 500m, a series of maps are presented. Regardless of compass direction (which is indicated), direction of flow is depicted from the bottom to the top of the page. All maps are at 1:2500 unless otherwise stated but the channel width has been exaggerated. A Key is provided before the Section Descriptions.

The tick lists are based on:

- all the riparian or saltmarsh plant species that were recorded in the catchment during the survey

- all the notable plants from adjacent habitats recorded in the catchment during the survey

- all the dragonflies/damselflies recorded in the catchment during the survey.

Information on birds is not included since they are the subject of a separate report.

The object of such lists is to provide a quick picture of the species diversity of the section in relation to the catchment.

#### 3.1.4. Descriptions of other sites

The other important named dykes in the Crayford Marshes (Howbury Dyke and Green Lane System) are described in detail and accompanied by a map and species tick list.

Descriptions provided for the named tributary dykes on Erith Marshes (excluding Eastern Way Dyke, see 3.1.3.) and the remaining tributary dykes and Howbury Moat on Crayford Marshes contain ecological details and physical data where relevant. The descriptions for Crayford Marshes are supported by a chart of riparian plant species (Figure 7). There is a field by field description of Erith and Crayford Marshes but not of developed or undeveloped Thamesmead as this was not included in the brief.

#### 3.1.5. Additional data

Complete lists of all plants, lichens, dragonflies/damselflies and butterflies recorded during the survey are placed in the Appendices.



### 3.2. EVALUATION CRITERIA

#### 3.2.1. Evaluation categories

Each section has been placed in one of four categories as in the previous ecological surveys of the Beverley Brook and the Rivers Crane, Ravensbourne and Wandle. The categories are:

**CRITICALLY IMPORTANT** for wildlife: the most ecologically fragile reaches of water or adjacent habitats, which depend on the present hydrological conditions and would be severely damaged by inappropriate engineering works. This includes most examples of regionally rare habitats and reaches with significant communities of rare flora or fauna.

**IMPORTANT** for wildlife: areas of high wildlife value but in the case of adjacent habitat not necessarily closely associated with water. However, they may be potentially vulnerable to the incidental effects of inappropriate engineering works. They are typically composed of either a mixture of well structured habitat types but with few species of particular note, or a good example of a single habitat type which is not considered rare in the London area.

**GOOD** for wildlife: these are small, localised features or short reaches of water with little supporting habitat but which provide particular local interest. They are habitats of a more robust nature, less vulnerable to engineering works and may potentially be restored afterwards.

**POOR** for wildlife: these are reaches of water and adjacent open space with little semi-natural vegetation and consequently of low intrinsic ecological interest. However, they may have some importance as a link in the wildlife corridor. Sensitive engineering works could enhance biological interest.

### 3.2.2. Terminology

These categories are accorded separately to the water (channel and banks) and to the adjacent habitats. Where there are stretches of varying quality along the waterway or on adjacent land, the higher rating has been given. If the adjacent fringe of habitat extends no more than 5m either side of the waterway, (eg abutting onto gardens or factories), a habitat rating is not applicable and N/A is recorded.

"Banks" of the term "Channel and banks" was generally interpreted as the slope above the channel ending either where this slope flattened out or at the outer limit of any dredgings piled on the bank top and not as a fixed number of metres back from the water's edge. Beyond this "Adjacent habitat" was deemed to begin. The same criteria were followed for the foreshore ie the flat ground either side of the riverside walk or track was not counted as bank.

No rigid measurement for the extent of "Adjacent habitat" was applied, the term being interpreted according to common sense.

### 3.2.3. Figures and Tables

Figures 5 and 6 illustrate the evaluation ratings accorded to each section.

The evaluation ratings for each catchment area are set out in Table 1. The sections within each area are in alphabetical order.

Table 2 has been drawn up to show how much of the catchment falls into each evaluation category.

TABLE 1: HABITAT EVALUATION CATEGORIES FOR EACH SECTION OF MAIN RIVER, FORESHORE, IMPORTANT TRIBUTARY DYKES AND ERITH SOUTHWEST MARSH

Sections	L(m)	Grid Ref.	Ch/banks	Adj. Hab.
<u>Thamesmead</u>				
Birchmere		464799	Good	Poor
Crossway Lake		476812	Important	Good
Gallions Lake		449787	Good	Good
South Mere		476801	Poor	Poor
Thamesmere East		465809	Good	Important
Thamesmere West		461809	Important	Important
Tump 53		467803	Critical	N/A
Twin Tumps		460806	Critical	Important
Butts Canal	750	467803-463808	Good	Good
Crossway Canal	1300	477802-475814	Good	Poor
Harrow Canal	1350	466800-475809	Poor	N/A
Waterfield Canal	650	460805-464801	Poor	Good
<u>Erith Marshes</u>				
Great Breach E	600	492799-492803	Critical	Critical
Great Breach N	225	492803-493805	Good	Critical
Great Breach S	500	487795-492799	Critical	Critical
Great Breach W	580	492799-492803	Critical	Critical
SW Marsh		480803	Critical	Important
Eastern Way Dyke	1050	481803-490800	Critical	Critical
<u>Belvedere Dykes</u>				
Belvedere Dyke	250	496801-499802	Good	Important
Corinthian Dyke 1	500	508787-504790	Good	Good
Corinthian Dyke 2	560	503791-501794	Good	Poor
Corinthian Dyke 3	250	501795-502797	Important	N/A
Crabtree Dyke	440	502800-503801	Good	N/A
Green Level Dyke	300	502797-505797	Good	N/A
Horse Head Dyke 1	475	492799-496799	Important	Important
Horse Head Dyke 2	412	496799-501797	Important	Critical
Keats Road Dyke	175	501792-502792	Good	N/A
Norman Road Ditch	460	496805-496800	Good	Critical
Picardy Ditch 1	220	495792-497792	Good	N/A
Picardy Ditch 2	480	497794-500797	Good	Important

TABLE 1 cont

Sections	L(m)	Grid Ref.	Ch/Banks	Adj. Hab.
<u>Crayford Marshes</u>				
Crayford Dyke 1	450	528770-530772	Critical	Critical
Crayford Dyke 2	425	530772-533774	Critical	Critical
Crayford Dyke 3	500	533774-536778	Critical	Critical
Crayford Dyke 4	650	535776-535779	Poor	N/A
Crayford Dyke 5	125	535779-534778	Critical	Critical
Crayford Sluice	150	534778-533779	Critical	Critical
Lower Farm Dyke 1	550	530772-531775	Critical	Critical
Lower Farm Dyke 2	600	531775-534778	Critical	Critical
Green Lane Dyke	450	533769-530770	Critical	Critical
NCC 50	200	531768-530770	"	"
Howbury Dyke	500	528767-530770	Critical	Critical
Triglochin Dyke	250	534776-535777	Critical	Critical

(Green Lane Dyke and NCC 50 together form Green Lane System)

Foreshore

Thamesmead F1	875	446799-450805	Important	Important
Thamesmead F2	650	450805-454809	Critical	Important
Thamesmead F3	600	454809-460810	Poor	Good
Thamesmead F4	1500	460810-475814	Poor	Important
Thamesmead F5	1000	475814-484811	Critical	Important
Erith F6	450	490809-495808	Critical	Critical
Crayford F7	900	528778-535781	Critical	Critical
Crayford F8	575	535781-540780	Critical	Good

TABLE 2

Totals of sections receiving each evaluation category within the catchment followed by that total expressed as a percentage.

The first column contains the figures for Channel and Banks only, the second when combined with Adjacent Habitats. In the second column, where there are two different ratings, the higher value is used.

	Channel and Banks		Channel and Banks and Adjacent Habitats	
Critical	22	45.0%	25	51.0%
Important	6	12.2%	9	18.4%
Good	15	30.6%	12	24.5%
Poor	6	12.2%	3	6.1%
TOTAL	49	100.0%	49	100.0%

This Table shows that in the catchment as a whole there is a high proportion of CRITICALLY IMPORTANT sections which require sensitive management and relatively few sections have low ratings. The catchment can be seen to be very significant in terms of wildlife conservation.

There is little difference between the figures for Channel and Banks only and for when these are combined with Adjacent Habitats reflecting the fact that in much of the catchment the watercourses and adjacent habitat are mutually interdependent.

Table 3 shows how these categories are spread across the catchment.

TABLE 3

Distribution of evaluation categories within each catchment area.

#### Channel and Banks

	Th'mead		Erith		B'dere		Crayford		F'shore	
Critical	2	17%	5	83%	0	0%	10	91%	5	62%
Important	2	17%	0	0%	3	25%	0	0%	1	13%
Good	5	41%	1	17%	9	75%	0	0%	0	0%
Poor	3	25%	0	0%	0	0%	1	9%	2	25%
TOTAL	12	100%	6	100%	12	100%	11	100%	8	100%

#### Channel and Banks and Adjacent Habitats

	Th'mead		Erith		B'dere		Crayford		F'shore	
Critical	2	17%	6	100%	2	17%	10	91%	5	62%
Important	3	25%	0	0%	4	33%	0	0%	2	25%
Good	5	41%	0	0%	6	50%	0	0%	1	13%
Poor	2	17%	0	0%	0	0%	1	9%	0	0%

#### CHANNEL AND BANKS ONLY

Thamesmead, an urban area, has relatively few sections that receive critically important or important ratings. Of the two CRITICALLY IMPORTANT sections, Tump 53 is a remarkable survivor in a residential area where 66% of the waterways fall into the lower categories. The other, Twin Tumps, is likely to swell this figure if current development proposals are adopted. In the IMPORTANT category, Crossway Lake appears not to be at risk but this does not hold true for Thamesmere West which will be adversely affected by implementation of current proposals.

All the waterways in Erith except Great Breach Dyke North are shown to be CRITICALLY IMPORTANT.

Although the Belvedere dykes mostly flow through industrial sites, the channels are well vegetated with common emergent plants of local importance. Most fall in the GOOD category and none in the POOR. In this respect they compare well with Crayford Dyke Section 4.

In Crayford, as with Erith, virtually all the waterways are shown to be CRITICALLY IMPORTANT. Crayford Dyke Section 4 alone is a "disaster area" and demonstrates the implications of uncontrolled development.

The catchment includes the last areas of saltmarsh in the London area on the south bank of the Thames. Consequently a large proportion of the sections fall in the CRITICALLY IMPORTANT category. F3 and F4 would have been put in a lower category than POOR if one were available. They serve as a warning of the effect of vertical embankment.

#### CHANNEL AND BANKS and ADJACENT HABITATS

In Thamesmead the comparatively little difference between the single and doubled ratings reflects the obvious conclusion that an urban environment is unlikely to improve a waterway rating.

In Erith, all the adjacent habitat is CRITICALLY IMPORTANT grazing marsh and so Great Breach Dyke North receives a higher rating.

In Belvedere, Norman Road Ditch and Horse Head Dyke Section 2 are raised by doubling the ratings to CRITICALLY IMPORTANT because they also are adjacent to grazing marsh.

In Crayford apart from the industrial estate, all the surrounding habitat is grazing marsh and therefore CRITICALLY IMPORTANT.

In the Foreshore sections, the poorly rated F3 and F4 receive higher ratings when taken together with their Adjacent Habitats. However, it is feared that current proposals if adopted will result in a downgrading of these neighbouring environments. Another concern is that creation of an urban riverside walk in F1, F2 and F5 similar to that in F3 and F4 would reduce the importance of their surrounding habitat.

## 4. BIOLOGICAL ASSESSMENT

### 4.1. RANGE OF HABITATS WITHIN EACH MAIN CATCHMENT AREA

#### 4.1.1. Thamesmead

An urban site with ornamental lakes and canals. Large areas of wasteland and secondary woodland await development.

12 notable riparian species  
5 notable wasteland species

Sites of wildlife interest are almost without exception those where development has not yet begun (exception Tump 53 and to some extent Crossway Lake). Parts of the foreshore have important saltmarsh communities.

Thamesmead has a great deal of open space much of which is associated with the manmade lakes and canals. Unfortunately, this is green in name only; there is no submerged and very limited fringing vegetation in the lakes and canals and few areas of overhanging cover native or otherwise beside the water. The grassland is uninteresting and nearly all regularly mown and most of the shrub and tree plantings are of exotic species.

Recommendations for enhancement are contained in the individual site descriptions. The canal structure is such that berms are easily created and there are already a few examples. The native species used appear to be well established and more opportunities for enhancement exist. Some planting has also been carried out in lakeside situations and it was difficult for the surveyors to distinguish between these reed beds and naturally occurring ones (if any). The southern shore of Birchmere is a good example of how the lake margins can be enhanced.

Areas as yet undeveloped are rich in opportunities for wildlife. The Tripcock Park complex was not included in the survey brief apart from Twin Tumps but has been intensively surveyed by others. Its importance is dependent on a continuation of its wild and undisturbed character. Separated from this "wilderness" Twin Tumps and Thamesmere West would lose much of their value. Remaining areas of wasteland and scrub, often mature, are important for invertebrates and birds. These areas support some notable as well as common species.

Ornithological records suggest that the lakes and canals have limited interest in the summer months but Tump 53 and Twin Tumps do support some breeding species. Swans successfully bred at Thamesmere and Crossway while the canals provide valuable linkways between the various parts of the system. Little grebe, which is very sensitive to disturbance, also bred at Thamesmere West, indicating the very favourable conditions at this site.



As the canals and lakes have suitable features and sufficient capacity, significant numbers of wildfowl rest and feed there in the winter months, proving there is a supply of fish and invertebrate life.

#### 4.1.2. Erith

A still comparatively unspoiled area of grazing marsh with dykes, a little scrub and planted woodland.

22 notable riparian species

4 notable grassland species

Although south of Eastern Way drainage has been changed with the loss of some tributary dykes, Great Breach Dyke South, Eastern Way Dyke and the Southwest Marsh remain highly important. Similarly north of the spine road, minor dykes have disappeared but most of the main Great Breach system is a very valuable resource. There is a good range of riparian species throughout with many plants notable in the London area.

Some land has been lost already (Allders) but on the whole, the marshes remain as open grazing. The pasture reflects the different treatment that the fields have been given since they reverted from arable. The Marshes are criss-crossed by former tidal defence banks which retain notable species.

The marshes are very exposed with little scrub and no trees except those planted fairly recently near Great Breach Dyke South and the "woodland" on the southern boundary. There are few remaining hedges.

The dykes and reed beds are important for breeding warblers and the major dykes, lagoon and surrounding marshes in the north are critically important for wintering wildfowl.

#### 4.1.3. Belvedere

A system of drainage dykes flowing for the most part in narrow corridors through industrial sites. The longer arm (Horse Head Dyke Section 2) finally flows along the edge of Erith Marshes.

5 notable riparian species

1 notable grassland species

There are good reed beds in the channels but scarcely any submerged aquatic plants and a very limited range of the smaller marginal plants. (For example, celery-leaved buttercup Ranunculus sceleratus occurs only along Picardy Ditch Section 2 and bur marigold Bidens tripartita not at all.) The banks often have an important wasteland flora, sometimes associated with good bramble patches. The only scrub of any real wildlife significance is restricted to Horse Head Dyke. Important trees occur along Keats Road Dyke and the adjacent Section 2 of Corinthian Dyke. Adjacent areas with valuable mature wasteland/grassland are likely to be developed.

A range of maintenance levels was observed ranging from reed cutting only to desilting every two years.

A provisional assessment of the ornithological value of this area suggests relatively low interest in winter months but the reed beds, particularly those associated with hawthorn scrub, will prove to be good for breeding migrant warblers and the small remnants of meadows for skylark and meadow pipit.

#### 4.1.4. Crayford

A largely unspoilt area of grazing marsh with dykes, hedges, scrub and trees.

22 notable riparian species  
6 notable grassland species

There are 2 important main river dykes and a supporting network of tributary dykes, the majority of which still have a drainage function. The full range of riparian vegetation includes a large number of notable species. The vegetation pattern varies in relation to differences in management ranging from recently cleared and desilted channels to those supporting a single species stand of climax common reed.

A significant vegetational difference can be observed between the dykes north and south of Wallhouse Road, those to the north being affected to a greater or lesser degree by the saline incursions from the Thames. For a detailed breakdown of this flora, see the 1985 Report by the Nature Conservancy Council.

About three quarters of the damp fields are used for grazing. There are cows at Howbury Farm but horses predominate elsewhere. Grazing intensity varies. The remaining fields are used for hay.

It is the combination of dykes, hedges and patches of hawthorn scrub in grazing marshes which has such value throughout the year for birds. Following the extremely dry conditions, by early December the marsh meadows have become wet and are showing use by feeding snipe and lapwing. The water table is the critical factor.

#### 4.1.5. Foreshore

Tidal. Channel with vertical revetments, sloping boulder walls in varying states of repair, loose boulders, shingle and mudflats. Saltmarsh communities.

14 notable saltmarsh species  
4 notable grassland species

The saltmarsh communities are the last which remain on the south bank of the Thames in the London area. The furthest upstream are

at Thamesmead where there are two relatively small but rich areas on almost flat river wall. At Erith and Crayford there are more extensive areas associated with large reed beds on the mud flats. Common reed Phragmites communis in these beds indicates the presence of fresh water.

In parts of Thamesmead the adjacent habitat while presently consisting of fairly secluded lakes, secondary woodland, scrub and rough grassland and wasteland will change as development goes ahead.

In Erith and Crayford grazing marsh behind the defences provides a continuity of unspoilt habitats unique south of the Thames in the London area. The old and new earth walls at Crayford have an important flora including some rarities.

Every effort should be made to protect these areas which are under threat from development.

In migration periods and winter months Gallions Reach to Tripcock Ness and Crossness to Halfway Reach shore are of outstanding importance, providing feeding and roosting opportunities for many wildfowl and waders. Limited nesting sites are available in the reed bed at Halfway Reach. The tree and shrub communities which adjoin these sections add diversity and valuable breeding habitat. The Crossness sewage works frontage is quite exceptional and provides the most important winter bird habitat in the survey area.

Comparison of totals of notable species from all habitats:

Thamesmead 17

Erith 26

Belvedere 6

Crayford 28

Foreshore 14

## 4. BIOLOGICAL ASSESSMENT

### 4.2. NOTES ON THE FLORA AND FAUNA

#### 4.2.1. Flora

##### FLOWERING PLANTS: NOTABLE SPECIES

The term "notable" is used to distinguish plants which are scarce in the London context ie occurring in less than 12.5% of the c850 tetrads (2km squares) in the Flora of the London Area by R. M. Burton 1983.

Where it is relevant to do so, comparisons have been made with distribution status in Kent, again expressing information in terms of a percentage of the total of 1044 tetrads mapped in the Atlas of the Kent Flora by E. G. Philp 1982.

References to national status are based on the Atlas of the British Flora 1961. However, as most records in the Atlas are 40 years old and as the basic date-line for records was 1930, it is only reasonable to consider it to be out of date. Many wetlands have been lost and the plants of such areas are now much more infrequent. The grades quoted in the text are those of the Atlas (see below) but should be mentally adjusted for increased rarity.

A: Rare species, recorded from not more than 20 vice counties  
B: Medium species, recorded from 20-100 vice counties  
C: Common species, recorded from more than 100 vice counties

50 plants recorded during the survey are "notable" species. 5 of these occur only on the saltmarsh and are necessarily rare in the London context as they are confined to the Thames foreshore. 13 species are associated with brackish conditions along the shoreline or in the dykes near the Thames which are subject to saline intrusions. These species also are inevitably rare in the London context. 20 notable species including both true aquatics and emergent species are present in certain dykes and ditches and 7 others on the grazing marshes or the old tidal defences. The remainder are plants which benefit from the temporary or calcareous conditions of the infill at Thamesmead.

4 of the plants deserve special mention because they feature in "Table 25: Nationally Scarce Species of Vascular Plants" which is contained in NCC Guidelines for Selection of SSSIs 1989. The figure after the plant name is the number of 10km squares in which the plant occurs out of a total of 3500 and then that figure expressed as a percentage.

<u>Carex divisa:</u>	79, 2%
<u>Ranunculus baudotii:</u>	83, 2%
<u>Rumex palustris:</u>	72, 2%
<u>Verbascum lychnitis:</u>	24, 0.6%

The following are notes on all notable plants recorded during the survey.

Apium graveolens wild celery

London : 2% Kent : 8% National : B+

A native species of damp places especially near the sea. Occurs with the saltmarsh communities along the foreshore in 4 Sections: F2 and F5 in Thamesmead, F6 at Erith and F7 at Crayford. Also on the bank of Great Breach Dyke West, Eastern Way Dyke and Crayford Dyke.

Aster tripolium sea aster

London : 4% Kent : 12% National : C+

A common saltmarsh plant, occurring along all the foreshore except F3 and F4 where the vertical revetment offers no opportunity. Also occurs inland in abundance on the shore of Thamesmere West and Thamesmere East, on Erith Marshes in Field 12 and on Crayford Marshes in Field 26.

Atriplex littoralis grass-leaved orache

London : 1% Kent : 11% National : B+

A plant of muddy coastlines around the coasts of the British Isles. In Kent more frequent in the north. Occurs on the foreshore at Crayford and in F5.

Atropa belladonna deadly nightshade

London : 10% Kent : 8% National : B

A plant of the chalk associated with the calcareous infill at Thamesmead.

Berula erecta lesser water-parsnip

London : 4% Kent : 10% National : C

A rather local and disappearing species associated especially with the dykes in the north Kent marshes. Only occurs in Erith where it is most frequent in Eastern Way Dyke but also occurs in most sections of the Great Breach system.

Beta maritima sea beet

London : 3% Kent : 10% National : B

A coastal species quite common on the upper foreshore and well drained but saline situations inland throughout the catchment.

Butomus umbellatus    flowering rush  
London : 5%    Kent : 8%    National : B

A rather local plant in England. In Kent it occurs in the dykes in the Thames marshes and in some southern and eastern locations. In the catchment only recorded in Corinthian Dyke Section 3 where it may be natural. Introduced in a new planting in the basin off Gallions Lake.

Calamagrostis epigejos    wood small-reed  
London : 3%    Kent : 2%    National : B

A scarce grass of damp soils mostly in the southern and eastern half of the country. Only recorded beside Howbury Dyke in the Crayford Marshes.

(Carex distachia    brown sedge

This notable plant of the London area, rare in Kent, was recorded in the London Naturalist by R Burton 1987 from three sites somewhere on the Crayford Marshes.)

Carex divisa    divided sedge  
London : 1%    Kent : 11%    National : B+  
2% of all 10km squares NCC 1989

A nationally rare species of damp grazing marshes and the edge of marsh dykes. In Crayford occurs beside dykes both north and south of Wallhouse Road but is particularly abundant in the field complex to the northeast.

Ceratophyllum demersum    rigid hornwort  
London : 7%    Kent : 10%    National : B

An occasional submerged plant of ponds and ditches. Abundant in Lower Farm Dyke, the Twin Tumps, Tump 53 and Great Breach Dyke West. Also present in Crayford Dyke Section 3 where the duckweed cover made assessment of its status difficult.

Cochlearia anolica    English scurvygrass  
London : 1%    Kent : 6%    National : B+

Locally common on muddy shores and in estuaries. Few suitable sites remain in the London area. Furthest upstream station in the Thames has been recorded at Tripcock Ness (LEU Handbook 10) but this could not be confirmed during the present survey. Thamesmead can claim a site however for it does grow west of Crossness sewage works. It is abundant in the saltmarsh near the Great Breach Outfalls and on the Crayford foreshore.

Echium vulgare    viper's bugloss  
London : 6%    Kent : 17%    National : B+

A plant of dry, often calcareous places. Considered naturalised on the infilled wasteland in undeveloped parts of Thamesmead.

Elodea nuttallii      Nuttall's waterweed  
London : 2%      Kent : 4%      National : A+

A submerged aquatic plant from N America. The figures are quoted but should be viewed with caution because this plant can be mistaken for E. canadensis and therefore overlooked. It is thought to be increasing rapidly and replacing its rampant relative in some Kent rivers. Recorded from Tump 53, Great Breach Dykes South and West, Triglochin Dyke, Lower Farm Dyke and Crayford Dyke.

Eleocharis palustris      common spike-rush  
London : 12.5%      Kent : 19%      National : C

A plant of shallow water persisting when the water has gone. Not common along the Thames corridor and restricted in the catchment to edges of dykes poached by grazing animals. It is abundant in the Crayford Sluice Dyke and others adjacent to it, in Great Breach Dykes South, East and West and in the Southwest Marsh. The population in Birchmere is probably introduced.

Erigeron acer      blue fleabane  
London : 12%      Kent : 17%      National : B

A plant of dry, sparsely vegetated areas often on a chalky substrate. Recorded at Thamesmead at the Twin Tumps.

Glaux maritima      sea milkwort  
London : 1%      Kent : 6%      National : C

A saltmarsh species occurring in relatively discrete communities on the foreshore in Thamesmead as well as at Erith and Crayford.

Glyceria declinata      small sweet-grass  
London : 6%      Kent : 5%      National : C

Grows beside ponds and ditches. Recorded from several sites in Crayford including the dried edges of the pond in Field 35, Howbury Dyke, Howbury Moat and Triglochin Dyke.

Juncus gerardii      saltmarsh rush  
London : 1%      Kent : 11%      National : C

A saltmarsh species recorded from the foreshore in Thamesmead in F2 and F5 and from Crayford where it also grows in or beside brackish dykes just behind the tidal defence wall (NCC 1, 9 and 16). Although not observed during the survey on the foreshore at Erith, it was recorded from sites further inland: along Horse Head Dyke Section 2, Great Breach Dykes South and West and from the Southwest Marsh.

Lemna gibba fat duckweed  
London : 5% Kent : 14% National : B

A plant of slow moving water occurring mainly in the south and east of England. Local in Kent along marsh dykes and the main rivers but very uncommon in the south and east of London. Only recorded at Great Breach Dyke West and Gallions Lake.

Lemna trisulca ivy duckweed  
London : 10% Kent : 21% National : C

Considerably more abundant than the preceding species but with a similar national and county distribution. In the Twin Tumps and Tump 53 in Thamesmead, quite frequent in main river and tributary dykes in Crayford but only recorded in Great Breach Dyke West, Eastern Way Dyke and Cross Dyke 2 in Erith.

Lotus tenuis slender-leaved bird's foot trefoil  
London : 3% Kent : 8% National : B

A species of dry grassy places in the southeast of the country. In London common only near the tidal Thames below the capital. Recorded on wasteland near the Twin Tumps, locally abundant in Crayford on the earth defence wall and in some fields. A catchment speciality.

Medicago arabica spotted medick  
London : 11% Kent : 61% National : B

A grassland species of the southern half of the country especially near the sea. Easily overlooked in heavily grazed turf and may be more widespread in the survey area. Recorded from Fields 18 and 29 on the Crayford Marshes and Field 16 on the Erith Marshes.

Myosotis caespitosa tufted forget-me-not  
London : 8% Kent : 17% National : C

A small marginal plant of streams and still water throughout the British Isles. Almost absent from the central areas on the London map and only recorded from 3 reaches in the southwest of Crayford Marshes where it is dependent on continued poaching by stock.

Myriophyllum spicatum spiked water-milfoil  
London : 6% Kent : 14% National : C+

A submerged aquatic of still or slow moving water scattered throughout London where suitable habitats occur but very rare in the catchment where it was only recorded from Great Breach Dyke West.



Petroselinum segetum corn parsley  
London : 2% Kent : 13% National : B

A nationally rare species with a centre of distribution along the tidal Thames where it is a feature of the old dry grassy tidal defence walls. Recorded from several stations on both the Erith and Crayford Marshes, sometimes abundant.

Plantago maritima sea plantain  
London : 1% Kent : 9% National : C+

A common plant of saltmarshes and short turf near the sea. Occurs all along the foreshore except where there are vertical revetments.

Potamogeton crispus curled pondweed  
London : 12% Kent : 15% National : B+

Just qualifies as a notable species and described as quite common in a variety of waters in the London area. However, this submerged aquatic was missing from a number of its former stations in the catchment (Butts and Harrow Canals, Crayford Dyke Section 3), and was only recorded from Great Breach Dyke South and West. It was thought to be present in Howbury Moat in July 1990.

Potamogeton pectinatus fennel pondweed  
London : 10% Kent : 17% National : B

A submerged aquatic fairly tolerant of pollution and salinity. It was recorded right across the catchment although in Thamesmead it can only survive in the Twin Tumps. Also in Great Breach Dyke West, Triglochin Dyke and several tributary dykes north of Wallhouse Road on the Crayford Marshes.

Potamogeton pusillus  
London : 1% Kent : 3% National : B

A submerged aquatic tolerant of brackish conditions. Recorded from the Twin Tumps and Great Breach Dykes South and West.

Puccinellia distans reflexed saltmarsh-grass  
London : 2% Kent : 16% National : B+

A grass of muddy estuaries and saltmarshes, recorded from Erith Marshes only where it was abundant beside the track by the sewage farm and formed a single species sward in Field 19. Also along the bank of Great Breach Dyke West.

Puccinellia maritima common saltmarsh-grass  
London : 2% Kent : 16% National : B+

A grass of tidal saltmarshes where it can be dominant. Recorded only from Crayford Foreshore where it is indeed locally dominant.

Ranunculus baudotii

London : less than 1%    Kent : 7%    National : B+  
2% of all 10km squares NCC 1989

A nationally rare submerged/floating aquatic occurring in brackish water. However all the sites where this and R. trichophyllus were seen were dry in the drought conditions of 1990 and very few specimens were flowering. This species was confirmed from Howbury Moat (N Holmes) and thought to be present in Eastern Way Dyke and the Southwest Marshes.

Ranunculus sardous    hairy buttercup

London : less than 1%    Kent : 12%    National : B

A nationally rare plant of damp meadows near the coast. Recorded on the grazing marshes in Crayford mostly north of Wallhouse Road. Likely to be present in similar places on Erith Marshes.

Ranunculus trichophyllus

London : 2%    Kent : 11%    National : B

A nationally rare submerged aquatic species previously recorded from dykes in the northwest of Crayford Marshes (NCC, Selmes 1986). The non-flowering plants recorded in this area during the current survey (NCC 7,8,9,10,11,12) are likely to be this species but could not be firmly identified.

Rumex palustris    marsh dock

London : 4%    Kent : less than 1%    National : B  
2% of all 10km squares NCC 1989

A nationally rare dock of eastern counties quite abundant beside the dykes on the Erith Marshes. Absent from the other areas apart from a few plants near the dried up pond in Field 22 on the Crayford Marshes.

Samolus valerandi    brookweed

London : 0%    Kent : 5%    National : C

A plant of wet places usually near the sea. According to Burton (1983) "thought lost to London but in 1976-77 it was found in two places in the Woolwich Arsenal area...since closed off". It was not re-recorded in 1984 (Burton 1985). However, during the survey it was recorded in four locations on the Crayford Marshes. There were good populations beside Triglochin Dyke and NCC 20 (east). It occurred along NCC 10 and a single plant was also found beside the first stretch of Lower Farm Dyke Section 2. It is interesting that this plant was more abundant than usual in some of its stations in Kent in the year of the survey.

Scirpus maritimus sea club-rush  
London : 3% Kent : 20% National : C+

A club-rush of coastal areas common in London in brackish ditches and on the strand line of the Thames. The description exactly fits the occurrence of the plant in the survey area. Occurs inland as far as Picardy Ditch Section 1 and Great Breach Dyke South.

Schoenoplectus lacustris ssp tabernaemontani grey bulrush  
London : 1% Kent : 8% National : C

Primarily a species of brackish water confined in the London area to marsh ditches near the tideway in Kent. Locally abundant in the catchment where it occurs in most waterways on the Erith Marshes and north of Wallhouse Road on the Crayford Marshes. Perhaps natural in Tump 53.

Silaum silaus pepper-saxifrage  
London : 10% Kent : 15% National : B+

A plant of old grassland and therefore a decreasing species. Recorded only in the southeast of the Crayford Marshes where it is locally frequent in Fields 22 and 25.

Spergularia marina lesser sea-spurrey  
London : 1% Kent : 12% National : C

A saltmarsh species which is quite common in suitable places along the foreshore in the catchment. Often growing from cracks in the sloping riverwall with the sea aster.

Spergularia media greater sea-spurrey  
London : 1% Kent : 10% National : B

Not easy to distinguish from the above as intermediates occur. Identified positively along the foreshore at Erith and Crayford.

Torilis nodosa knotted hedge-parsley  
London : 2% Kent : 9% National : B

A nationally uncommon plant which usually occurs on dry banks in the London area. It was recorded both on the old sea walls and in the grass in Fields 5 and 19 on the Crayford Marshes and Fields 1, 4, 9, 12, 18 and 19 on the Erith Marshes.

Iriglochis maritima sea arrowgrass  
London : 2% Kent : 9% National : C

A common component of saltmarshes, this plant occurs wherever it can get a foothold all along the foreshore except, of course, F3 and F4.

Triglochin palustris marsh arrowgrass  
London : 1% Kent : 2% National : C

A more northerly species very rare in Kent, exceedingly rare in the London area and thought to be lost from some locations. Not mentioned for Crayford Marshes in any of the literature studied but found in abundance on the poached edges of NCC 30 which was named Triglochin Dyke in its honour. Also recorded in a similar situation beside the second reach of Lower Farm Dyke Section 1 and the adjacent NCC 15.

Trifolium arvense hare's foot clover  
London : 10% Kent : 10% National : C+

An early coloniser on dry sandy soils recorded on the relatively new banks of Thamesmere West and regions adjacent. Also occurs on the earth defence wall at Crayford.

Trifolium fragiferum strawberry clover  
London : 4% Kent : 10% National : B

A diminishing species of damp grassland often on saline soils. Flowered well in very short turf in Fields 16 and 18 on Crayford Marshes but also among rank grasses both sides of the road in Field 16 on Erith Marshes.

Typha angustifolia lesser reedmace  
London : 6% Kent : 17% National : B

A rather local plant more frequent near the coast in Kent. The true species was only recorded in the Southwest Marsh on the Erith Marshes where it was locally dominant. All other material examined proved to be a narrow leaved form of the ubiquitous reed mace.

Verbascum lychnitis white mullein  
London : 4% Kent : 3% National : A  
2% of all 10km squares NCC 1989

A nationally rare species of waste places and calcareous banks with a centre of distribution in suburban Kent and into Surrey. Recorded in Thamesmead near Gallions Lake and between Thamesmere West and East.

Veronica catenata pink water-speedwell  
London : 4% Kent : 9% National : B+

A mostly southern and rather local species with a penchant for the Thames and coastal ditches which occurs in some abundance on drying mud in three locations in the catchment, in the Southwest Marsh and Eastern Way Dyke on the Erith Marshes and at Howbury Moat in Crayford.

Zannichellia palustris      horned pondweed  
London : 6%      Kent : 12%      National : B

A submerged aquatic of both fresh and brackish water, abundant in ditches near the tidal Thames. Limited in Thamesmead to the Twin Tumps; occurs also in Corinthian Dyke Section 3 but not downstream, in Great Breach West and Eastern Way Dykes on Erith Marshes and in NCC 7 and 15 just behind the seawall on the Crayford Marshes.

#### FLOWERING PLANTS: OTHER INTERESTING SPECIES

Other plants are of interest because they are restricted species in Greater London or, conversely, they may be relatively common in London but less frequent in Kent. Others deserving comment have a surprisingly limited distribution in the catchment.

Bidens tripartita      bur marigold  
London : common      Kent : 5%      National : B+

A plant of muddy edges exposed by dropping water level. Quite common in the west of the London area but not so in the catchment where it occurs in the Erith dykes but not at Crayford. It has been introduced in Birchmere and Crossway Lake but looks natural in the pool where Crossway Canal begins.

Carex riparia      great pond sedge  
London : 14%      Kent : 13%      National : B+

A plant growing by slow moving fresh water often forming single species stands and sometimes on drier ground. Quite frequent in suitable habitats in the west of the London area but less common eastwards. Occurs throughout Crayford although less common in the north but almost absent from Belvedere and Erith where it is only present in the Eastern Way Dyke. In Thamesmead it is introduced in several place but may be natural in Tump 53.

Chara sp      stonewort

A first coloniser in disturbed water.  
Recorded in NCC 7, Triglochin Dyke and the spur off Crabtree Dyke behind Tuffnells.

Cyperus longus      galingale

A curious record for a single plant at Tump 53. Another isolated specimen seen in the new planting in the basin beyond Gallions Lake.

Inula conyza      ploughman's spikenard

Not a notable species in the London area in terms of percentages but rare off the chalk. Recorded at the Twin Tumps in Thamesmead.

Lycopus europaeus      gipsywort

Described as a common waterside plant in the London area but distinctly uncommon in the catchment despite a wealth of apparently suitable habitats. A small (introduced?) group was recorded at Thamesmead East and another in the canal linking the lakes. A single specimen survives in the cracks in the concrete near Tripcock Ness. None was recorded at Crayford in its old site near Howbury Moat. There was a relic clump in Allders Dyke but the only colony of any size occurred in the "stream" feeding the Southwest Marsh and in the surrounding horse-grazed area.

Nasturtium officinale      water-cress

The two subspecies were not recorded separately. Although not strictly "notable", this species is more frequent to the west of London. Not recorded in Erith and only in Tump 53 in Thamesmead where it may be introduced. In Crayford, however, it is abundant and often dominant following clearance in the freshwater dykes south of Wallhouse Road.

Oenanthe crocata      hemlock water dropwort

Not a "notable" species but uncommon in the catchment where it only occurred high on the foreshore in Fl, Erith and Crayford. There was a single, poor specimen beside Triglochin Dyke.

Pulicaria dysenterica      fleabane

Although this is quite a common plant in London generally, it has a very limited distribution in the catchment, only being recorded from Great Breach Dyke South and Thamesmere West.

Rorippa islandica      marsh yellow-cress

Occurs in wet ground at the edge of streams. Uncommon in Kent but frequent especially to the west of the London area. Restricted in the catchment to 2 sites: the poached edges of Triglochin Dyke and the basin of Crossway Canal in Crossway Park where it has a natural appearance both at the margin and as an important element of the adjacent grassland.

Rumex hydrolapathum      water dock

A waterside dock not uncommon to the west of London but with few sites in the south and east. Restricted in the survey area to Erith Marshes and only recorded there in the Southwest Marsh where it is abundant.

Scrophularia aquatica      water figwort

Quite common in the London area but not so in the part surveyed where it only occurred at the Twin Tumps and beside the dykes south of Wallhouse Road on the Crayford Marshes.

Sparganium erectum      branched bur reed

Rather common in the London area but not so in the catchment, where it is largely restricted to the freshwater dykes in the southern Crayford Marshes where it is locally dominant. A small relic population survives in Thamesmead in the reach of Crossway Canal between the Southern Outfall and Eastern Way.

Symphytum officinale      comfrey

A species usually by water and not uncommon in the London area generally but decidedly so in the catchment as it was only recorded in significant amounts along Cross Dyke 2 on the Erith Marshes from which it had spread a little way along Eastern Way Dyke. There are also small populations beside Crossway Canal near the Southern Outfall and beside Picardy Ditch Section 1.

Veronica beccabunga      brooklime

A plant of wet places quite common in the suburbs but more or less absent from central London. Certainly very uncommon in the survey area despite suitable looking sites. A single scrappy plant was recorded in the Crossway Canal near the Southern Outfall Sewer.

#### FLOWERING PLANTS: INVASIVE ALIENS

The two following non-native species are extremely invasive and should be eradicated or controlled wherever they occur.

Heracleum mantegazzianum      giant hogweed

A plant from the Caucasus, spreading vigorously in wetlands. A dangerous as well as unwelcome alien. Recorded in the central areas of the catchment beside Green Level Dyke, Crabtree spur and on the sea wall at Erith. It is important to cut this plant before the seed is ripe.

Reynoutria japonica      Japanese knotweed

A native of Japan, this species occurs in a wide range of habitats, smothering native flora. Usually managed near watercourses by regular cutting.

#### MOSSES

Mosses were not generally recorded. However, Drepanocladus aduncus, a moss of aquatic and semi-aquatic habitats, and a disappearing species, was observed at one site, Triglochyn Dyke, where it was abundant.

## LICHENS

(A full list appears in the Appendix 2)

Few suitable habitats for corticolous lichens exist in the survey area. One white willow on Crayford Marshes (in Field 35) had a limited flora (6spp) of relatively pollution tolerant species and elder bushes at Crossway Lake had some Phaeophyscia orbicularis. Old tree stumps near the Twin Tump supported Cladonia spp including C. macilenta. An interesting Cladonia community has developed beside Thamesmere East where C. fimbriata, C. squamosa and Peltigera polydactyla are common on the ground and several saxicolous species occur on the pebbles.

A wooden seat beside Butts Canal overlooking Tump 52 has a surprising range of lichens including two Parmelia spp and Evernia prunastri.

Saxicolous lichens can be found on the walls comprising the river defence banks and on the constructions around sluices, bridges etc throughout the catchment. The majority of species seen are those of calcareous substrates and tolerant of pollution eg various Caloplaca and Lecanora spp. No characteristic coastal species were seen.

### 4.2.2. Fauna

The following records were all collected as incidental to the main botanical survey July-September 1990.

## DRAGONFLIES AND DAMSELFLIES

Nine species were recorded during the survey period all of which can tolerate brackish water conditions. Evidence of breeding was seen for most species (exceptions Lestes sponsa and Libellula depressa). Dragonflies and damselflies which emerge early in the year could not be recorded.

### Ischnura elegans blue-tailed damselfly

A widespread species tolerant of some pollution occurring in still, slow-moving and temporary waters. It requires plenty of marginal vegetation. The commonest species encountered on the survey, present and breeding in all areas and particularly numerous along the Belvedere dykes.

### Enallagma cyathigerum common blue damselfly

A common and adaptable species which has a preference for open stretches of water with well vegetated margins. Recorded from the Great Breach system, Twin Tumps, Thamesmere East and Belvedere Dyke but not from Crayford Marshes where it is likely to be present.



Lestes sponsa emerald damselfly

This is a tolerant species occurring in all forms of still or slow moving water especially with luxuriant marginal vegetation. It is rarely seen out in the open. Only recorded from the lagoon on Erith Marshes but likely to have been overlooked elsewhere.

Aeshna mixta migrant hawker

A highly migratory species which will readily colonise large ponds and lakes. In recent years it has become much more common and it was the most numerous hawker seen on the survey. It was recorded throughout Thamesmead (with up to 8 individuals seen at Birchmere) and Crayford Marshes. The lack of records from Erith Marshes is probably due to the early date of the survey in that area.

Aeshna cyanea southern hawker

This species will breed in a wide variety of standing water habitats. It was not positively identified during the survey but a number of "sp" records were almost certainly this hawker eg Corinthian Dyke Section 3 and Crayford Dyke Section 4. The larvae were found in Great Breach Dyke North by Tinsley (NRA 1990).

Aeshna grandis brown hawker

This is the most commonly encountered aeshnid in the London area and will breed in standing or slow moving water. It was the most widespread hawker in the catchment occurring in all areas but in small numbers. It was observed ovipositing at Twin Tumps, Thamesmere West and Lower Farm Dyke.

Libellula depressa broad-bodied chaser

This species will breed in a variety of still and slow moving waters where there is good marginal vegetation. It was seen at Crayford Marshes in Field 35 and at Gallions Lake.

Orthetrum cancellatum black-tailed skimmer

A good coloniser of new sites, the black-tailed skimmer is becoming more common in the London area. It prefers open, still, relatively shallow water with some bare ground and was recorded defending a territory at the lagoon on Erith Marshes.

Sympetrum striolatum common darter

This is not a demanding species and is found in all forms of still water. It particularly favours bare or light-coloured patches on which to bask. It was recorded throughout the catchment and preferred the muddy poached edges of the dykes on Erith and Crayford Marshes. It was often seen ovipositing.

The best sites for dragonflies and damselflies were the lagoon (Erith), Great Breach Dyke South and Twin Tumps. Overall, 7 species were recorded from Erith Marshes and 5 from Crayford Marshes. Wright (1984-5) recorded 9 species of dragonfly and damselfly from the Tripcock Park area, all (except Cordulegaster boltonii) common in the London area.

## BUTTERFLIES AND MOTHS

Twenty species of butterfly were recorded during the survey and with the exception of holly blue they belonged to genera whose larvae do not rely on a specific food plant. On the whole Thamesmead was a poor area with no butterflies seen in the urban areas, along the canals or around the southern lakes. Nearer the Thames where there is more herb rich wasteland, butterflies were numerous. The best areas were the foreshore Sections 1, 2 and 5, the latter being outstanding with an abundance both of species variety and numbers. On Erith Marshes the Foreshore and the meadow adjacent to Great Breach Dyke South yielded most species. The best areas on Crayford Marshes were the herb rich flood defence walls and the fields in the southwest particularly Field 35. Perhaps surprisingly the Belvedere dykes were a rich area for butterflies. Any dyke with a herb rich grassy bank had at least six species, usually seven or eight (exceptions were Green Level and Keats Road Dykes). Not only was there a good variety of species but the abundance of individuals was impressive. The strong populations on the banks emphasise the importance of these corridors for invertebrate fauna.

By far and away the commonest butterfly recorded was the meadow brown, present at over 60% of the sites. Green-veined white, small white, gatekeeper, small tortoiseshell and common blue were also widespread. Orange tip is very likely to be present earlier in the season. On the other hand, two migrants, painted lady and clouded yellow were both seen on only two occasions, the former at Thamesmere East and West and the latter on the flood defence walls and in Field 32 on Crayford Marshes.

Cinnabar moths were common on the banks of many dykes in Belvedere and along the Foreshore Sections 1, 2, 3 and 7. Six-spot burnet moths were only recorded from Foreshore Section 1.

There seems to be little information on the lepidopteran fauna of the survey area. Wright (1984-5) recorded 8 common species of butterfly in the Tripcock Park area and Goode (1983) had a similar number of species from Crayford Marshes. Sokoloff (1981) stated that at least two year's work was needed to conduct an adequate survey but thought a rich and diverse microlepidopteran fauna would be present on Crayford Marshes.

## GRASSHOPPERS AND CRICKETS

Most of the dry grassland and wasteland sites throughout the catchment have strong populations of grasshoppers. Both the field and meadow grasshopper Chorthippus brunneus and C. parallelus are particularly numerous beside many of the dykes in Belvedere. So too is the lesser marsh grasshopper C. albomarginatus, a coastal species but common along the River Thames. Roesel's bush cricket Metrioptera roeselii prefers longer grass and was found in Fields 25 and 34 on Crayford Marshes, Fields 6 and 16 on Erith Marshes and was heard near the open culvert of Picardy Ditch Section 2. Although a rare species at the beginning of the century, it has become much more common while remaining a species typical of the River Thames area. English (1986) recorded this species from several sites in Thamesmead and from aster thickets on the foreshore at Halfway Reach. The great green bush cricket Tettigonia viridissima also prefers longer vegetation and has been recorded throughout the Erith Marshes and into Thamesmead Town by English (1986). During the survey it was found beside Eastern Way in Field 16. The short-winged cone-head Conocephalus dorsalis, another predominantly coastal species, was only recorded from Crayford Marshes in Fields 25, 34 and 35 (where it was present in its macropterous form). English (1986) has found a population on the southern part of Erith Marshes near Woodland Way.

## BEEES AND HOVERFLIES

Both honey and bumble bees were extremely abundant where there were plenty of flowers, brambles etc. Hoverflies of several different species were also numerous, particularly Eristalis and Helophilus spp, the larvae of which live in ditches and drains. Volucella zonaria, a large and spectacular hoverfly, which parasitises wasp's nests, was seen in a woodland clearing near the start of Allders Dyke on Erith Marshes. This species only became established in Britain in the 1940s but is now quite frequent in the London area (Stubbs and Falk, 1983). Two other Volucella spp were recorded, V. pellucens from Erith Marshes and V. inanis from Crayford Marshes. There are hoverflies restricted to coastal and grazing marsh habitats which are almost certainly present in the catchment (C. Plant pers. comm.). A survey of Diptera and Coleoptera of the Crayford and Erith Marshes is strongly recommended, particularly as the better studied area at Rainham is currently under threat from development.

## FRESHWATER INVERTEBRATES

Only a limited study of the Erith and Belvedere areas has been undertaken by Tinsley (NRA, 1990). Preliminary results have identified 73 taxa. Two surveys undertaken on Crayford Marshes (Knights and Powlesland, 1984; Carr, 1986) have identified about 67 macroinvertebrate species (with Coleoptera, Hemiptera and Gastropoda well represented). The Crayford studies both

suggest that industrial pollution contributes to the low diversity of the fauna.

It is important to obtain more information about invertebrates. The present survey has been limited and further study seems essential. In particular, no data has been made available on the canals, lakes and foreshore.

#### AMPHIBIANS AND REPTILES

Frogs were recorded throughout the catchment area from Eastern Way Dyke, Corinthian Dyke Sections 1 and 3, Picardy Ditch Section 1, Gallions Lake, Tump 53 and from several dykes on Crayford Marshes. Newts were reported from Picardy Ditch and Howbury Moat (pers comm). Grass snakes (2) were seen at Howbury Moat and a lizard was seen on the flood defence wall at F8. Wright (1984-5) lists frogs, newts, adders and grass snakes from the Tripcock Park area but none of these were personally recorded.

#### BIRDS

In broad terms, the stretch of the Thames which is the subject of this review holds many CRITICALLY IMPORTANT and IMPORTANT sites for birds in the context of the London area with some species records of wider significance. The winter bird populations of tufted duck, teal and shelduck are good. Pintail is of note although only present in small numbers. Among the waders, dunlin, snipe and redshank are well represented and there are small but significant numbers of ruff.

It is noteworthy that the Crossness Sewage Treatment Works frontage and the open lagoon within the works combine to provide a very important site for wintering ducks and waders. The area of mudflats in front of the works is the most important feeding ground in the survey area. It is proposed that the current status of the invertebrate food sources here should be subject of a specific survey as a matter of some urgency to establish the present situation and form a part of a regular programme of monitoring. The frontage also provides a valuable high tide roost for ducks and waders. The extent and range of the breeding bird population is unknown and, together with the general habitat survey, should provide an important addition to the current knowledge of the wildlife on this section of the Thames.

The dykes and, particularly, the lagoons of the Erith Marsh northern section (Great Breach Dykes East and West) add considerably to the bird interest in winter. It is apparent from existing records and from surveys now being undertaken that the Thamesmead lakes also provide a considerable capacity for wintering ducks with Thamesmere West of special interest.

Crayford and Erith Marshes provide potential for riparian breeding bird species. It will be interesting to see if this

survey provides significant additional information on breeding species and densities. Such information would support strong observations on future planning proposals and promote scientific interest and conservation measures for these areas.

The special features of the Twin Tumps and Thamesmere West are also likely to be of high interest in the breeding season. Results here must be studied in the context of the current proposals for major development which constitute a great threat to this area.

#### MAMMALS

Few species of mammals were actually recorded during the survey. Rabbits were abundant on the wasteland and foreshore areas of Thamesmead, particularly at Thamesmere East, Twin Tumps, F1 and F2. A field mouse was seen at Thamesmere East. In Field 34 on Crayford Marshes a fox was disturbed. Records of stoats and weasels near Belvedere and Corinthian Dykes and a hedgehog at Crayford Marshes were passed on to the surveyors. F. Booth reported a water vole on Crayford Marshes where they had previously been recorded by Goode (1983). There are also records for Tripcock Park (Wright 1984-5). Other mammals from these two areas include : wood mouse, bank vole, common shrew, weasel and stoat.

Bats were not seen during the survey and information on roost sites could not be found except for an unconfirmed report of a roost at Waterfield School. However, there are records of bats feeding over many of the waterbodies in Thamesmead including Birchmere, Twin Tumps, Tump 53 (possibly serotine, M. Halpin, pers. comm.), Thamesmere East, South Mere, Crossway Lake and also from Crossway Park and Crossness Sewage Works (Mickleburgh 1987). There are no records at all for Erith or Crayford Marshes. Both areas seem to offer good feeding grounds and have suitable roosting sites nearby. More survey work is needed on these animals.

## 4. BIOLOGICAL ASSESSMENT

### 4.3. DESCRIPTION OF HABITAT TYPES AND INDICATIONS OF BEST EXAMPLES

#### 4.3.1. Critical habitats

The following four habitat types are not only of extremely high ecological interest in the London area but are also intimately associated with riverine conditions. Their maintenance is therefore closely linked with local hydrology and would potentially be most seriously affected by river engineering works.

#### CHANNEL AND BANKS

Dominant spp: common reed Phragmites communis, sea club-rush Scirpus maritimus, reed mace Typha latifolia, water plantain Alisma plantago-aquatica. Great pond sedge Carex riparia is often dominant throughout Crayford but not found in Erith except at the beginning of the Southwest Marsh.

Branched bur reed Sparganium erectum, fool's water cress Apium nodiflorum and water cress Nasturtium officinale are dominant south of Wallhouse Road in Crayford but not elsewhere.

It must be remembered that in a dyke system, the rotational management whereby successive sections are cleansed or dredged, causes a regular cycle of floral diversity. A section which has a climax reed vegetation may well, in this catchment, support between 20 and 30 species some two years after dredging.

A further facet of the inter-relationship between grazing marsh and marsh dyke is shown in the fact that without exception the more canalised dyke sections have a less diverse flora than those poached by stock.

Within these limitations, out of the sections awarded the Critically Important category in 1990, Triglochin Dyke is exceptional with 28 spp overall including outstanding populations of marsh arrowgrass Triglochin palustris, a plant that is scarce and decreasing in the southeast, and brookweed Samolus valerandi which is even more rare in the London area. None of the individual Crayford sections is equally rich but both Crayford (28 spp) and Lower Farm Dykes (26 spp) match its diversity when taken as a whole. Howbury Dyke has been recently cleansed throughout but recolonisation is good while the Green Lane System has a wide range of successional vegetation types and overall species richness. In Erith Great Breach Dyke West has the best community of submerged aquatics in the whole catchment and also the highest number (17) of notable riparian species most of which are in the southern reach. Great Breach Dyke South has a higher total species diversity (29) but a more limited submerged aquatic flora. Eastern Way Dyke resembles the latter but considerable lengths are nearing climax and need sensitive management.

## REEDSWAMP, MARSH AND POND VEGETATION

The same vegetation type as above.

The outstanding area in this category is the Southwest Marsh in Erith. Out of a total of 27 species, 10 are notable in the London area. Not only is the plant assemblage unique in the catchment but it also contains species not or rarely seen elsewhere.

Howbury Moat in Field 32 at Crayford was not seen at its best during the survey but it supports 3 notable species and previous surveys in better years have proved its interest. A very good case can be made for management here.

Twin Tumps and Tump 53 fall into this site category as the former is not, and the latter only partially, linked to the canal system. The riparian vegetation of the tumps is similar to that of the dykes but lacks the short emergent vegetation associated with grazing.

Of the sites included in the brief for Thamesmead, these are the only ones which have a good range of submerged aquatics. All are species which can tolerate brackish conditions. Both areas have very good fringing reeds, the more diverse being at Tump 53. In addition the latter has possibly the most extensive reed swamp in the catchment. Other large reed swamps occur inland along Eastern Way Dyke, Great Breach Dyke West and along the foreshore at Crayford.

## GRAZING MARSH

Dominant grass spp: meadow barley Hordeum secalinum, creeping bent Agrostis stolonifera, marsh fox-tail Alopecurus geniculatus, false oat grass Arrhenatherum elatius and couch Agropyron repens.

Previous farming practice has left some fields more interesting than others but if water levels are kept high and traditional management pursued, it is likely that "improved" fields would recover.

Most of the fields are horse grazed and vary from tightly cropped all over to rough and neglected. Some have been improved by addition of rye grass Lolium perenne and clover Trifolium repens and others are rich in grass species but herb poor. Field 16 in Erith illustrates what can happen when grazing pressures are removed or absent.

The dampest fields support a flora typical of estuarine pastures. The areas in Crayford with the greatest number of notable plants are Fields 16-20. The southeastern half of Field 22 and part of Field 25 also support important plant populations.

The old tidal defence walls crisscrossing the fields support specialised plants often spreading into the fields. Fields 12, 18 and 19 in Erith and Fields 9 and 10 in Crayford are particularly good. These plants may well be found elsewhere.

## SALTMARSH

Dominant sp: sea aster Aster tripolium

As virtually all the foreshore in the London area has disappeared behind vertical embankments, the saltmarsh communities recorded in this catchment are the only ones surviving on the south bank of the Thames. The most extensive areas occur at Crayford west of the Ness. Other sizeable communities occur near the Great Breach Outfalls, in F2 and F5. Smaller pockets occur within the reeds on the Saltings at Crayford.

### 4.3.2. Other habitats

## HEDGE AND SCRUB

Dominant spp: hawthorn, blackthorn.

This habitat is limited in the area as a whole. Both Thamesmead and Crayford have examples but the first may soon disappear. Best sites are the tumps and the area between Butts and Waterfield Canals, near the Southern Outfall Sewer at Crossway Canal, north of Eastern Way in Field 16, along Alders Dyke and beside Horse Head Dyke Section 1.

In Crayford the marshes north of Wallhouse Road are largely open and exposed although there are some 'important' areas of scrub particularly at the eastern end. South of the road many of the dykes have associated hawthorn, blackthorn or elm hedges. Much of the southern boundary of the Marshes and Wallhouse Road itself near Lower Farm also retain their traditional hedges. There is a very good hawthorn hedge between the two wet fields in the far west Fields 34 and 35.

The hedges associated with Dykes 60, 61 and part of Dyke 63 in the southwest of Crayford Marshes contain many dying hawthorns. The fairly recent flooding of Fields 34 and 35 is likely to be the cause but it is not clear whether the problem arises from simple waterlogging or the effect of pollution. Only hawthorns are affected.

## TREES

Dominant spp: birch, hybrid poplar (Thamesmead), sycamore, white and crack willow

The most important trees are the birches near the Twin Tumps and the willows along the dykes near Howbury Farm. The invertebrate population in these trees possibly includes very specialised species (Glading 1987).



ROUGHLAND (includes wasteland and rough grassland)

There are several overlapping categories dependant on maturity. At its best this habitat has great floral diversity and is excellent for wildlife. In addition to the usual species of this habitat, the following were characteristic of the catchment: bristly ox-tongue Picris echioides, wild carrot Daucus carota, soapwort Saponaria officinalis, perennial wall rocket Diploaxis tenuifolia and the colourful aliens Hirschfeldia incana and goat's rue Galega officinalis.

Good examples include all the foreshore except F4, the banks of the Belvedere dykes especially Crabtree Dyke, the second reach of Green Level Dyke, Corinthian Dyke Section 1 and Field 3 on Crayford Marshes.

#### 4.3.3. Habitat mosaics

Where two or more habitat types occur together, the advantages to wildlife are more than doubled. Thus the importance of the habitat mosaic should always be considered when management is discussed. For example, the critically rated Twin Tumps would lose much of its importance without its dense hawthorn.

Examples of good associations of habitats on Crayford Marshes would be the Howbury Farm area in the southwest (dykes, standing water, grazing marsh, old walls, scrub, hedges and trees) or the northeastern field complex (dykes, grazing marsh, dry banks and scrub).

## 4. BIOLOGICAL ASSESSMENT

### 4.4. HABITAT LOSSES

#### 4.4.1. Introduction

The notes below indicate losses that have been observed in the catchment but the surveyors wish to stress that it has not been possible to reach any valid conclusions for the following reasons:

the data was collected in Sections but with the exception of Crayford Marshes and the Southwest Marsh on Erith Marshes previous information was of a general nature and not site specific. There is no equivalent base-line data for the catchment as a whole;

it is in the nature of a dyke drainage system to have a fluctuating vegetation pattern and, depending on management practices, a species present and recorded in 1990 may not have recovered after management at the time of a previous survey;

there are many variables to be taken into account such as time of year, nature of the season, constraints of any survey (eg time - when dykes have a total cover of duckweed, it is necessary to use a grapple to extract samples of submerged aquatics. When populations are small, it is very easy to miss their occurrence as it is not feasible to use the grapple every metre);

even if a plant recorded 5 years before is re-recorded for the same site, accurate details of population size are not always known.

In the broadest possible terms it could be said that there appears to have been scarcely any loss of species in the last ten years from Erith and Crayford taking the areas as a whole (the Groenlandia densa and Potamogeton crispus may still be present in Crayford Dyke). Two very important species appear to have been gained in Crayford but may have been overlooked before.

#### 4.4.2 Thamesmead

The submerged flora in Butts and Harrow Canals near Tump 53 was not re-recorded.

(This loss is probably due to the use of algicide in the water. Both Terbutryn and Diquat/diquat alginate, the two approved algicides, also kill submerged and floating aquatics.)

The ditch between Twin Tumps and Waterfield Canal is thought to be the site described in the Report of the Ecological Survey

carried out for Thamesmead Town (Pagenham and Hare 1988) where a good range of submerged aquatic plants were recorded. No submerged species were recorded in 1990.

Reed beds/wetland have been converted to amenity parkland beside the basin in Crossway Park. The range of wetland plants not present elsewhere indicates a former wild area. Relic common reed Phragmites communis is pushing through shrub beds.

Insensitive work at Tump 39 in Crossway Lake has exchanged natural vegetation for amenity plantings.

A diverse mature wasteland flora has been exchanged for a green desert of mown ryegrass. Wasteland flora, if retained, is an asset eg the species rich turf beside Crossway Canal near Crossway and species rich area below the sub-stations by Gallions Lake.

There is a loss of microhabitat where hawthorns are brashed to head height eg Butts Wood Park.

The eastern bank of Tump 52 has lost much of its interest and is scraped clean.

#### 4.4.3. Erith

Grazing marsh has been lost where Alders now stands.

South of Eastern Way, water is now absent from Cross Dykes 1 and 3, from Alders Dyke and from the dyke south of the Marshes that once flowed into Alders Dyke.

This absence of water is associated with the blocking of Cross Dyke 1 (apparently once the beginning of Eastern Way Dyke) and Cross Dyke 3.

North of Eastern Way, the dykes once crossing Fields 18 and 19 have been allowed to silt up completely.

Aquatic and riparian flora and fauna, once associated with these dykes has been lost.

Many submerged plants in the Great Breach dykes north of the spine road appear to have been lost. Spiked water-milfoil Myriophyllum spicatum and hornwort Ceratophyllum sp were reported from the "channels" (LWT 1986). In 1990 they were only recorded from one reach of one Section.

Perhaps the last desilting operation was too thorough (some weed should always be thrown back to sustain the plant populations) or perhaps there has not been enough time for recovery of these communities (date of last desilting is not known). However, the annual cleanse, though conducted in two half yearly sessions, does seem too frequent and is probably the reason for this loss.

Trees have been planted into grazing land near Great Breach Dyke South. Non-native species have been included.

#### 4.4.4. Belvedere

Aquatic flora has been lost between Picardy Ditch Section 1 and Picardy Ditch Section 2.

Aquatic flora has been lost between Corinthian Dyke Section 3 and Horse Head Dyke. Is the latter cleansed too often?

Bank habitat and the opportunity for its renewal have been lost where gabions have been installed in Green Level Dyke.

#### 4.4.5. Crayford

Land has been lost to the landfill site with subsequent problems with leaching.

Houses have been built on fields in the west.

Crayford Dyke loses its interest once it enters the industrial site.

The moat at Howbury Farm has lost much of its water - see evidence of previous water level on ruins.

The moat is also likely to lose its interest soon as no desilting has been carried out.

The rare stiff saltmarsh-grass Puccinellia rupestris, once present near Crayford Sluice has not been seen for some years.

Curled pondweed Potamogeton crispus and opposite-leaved pondweed Groenlandia densa may have been lost from Crayford Dyke following maintenance. (However, duckweed cover and heavy algal growth made search difficult.)

Fennel pondweed Potamogeton pectinatus was not recorded from the first reach of Lower Farm Dyke 2 NCC 17 (recorded by Pardon for NCC 1985). This may be due to too frequent or too thorough maintenance.

NCC 33 has lost its water and much of its riparian vegetation. This may arise from natural silting or be associated with the development of the adjacent industrial site. Horned pondweed Zannichellia palustris, brackish water crowfoot Ranunculus baudotii, water starwort Callitriche sp and duckweed Lemna minor have all been recorded here (NCC 1985).

NCC 48 has disappeared to create a larger hayfield.

NCC 3, 6, 24, 26, 29, 34, 35, 36, 40, 43, 49 and 66 are all dry and mostly grassed over.

Lower Farm Dyke Section 2, first reach NCC 17, appears to have lost its interest following dredging. There is very little evidence of regenerating vegetation.

#### 4.4.6. Foreshore

11ha of Woolwich Bay foreshore have been lost as a result of the construction of the river wall and land reclamation.

Upper saltmarsh in Crayford has been lost by the spreading of hardcore to stabilise the sea wall and the extension of its base into the the saltings.

The development of the Erith Yacht Club site has resulted in the loss of some saltings.

#### 4.4.7. Threats

In addition to these actual losses, development proposals and current plans threaten the whole area (Thamesmead town centre expansion, East London river crossing, housing at Crossness, development zoning for the Erith Marshes, grazing land for sale in Belvedere, Erith spine road, marina at Crayford, housing and road to industrial estate ....).

## 5. SOME GUIDELINES FOR MANAGEMENT

### 5.1. HABITAT MANAGEMENT

Specific suggestions for enhancement are given in the individual Section Descriptions. It seems appropriate, however, to offer some general guidelines.

Most of the CRITICALLY IMPORTANT sections are dependent on a high water table for their wildlife interest so it is important to maintain the high levels observed during the survey period despite almost two years of dry conditions. That the dykes can dry out is illustrated by the lack of water in some marshes in Kent in the same season.

#### 5.1.1. Dykes

If there is to be a concentration of effort on the best sites, it must be remembered that diversity and interest are not static but move around with the cycle of management. (The one vital exception to this observation is Triglochin Dyke which appears to be isolated from the rest of the system.)

#### CHANNEL: Timing

It is important to work in short sections at any one time. Records show that Crayford Dyke and at least the Wallhouse Road stretch of Lower Farm Dyke were all desilted in late 1988. It would be better if the work were spread over several years in order to diversify the age of the vegetation.

The timescale could be reviewed with the object of lengthening the gap between desiltings in some sections. For example, the two year cycle for Horse Head Dyke seems too short and possibly accounts for the lack of submerged vegetation.

On the Crayford Marshes there is a particular problem concerning certain tributary dykes which are seasonally dry and silted but still retain much of interest eg rare water crowfoots. While ideally they should be brought back into the system with a "little and often" approach, in the short term one option would be to create a pond or bay at a depth below the base level. A junction between dykes is a suitable location. There are great conservation advantages in providing a refuge for amphibians, invertebrates and possibly fish where there is little summer water and providing continuity of habitat for wetland plants and animals.

#### CHANNEL: Algicides

The water in the lakes and canals in Thamesmead support only algae species which appear to be controlled by chemical means. To quote from the NCC handbook, Nature conservation and the management of drainage channels, "There is a fundamental relationship between a higher plant community and algae. Higher plants can partially control algae through competition factors and animals can partially control algae through grazing. The two together can effectively control algae. Eliminate or suppress this community and the algae take over". Once the point of herbicide dependency has been reached, it may be a while before viable populations of submerged aquatics become established.

#### CHANNEL: Reeds

There seems to be a good policy for patch clearance of reeds but frequency of this operation in some dykes seems excessive (records state twice yearly).

Cutting of reeds especially in the summer months has disadvantageous effects for wildlife. Seasonal water flow is better maintained with some form of patch clearance of reeds and some desilting. If reed cutting is continued, all cut material should be removed off site. The current practice of leaving the cut reeds to fall back in the water or lie as a mat on the bank smothering the less robust plant species and encouraging thistles etc should be discontinued.

#### BANKS: Profile

Drainage dykes often have uniform banks but diversity of structure increases opportunities for wildlife.

There is scope which would involve land take on both Erith and Crayford Marshes for varying profiles but care must be taken to safeguard sites of notable species.

Stock can be a cheap way of achieving a desired result. Poaching by grazing animals also creates ideal conditions for many plants and invertebrates. These shallow, muddy areas should be retained as much as possible.

Excess water problems can be solved by widening rather than deepening, using the opportunity to create gently sloping or two-tier banks and also pools and bays where appropriate. In particular, where banks have fallen away, a small shallow bay could be retained with the repair following the curve.

When reprofiling, where the original bank has good vegetation the turf should be retained and relaid.

Where it is absolutely essential to reinforce banks, prefabricated materials offering good footholds for recolonising vegetation are available to the engineer. It is even better when natural materials such as hurdles can be used.

## BANKS: Vegetation

On the whole, throughout Erith, Belvedere and Crayford there is at present an interesting diversity of bank vegetation types resulting from different levels of management (those banks cut in midsummer being of least value). Some are grazed, some are cut annually, some receive infrequent or no management. A useful and informative chapter on cutting frequency and the benefits to wildlife from the various regimes is contained in the NCC handbook on Nature conservation and the management of drainage channels 1989. Whenever banks are mown, all cuttings must be removed off site.

Where giant hogweed and Japanese knotweed occur, there needs to be a regular programme of control and, preferably, eradication. Cutting is recommended but current research into the problem by the NRA may provide a better solution.

### 5.1.2. Fields

It is recommended that no agrochemicals (artificial fertiliser, herbicide or pesticide) are used on the Marshes in Erith and Crayford.

If this principle cannot be accepted, then a broad headland should be left to protect the dykes.

Grazing is the preferred and traditional use of the Marshes, permitting higher water levels in the dykes than the arable option, and so sustaining the riparian flora and fauna. Another benefit is that the dyke edges become poached.

The grazing level seems to be right on Crayford but not on the Erith Marshes where the problems are two-fold and require overall control. First the multiplication of shantytown paddocks seems to be out of hand (one appeared during the survey on the Southwest Marsh). Secondly many paddocks are severely overgrazed.

### 5.1.3. Trees and shrubs

As this is a rare habitat in the catchment, it is important that it should be given protection.

As a general principle, only locally native trees and shrubs should be planted eg ash, white and crack willow, alder, birch, hawthorn, blackthorn and sallow.

While screening of unsightly structures is necessary, planting into good grassland is to be avoided.

### 5.1.4. Saltmarsh

While repairing the river wall, opportunities should be taken to provide more or less flat areas on which saltmarsh plants can become established.



#### 5.1.5. Thames riverside walk

It would be an aesthetic loss as well as a loss in wildlife conservation terms if the existing wild areas along the river were formalised like F4.

#### 5.2. PLANNING

It is important to coordinate nature conservation in a catchment area which is administered by a number of local authorities. Thamesmead Town and the Boroughs of Bexley and Greenwich are directly involved. In addition, Dartford District Council is indirectly involved as any development on the Dartford Marshes is likely to affect the neighbouring Crayford Marshes. At the more local level, management of the tributary dykes needs to be coordinated so that the entire system of interlocking waterways has a good balance between cleared and silted channels.

Some of the dykes, eg Picardy Ditch Section 2 and many reaches of Crayford Dyke Section 4, illustrate what happens when provision for a buffer zone is not included in development proposals. Corinthian Dyke Sections 1 and 2 are examples of buffer zones which improve the wildlife potential of the dyke. In addition, any premises adjoining the dykes should have secure fencing to prevent accidental or deliberate fouling of the waterway.

# APPENDIX 1

List of all plant species recorded during the survey.

N - naturalised; an alien species, spreading naturally  
P - planted; a native species, not occurring locally  
PI - introduced; an alien species, not occurring locally

<i>Acer campestre</i>	field maple	P
" <i>pseudoplatanus</i>	sycamore	N
<i>Achillea millefolium</i>	yarrow	
<i>Aesculus hippocastanum</i>	horse chestnut	PI
<i>Agrimonia eupatoria</i>	agrimony	
<i>Agropyron pungens</i>	sea couch	
" <i>repens</i>	couch	
<i>Agrostis stolonifera</i>	creeping bent	
" <i>tenuis</i>	common bent	
<i>Alisma plantago-aquatica</i>	water plantain	
<i>Allium vineale</i>	crow garlic	
<i>Alnus incana</i>	grey alder	PI
<i>Alopecurus geniculatus</i>	marsh foxtail	
" <i>pratensis</i>	meadow foxtail	
<i>Angelica archangelica</i>	angelica	
" <i>sylvestris</i>	wild angelica	
<i>Anthriscus sylvestris</i>	cow parsley	
<i>Apium graveolens</i>	wild celery	
" <i>nodiflorum</i>	fool's watercress	
<i>Arctium minus</i>	lesser burdock	
<i>Armoracia rusticana</i>	horse radish	
<i>Arrhenatherum elatius</i>	false oat grass	
<i>Artemisia verlotorum</i>	Chinese mugwort	
" <i>vulgaris</i>	mugwort	
<i>Asparagus officinalis</i>	wild asparagus	
<i>Aster tripolium</i>	sea aster	
<i>Atriplex hastata</i>	halberd-leaved orache	
" <i>littoralis</i>	grass-leaved orache	
<i>Atropa belladonna</i>	deadly nightshade	
<i>Avenula pubescens</i>	downy oat grass	
<i>Azolla filiculoides</i>	water fern	I
<i>Ballota nigra</i>	black horehound	
<i>Bellis perennis</i>	daisy	
<i>Berula erecta</i>	lesser water parsnip	
<i>Beta maritima</i>	sea beet	
<i>Betula pendula</i>	silver birch	
<i>Bidens tripartita</i>	bur-marigold	
<i>Brassica nigra</i>	black mustard	
<i>Bromus sterilis</i>	barren brome	
<i>Bryonia dioica</i>	white bryony	
<i>Buddleia davidii</i>	butterfly bush	
<i>Bunias orientalis</i>		
<i>Butomus umbellatus</i>	flowering rush	P
	(poss. also native)	

<i>Calamagrostis epigejos</i>	wood small-reed	
<i>Callitriche</i> agg.	water starwort	
" <i>stagnalis</i>	mud water starwort	
<i>Calystegia sepium</i> agg.	hedge bindweed	
" <i>sylvatica</i>	great bindweed	
<i>Capsella bursa-pastoris</i>	shepherd's purse	
<i>Cardaria draba</i>	hoary cress	
<i>Carduus acanthoides</i>	welted thistle	
<i>Carex divisa</i>	divided sedge	
" <i>hirta</i>	hairy sedge	
" <i>otrubae</i>	false fox sedge	
" <i>riparia</i>	great pond sedge	
<i>Centaurea nigra</i>	knapweed	
<i>Centaureum erythraea</i>	common centaury	
<i>Cerastium fontanum</i>	common mouse-ear	
<i>Ceratophyllum demersum</i>	rigid hornwort	
<i>Chenopodium album</i>	fat hen	
<i>Chrys. leucanthemum</i>	ox-eye daisy	
<i>Cichorium intybus</i>	chicory	
<i>Cirsium arvense</i>	creeping thistle	
" <i>vulgare</i>	spear thistle	
<i>Clematis vitalba</i>	traveller's joy	
<i>Cochlearia anglica</i>	English scurvygrass	
<i>Conium maculatum</i>	hemlock	
<i>Convolvulus arvensis</i>	lesser bindweed	
<i>Conyza canadensis</i>	Canadian fleabane	
<i>Coronilla varia</i>	crown vetch	
<i>Coronopus didymus</i>	lesser swine cress	
<i>Corylus avellana</i>	hazel	P
<i>Crataegus monogyna</i>	hawthorn	
<i>Crepis capillaris</i>	smooth hawk's beard	
" <i>vesicaria</i>	beaked hawk's beard	
<i>Cynosurus cristatus</i>	crested dog's tail	
<i>Cyperus longus</i>	galingale	P
<i>Dactylis glomerata</i>	cocksfoot	
<i>Daucus carota</i>	wild carrot	
<i>Diplotaxis tenuifolia</i>	wall rocket	
<i>Dipsacus fullonum</i>	teasel	
<i>Echium vulgare</i>	viper's bugloss	
<i>Eleocharis palustris</i>	common spike-rush	
<i>Elodea nuttallii</i>	Nuttall's waterweed	
<i>Epilobium adenocaulon</i>	American willow herb	
" <i>angustifolium</i>	rosebay willowherb	
" <i>hirsutum</i>	hairy willow herb	
<i>Equisetum arvense</i>	common horsetail	
" <i>telemateia</i>	great horsetail	
<i>Erigeron acer</i>	blue fleabane	
<i>Erodium cicutarium</i>	common storksbill	
<i>Erysimum cheiranthoides</i>	treacle mustard	N
<i>Euphorbia esula</i>	leafy spurge	
" <i>helioscopia</i>	sun spurge	
" <i>peplus</i>	petty spurge	
<i>Festuca arundinacea</i>	tall fescue	
" <i>rubra</i>	red fescue	
<i>Foeniculum vulgare</i>	fennel	
<i>Fraxinus excelsior</i>	ash	P

<i>Galega officinalis</i>	goat's rue
<i>Galium aparine</i>	goosegrass
" <i>verum</i>	lady's bedstraw
<i>Geranium dissectum</i>	cut-leaved cranesbill
" <i>molle</i>	dove's foot cranesbill
" <i>robertianum</i>	herb robert
<i>Geum urbanum</i>	herb bennet
<i>Glaux maritima</i>	sea milkwort
<i>Glechoma hederacea</i>	ground ivy
<i>Glyceria declinata</i>	small sweet-grass
" <i>maxima</i>	reed sweet-grass
<i>Hedera helix</i>	ivy
<i>Heracleum mantegazzianum</i>	giant hogweed
" <i>sphondylium</i>	hogweed
<i>Hippophae rhamnoides</i>	sea buckthorn
<i>Hirschfeldia incana</i>	hoary mustard
<i>Holcus lanatus</i>	Yorkshire fog
" <i>mollis</i>	creeping soft grass
<i>Hordeum murinum</i>	wild barley
" <i>secalinum</i>	meadow barley
<i>Humulus lupulus</i>	hop
<i>Hypericum perforatum</i>	perforate St John's wort
<i>Hypochoeris radicata</i>	common cat's ear
<i>Inula conyza</i>	ploughman's spikenard
<i>Juncus articulatus</i>	jointed rush
" <i>bufonius</i>	toad rush
" <i>effusus</i>	soft rush
" <i>gerardii</i>	saltmarsh rush
" <i>inflexus</i>	hard rush
<i>Knautia arvensis</i>	field scabious
<i>Lactuca serriola</i>	prickly lettuce
<i>Lamium album</i>	white dead nettle
<i>Lapsana communis</i>	nipplewort
<i>Lathyrus latifolius</i>	everlasting pea
" <i>pratensis</i>	meadow vetchling
<i>Lemna gibba</i>	fat duckweed
" <i>minor</i>	duckweed
" <i>trisulca</i>	ivy duckweed
<i>Leontodon autumnalis</i>	autumn hawkbit
<i>Lepidium ruderae</i>	narrow-leaved peppervort
<i>Linaria vulgaris</i>	common toadflax
<i>Lolium perenne</i>	rye grass
<i>Lotus corniculatus</i>	bird's foot trefoil
" <i>tenuis</i>	narrow-leaved bird's foot trefoil
<i>Lupinus sp</i>	lupin
<i>Lycopus europaeus</i>	gipsywort
<i>Malva sylvestris</i>	common mallow
<i>Mat. matricarioides</i>	pineapple weed
<i>Medicago arabica</i>	spotted medick
" <i>lupulina</i>	black medick
" <i>sativa</i>	lucerne

Melilotus alba	white melilot	
" officinalis	melilot	
Myosotis caespitosa	tufted forget-me-not	
Myriophyllum spicatum	spiked water milfoil	
" sp	parrot weed	N
Nasturtium officinalis	watercress	
Nymphoides peltata	fringed water lily	P?
Odontites verna	red bartsia	
Oenanthe crocata	hemlock water dropwort	
Pastinaca sativa	wild parsnip	
Petroselinum segetum	corn parsley	
Phleum pratense	timothy	
Phragmites communis	common reed	
Picris echioides	bristly ox-tongue	
" hieracioides	hawkweed ox-tongue	
Pilosella officinarum	mouse-ear hawkweed	
Plantago lanceolata	ribwort plantain	
" major	great plantain	
" maritima	sea plantain	
Platanus sp	London plane	P
Poa annua	annual meadow grass	
" pratensis	smooth meadow grass	
" trivialis	rough meadow grass	
Polygonum aviculare	common knotgrass	
" hydropiper	water pepper	
" persicaria	common persicaria	
Populus canescens	grey poplar	P
" sp	hybrid poplar	NP
" tremula	aspen	P
Potamogeton crispus	curled pondweed	
" pectinatus	fennel pondweed	
" pusillus	lesser pondweed	
Potentilla anserina	silverweed	
" reptans	creeping cinquefoil	
Poterium sanguisorba	salad burnet	
Prunus spinosa	blackthorn	
Pteridium aquilinum	bracken	
Puccinellia distans	reflexed saltmarsh grass	
" maritima	common saltmarsh grass	
Pulicaria dysenterica	fleabane	
Ranunculus acris	meadow buttercup	
" baudotii	brackish water crowfoot	
" repens	creeping buttercup	
" sardous	hairy buttercup	
" sceleratus	celery-leaved buttercup	
" trichophyllum	thread-leaved water crowfoot	
Reseda lutea	mignonette	
" luteola	weld	
Reynoutria japonica	Japanese knotweed	
Robinia pseudoacacia	false acacia	PI
Rorippa islandica	marsh yellow cress	
Rosa canina agg	dog rose	
Rubus fruticosus agg	bramble	

Rumex acetosella	sheep's sorrel	
" conglomeratus	clustered dock	
" crispus	curled dock	
" hydrolapathum	water dock	
" obtusifolius	broad-leaved dock	
" palustris	marsh dock	
" patientia		
Salix alba	white willow	
" caprea	goat willow	
" cinerea	sallow	
" fragilis	crack willow	
" viminalis	osier	P
Sambucus nigra	elder	
Samolus valerandi	brookweed	
Saponaria officinalis	soapwort	
Sarothamnus scoparius	broom	P
	(also native)	
Scirpus maritimus	sea club-rush	
Schoenoplectus lacustris		
ssp tabernaemontani	grey bulrush	
Scrophularia aquatica	water figwort	
"    nodosa	figwort	
Senecio erucifolius	hoary ragwort	
"    jacobaea	ragwort	
"    squalidus	Oxford ragwort	
Silaum silaus	pepper saxifrage	
Silene alba	white campion	
"    dioica	red campion	
"    vulgaris	bladder campion	
Sisymbrium officinale	hedge mustard	
"    orientale	eastern mustard	
Solanum dulcamara	woody nightshade	
Sonchus arvensis	corn sowthistle	
"    oleraceus	common sowthistle	
Sparganium erectum	branched bur-reed	
Spergularia marina	lesser sea spurrey	
"    media	greater sea spurrey	
Symphoricarpos albus	snowberry	PI
Symphytum officinale	comfrey	
Tanacetum vulgare	tansy	
Taraxacum officinale	dandelion	
Torilis japonica	hedge parsley	
"    nodosa	knotted hedge parsley	
Tragopogon pratensis	goat's beard	
Trifolium arvense	hare's foot clover	
"    campestre	hop trefoil	
"    dubium	lesser yellow trefoil	
"    fragiferum	strawberry clover	
"    pratense	red clover	
"    repens	white clover	
Triglochin maritima	sea arrowgrass	
"    palustris	marsh arrowgrass	
Tripleurospermum		
maritimum	scentless mayweed	
Trisetum flavescens	yellow oat grass	
Tussilago farfara	coltsfoot	
Typha angustifolia	lesser reedmace	
"    latifolia	reedmace	

Ulex europaeus	gorse
Ulmus procera	English elm
Urtica dioica	stinging nettle
Verbascum nigrum	dark mullein
"    thapsus	common mullein
"    lychnitis	white mullein
Verbena officinalis	vervain
Veronica beccabunga	brooklime
"    catenata	pink water speedwell
Vicia cracca	tufted vetch
"    hirsuta	hairy tare
"    sativa	common vetch
Vulpia bromoides	squirrel tailfescue
"    myuros	rat's tail fescue
Zannichellia palustris	horned pondweed

## APPENDIX 2

List of all lichen species recorded during the survey.

Key to letters denoting location/host.

Sa - On Salix in Field 35 on Crayford Marshes  
 Sn - On Sambucus nigra at Crossway Lake  
 BC - Butts Canal (seat overlooking Tump 52)  
 ThE - Thamesmere East (terrace)  
 W - Seawalls and walls of bridges, sluices etc  
 TT - Twin Tumps

Acrocordia salweyi	ThE
Caloplaca citrina	W TT
"    decipiens	W
"    holocarpa	W
"    saxatilis	W
Candelariella aurella	ThE W TT
"    vitellina	BC
Cladonia coniocraea	TT
"    fimbriata	ThE
"    macilenta	TT
"    squamosa	ThE
Evernia prunastri	BC
Hypogymnia physodes	Sa BC
Lecania erysibe	BC ThE
Lecanora campestris	W
"    conizaeoides	Sa BC
"    dispersa	ThE W TT
"    muralis	BC ThE W TT
Lecidella stigmathea	W
Lepraria incana	Sa
Parmelia saxatilis	BC
"    subaurifera	BC
"    sulcata	Sa
Peltigera polydactyla	ThE
Phaeophyscia orbicularis	Sa Sn W
Physcia adscendens	W
"    caesia	W
"    tenella	Sa
Rinodina genarii	W
Sarcogyne regularis	ThE W
Verrucaria viridula	ThE
Xanthoria calcicola	W
"    parietina	ThE W



### APPENDIX 3

List of all dragonflies, damselflies and butterflies recorded during the survey.

#### DRAGONFLIES/DAMSELFLIES

*Aeshna grandis*  
    *mixta*  
    *sp* (?*cyanea*)  
  
*Libellula depressa*  
*Sympetrum striolatum*  
*Orthetrum cancellatum*  
  
*Ischnura elegans*  
*Enallagma cyathigerum*  
*Lestes sponsa*

#### BUTTERFLIES

Speckled wood  
Wall  
Meadow brown  
Gatekeeper  
Small heath  
  
Red admiral  
Painted lady  
Small tortoiseshell  
Peacock  
Comma  
  
Common blue  
Holly blue  
Small copper  
  
Large white  
Small white  
Green-veined white  
  
Clouded yellow  
  
Small skipper  
Essex skipper  
Large skipper

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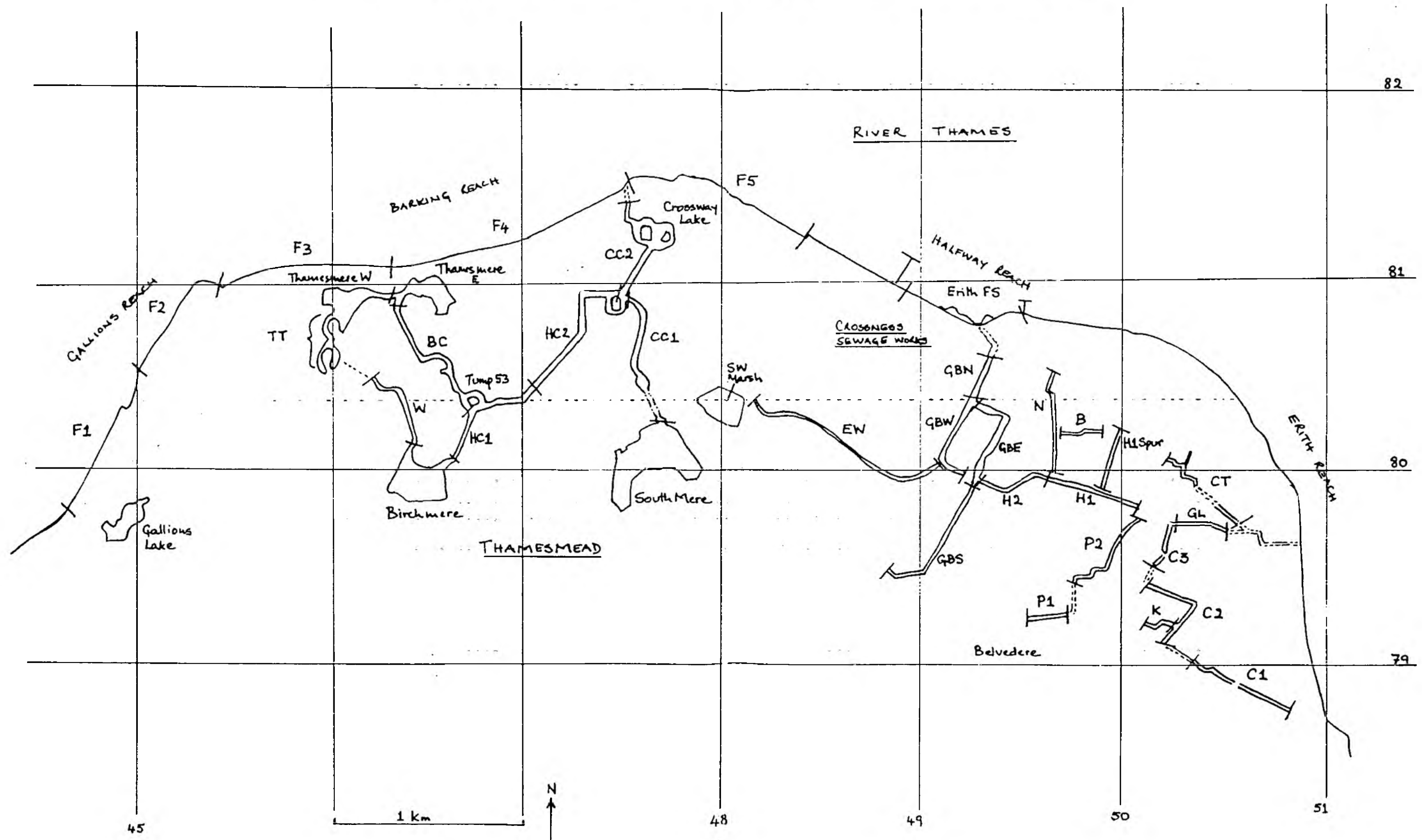
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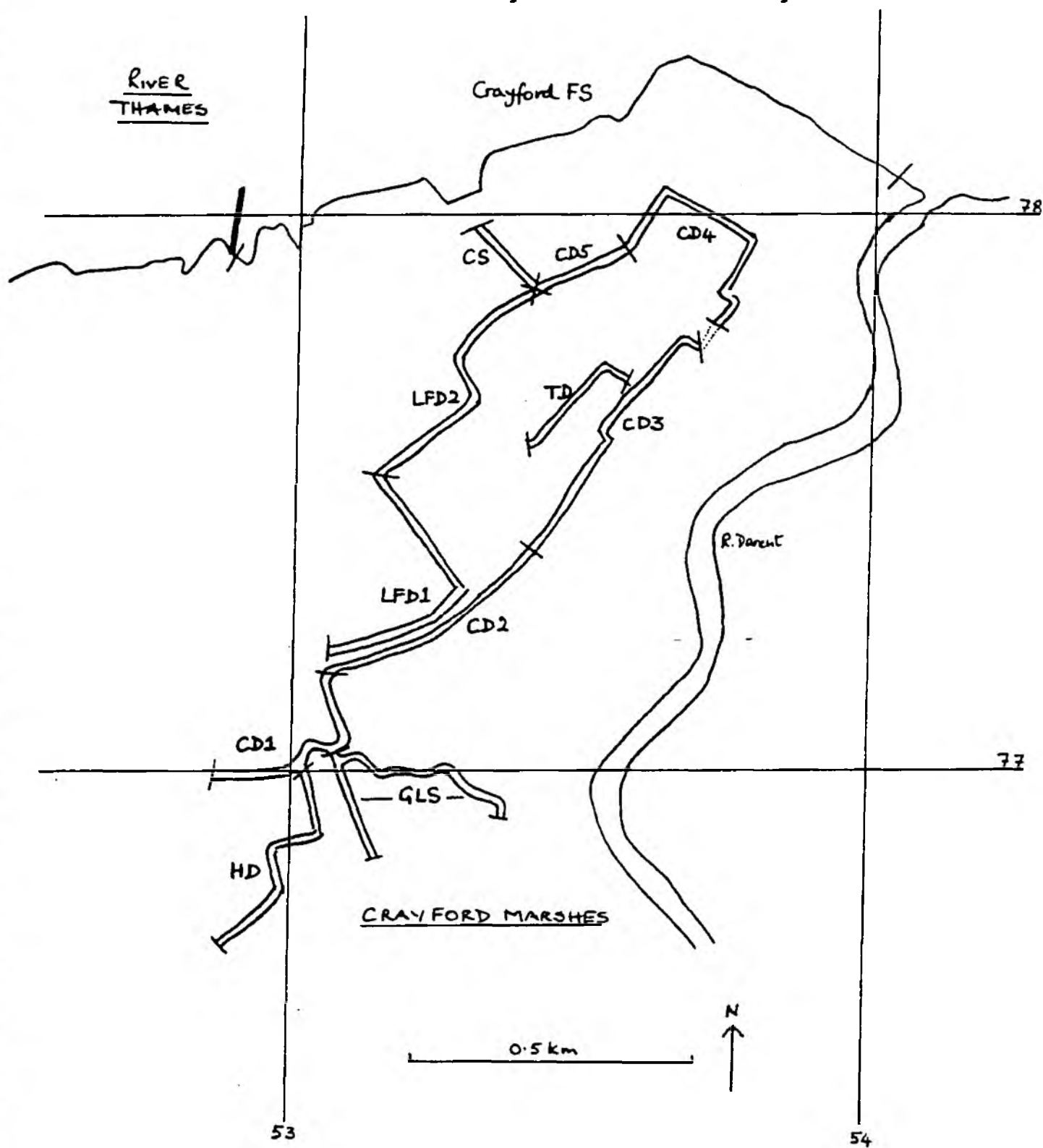
# MARSH DYKES ECOLOGICAL SURVEY 1990

Figure 1

Location of sections in the Marsh Dykes Catchment: Thamesmead and Erith



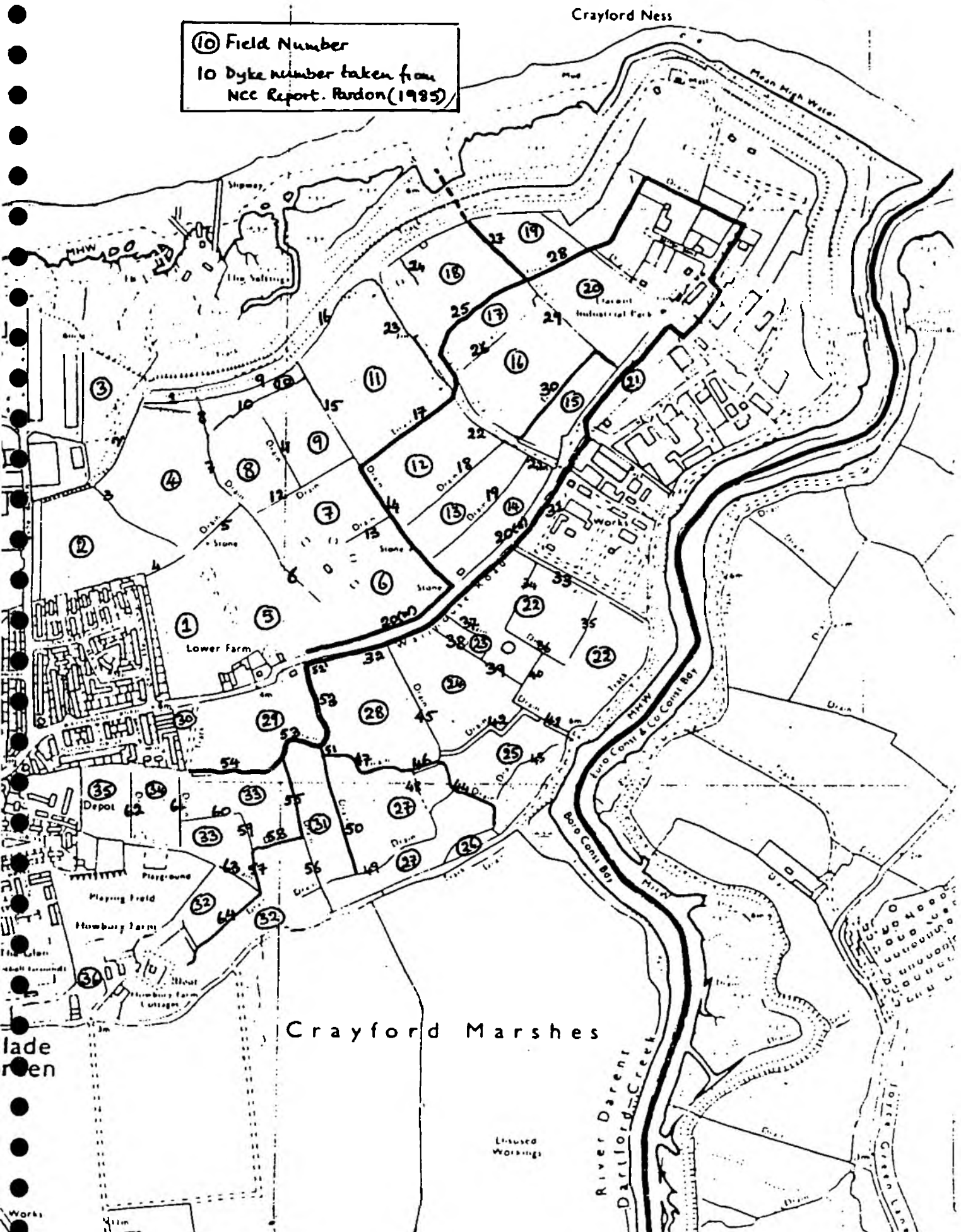
Location of sections in the Marsh Dykes Catchment: Crayford Marshes







**Dyke and field numbers on Crayford Marshes      Figure 4**





# KEY

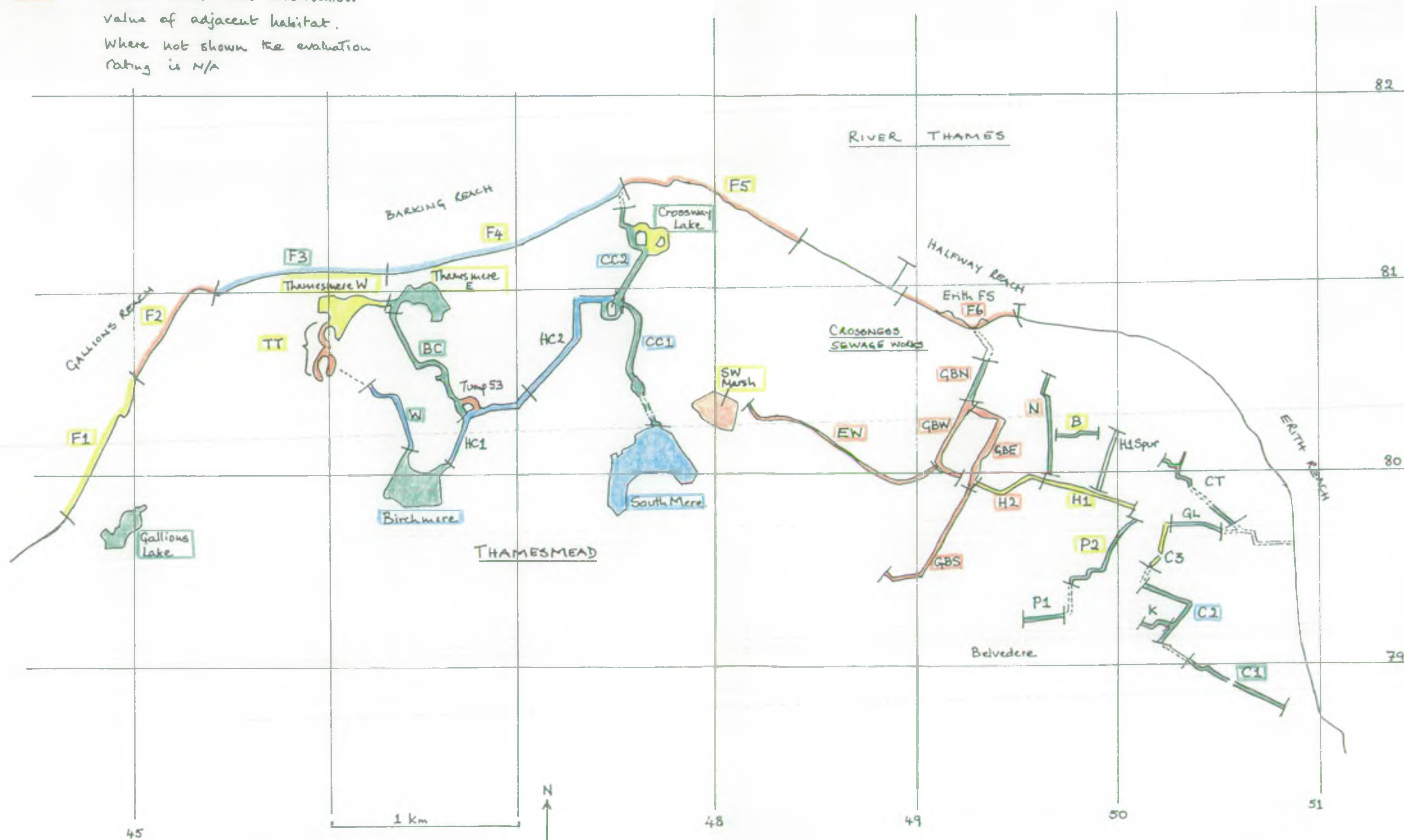
- CRITICALLY IMPORTANT
- IMPORTANT
- GOOD
- POOR

GBS Section code with conservation value of adjacent habitat.  
Where not shown the evaluation rating is N/A

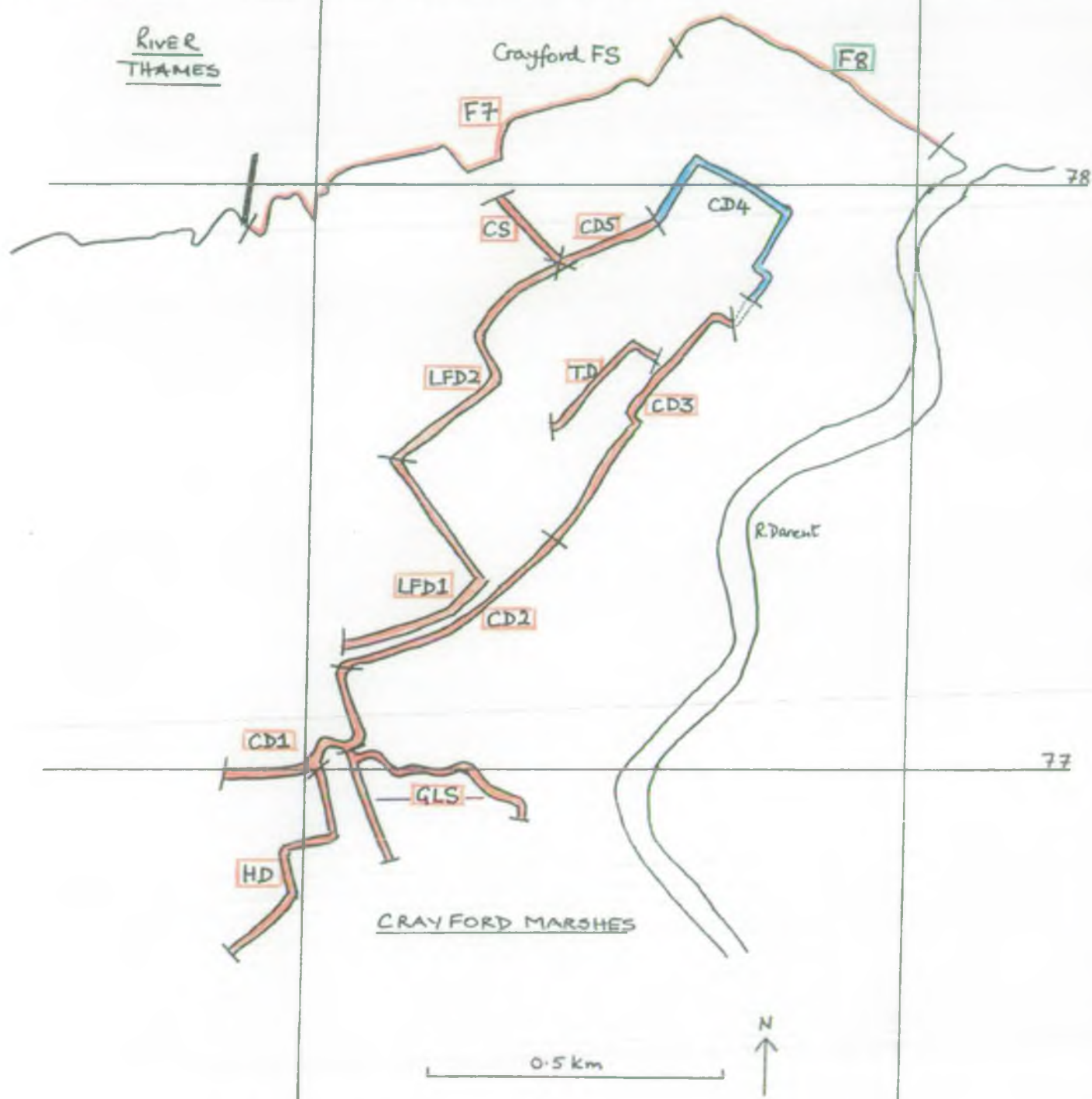
## MARSH DYKES ECOLOGICAL SURVEY 1990

Figure 5

Wildlife habitat evaluation in the Marsh Dykes Catchment:  
Thamesmead and Erith



## Wildlife habitat evaluation in the Marsh Dykes Catchment: Crayford Marshes



## KEY

- CRITICALLY IMPORTANT
- IMPORTANT
- GOOD
- POOR

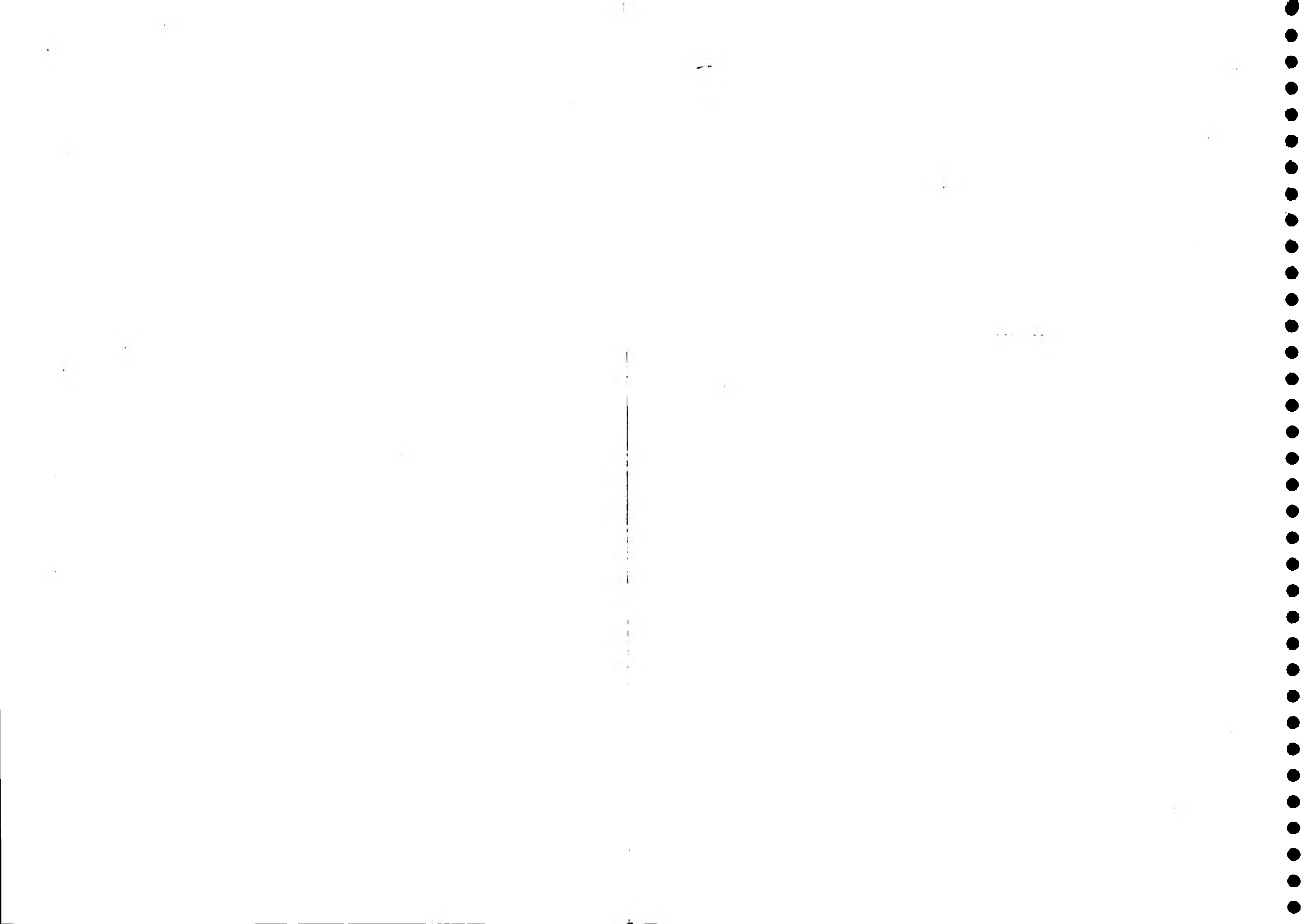
**CS** Section code with conservation value of adjacent habitat. Where not shown the evaluation rating is N/A



Chart of plant species recorded for the Remaining Tributary Dykes and open water on Crayford Marshes

Moat Pond, F22

[illegible]



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