

PART C : LINCOLNSHIRE WOLDS

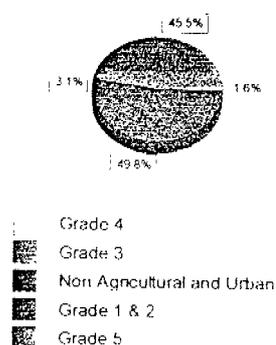
6.0 DESCRIPTION OF FARMING IN THE LINCOLNSHIRE WOLDS NATURAL AREA

Physical Characteristics

6.1 The largely chalk and limestone geology of the NA has been heavily influenced by glaciation, with extensive deposits of boulder clay. This has resulted in a range of good agricultural soils^{21,22}; to the north the main soils are the **Swaffham Prior** and **Hunstanton** associations, which are deep well drained soils over chalk suitable for cereals, sugar beet, potatoes and root vegetables. As the land rises to the main body of the Lincolnshire Wolds, the main associations are well drained calcareous **Andover 1** and **Panholes** soils, also suitable for cereals, potatoes and some root vegetables, and the more flinty **Carstens** soils, which are suitable for cereals and stock rearing. To the south the geology is more complicated, with sandstones, ironstones and clays present. This has resulted in a greater range of soil types, such as the well drained sandy **Cuckney 2** and **Cannamore** soils (suitable for a range of arable crops and root vegetables) and further areas of Andover 1 and Swaffham Prior soils.

6.2 The Agricultural Land Classification of the Lincolnshire Wolds Natural Area reflects the high quality of its farmland; 50% is classified as Grades 1 and 2 (defined as excellent and very good quality agricultural land respectively, with few limitations on cropping) compared to just 17% for England and Wales and a further 46% classified as Grade 3 (defined as good quality land with moderate limitations to cropping). Only 2% of the NA comprises poor quality Grade 4 land, with the remaining area covered by non-agricultural uses. The majority of the NA is therefore good, ploughable land typical of eastern counties. This is shown below:

Figure 6.1 : Land Quality By Grade



Agricultural Land-Use

6.3 In 1994, 82% of the NA was arable. This reflects the good quality land of the area. The breakdown within the NA is compared to the breakdown for the United Kingdom²³:

- 82.4% (71,809ha) arable (UK - 26.2% including bare fallow);
- 9.8% (8,528ha) grassland older than 5 years (UK - 30.8%);
- 2.7% (2,377ha) grassland less than 5 years old (UK - 8.3%);
- 0.9% (787ha) rough grazing (UK - 26.4%);
- 4.1% other land-use types (4,410ha).

Farm Types

6.4 Out of 635 holdings in the NA in 1994:

- 40% were part-time;
- 42% were full-time cropping farms;
- 7% were full-time cattle and sheep farms;
- 6% were full-time pig and poultry farms;
- 6% were other full-time farms.

The “other” farm types include full-time dairy farms, horticultural units and mixed farms. Part-time farms are defined by the MAFF Census Branch, in their analysis of census data, as those holdings with an estimated labour requirement of not more than 200 Standard Man Days (SMDs). 1 SMD is equivalent to 8 labour hours per year. The distinction between full and part-time farms throughout this report is based on this MAFF definition.

Farm Tenure

6.5 In 1994, 57% (49,780ha) of the NA’s agricultural area was owner-occupied and 43% (37,344ha) rented. The proportion of owner-occupied land is less than the 1994 national average for England of 64% owner-occupied and 36% rented.

Farm and Enterprise Size

6.6 In 1994 farms greater than 100ha in size were the most common size category in the NA:

Table 6.2 : Farm Sizes

Farm Size Category	Number of farms in each category as a percentage of all farms
Less than 5ha	18%
5ha to <20ha	17%
20ha to <50ha	13%
50ha to <100ha	14%
100ha and greater	38%

6.7 Farm labour inputs (measured by SMDs) provide valuable information about the size and intensity of farming enterprises. Although the MAFF Census Branch define a full-time farm as one with a labour requirement greater than 200 SMDs, other sources assume full-time workers provide labour worth about 250 SMDs annually (Nix 1995). These figures may be used as general indications of the number of full-time workers needed by an enterprise. However, the figures should not be interpreted too strictly. There may be some farms with labour requirements of less than 200-250 SMDs, but due to their individual circumstances are still able to employ a full-time farmer or worker. Likewise, some farms with large labour requirements may employ relatively few persons, relying on over-time or increased mechanisation for operations to be completed.

6.8 The SMD data suggests that 41% of farms in the NA (260 farms) were too small to provide full-time employment, which is confirmed by the analysis of farm types in paragraph 2.4, 40% (255 farms) of which were part-time. Most of the remaining farms have a labour input of in excess of 2 full-time workers, with a significant number (10%) of farms employing more than 7 workers.

Table 6.3 : Enterprise Size by SMD

Holding Size by SMDs	Approx. No. Of F/T Workers	Percentage
0-249 SMDs	0-1	41
250-499 SMDs	1-2	14
500-999 SMDs	2-3	20
1000-1999 SMDs	3-7	15
2000+ SMDs	>7	10

Labour Force

6.9 The NA's agricultural workforce totalled 2,138 people in 1994. 67% were full-time; 21% part-time; and 12% casual workers. The 1995 Census Guidance Notes, which assist farmers in completing the census form, define a full-time worker as one whose main occupation is farming and who devotes about 40 hours a week to carrying out work on the holding (67%). Casual workers are defined as those who are not regular workers, ie not employed on the holding for some part of each month throughout the year (12%). Part-time workers are those workers who are not full-time workers or casual workers (21%).

Summary of Farm Types in the Lincolnshire Wolds Natural Area

6.10 From the above analysis it is possible to draw a number of general conclusions about the main farm types in the NA:

- 1) Cropping farms are the main farm type and dominate farming in the northern and central part of the NA;
- 2) There is a small number of cattle and sheep farms, most of which are located in the southern part of the NA;
- 3) There is a significant number of pig and poultry farms throughout the NA (the national average for England is 0.8%, the NA contains 6%);
- 4) A large number of farms are part-time;
- 5) Just over half of farms are owner-occupied;
- 6) Almost 40% of farms are greater than 100ha.

7.0 **CHANGES IN FARMING IN THE NATURAL AREA, 1975 TO 1994**

7.1 This section analyses the changes in agriculture over the period 1975-1994, looking firstly at the main structural changes to the industry within the NA, followed by the changes within farming enterprises. The causes of these changes and their effects on nature conservation are also described.

7.2 In reading our findings it is important to recognise that the parish census data does not provide a comprehensive guide to changes in farming. For example, unimproved chalk grassland and improved grassland may both be categorised as grassland older than 5 years, despite their very different nature conservation interest. The Census also excludes common land. Nevertheless, the census data still provides a general indication of the changes that have taken place.

Summary of the Principal Structural Changes 1975-1994

7.3 Land Use. Principal changes are as follows:

- The total arable area, including set-aside, has increased by 19% (11,305ha), from 60,504ha to 71,809ha. This increase would appear to be largely due to the decline in the area of grassland; grassland less than 5 years old fell by 70% (5,440ha), from 7,817ha to 2,377ha, while the area of grassland older than 5 years fell by 37% (4,902ha), from 13,430ha to 8,528ha. The increase in the arable area reflects the good quality of soils in the NA and the higher profitability of arable cropping compared to livestock enterprises. The decline in short-term grassland also indicates a change in rotation practices, from traditional rotations which include grass leys to continuous arable cropping;
- Although still only covering 1% of the NA, the area of rough grazing increased by 220ha (39%), from 567ha to 787ha. This may be because of the neglect of marginal land on steep slopes and along wet river valleys. However, the area of rough grazing was even greater in 1984, with 1,117ha. This decline in rough grazing since 1984 may largely be in part due to the 110% increase in farm woodlands, from 765ha in 1975 to 1,602ha in 1994. The increase in the woodland area will have been encouraged by grants and policies encouraging the planting of new woodlands. The direct link between these two changes cannot be shown from the analysis or any other source and will have to be established by new survey.

7.4 Farm Holdings. The total number of holdings in the NA fell by 17.4%, from 769 in 1975 to 635 in 1994.

- the number of full-time holdings fell by 119 (24%), from 499 to 380 farms;
- the number of part-time holdings fell overall by 6%, from 270 to 255 farms. However, despite the overall fall since 1975, part-time farms actually increased since 1984, when there were only 229 farms.

7.5 Farm Size. There has been a decline in the number of farms in all size categories in the NA since 1975. The greatest falls have been in farms between 5ha-20 ha (down 22%) and in farms greater than 100ha (down 21%), although the latter category still remains the most common in the NA. The fall in all sizes of farm reflects the economic pressures on farming over the last twenty years; many farmers have left the industry or

have amalgamated for economies of scale. There has also been a trend to sell farms in lots in order to maximise their capital values, usually resulting in their break-up. However, despite their overall decline, farms less than 5 ha and farms between 5ha- <20ha actually increased in number after 1984, by 35% and 6% respectively. This reflects the increase in number of part-time farms over the same period.

Table 7.1 : Farm Size Changes

Size (ha)	1975	1984	1994	% Change 1975-1994
<5	122	85	115	-6%
5-<20	135	99	105	-22%
20-<50	102	96	85	-17%
50-<100	105	98	90	-14%
100+	305	254	240	-21%
Total	769	632	635	-17%

7.6 Employment. The total agricultural workforce decreased by 39% between 1975-1994:

- full-time workers fell by 42%, from 2,473 to 1,429;
- part-time workers fell by 19%, from 550 to 446; and
- casual workers fell by 44%, from 470 to 263 (casual workers include contractors).

The decline in the number of the full-time workforce is probably the result of a number of factors. These include:

- the fall in the number of farms;
- economic pressures to reduce labour costs;
- increased farm mechanisation;
- a movement away from livestock to less labour intensive arable enterprises;
- increasing use of contractors on some farms; and
- the introduction of set-aside.

The only agricultural workers to have increased in number during the period were part-time farmers (up 19%, from 215 to 255) and family workers (up 31%, from 193 to 253). The increase in family workers indicates many farms would appear to be increasingly dependent on family labour (part and full-time). This may suggest an ageing farming community (as more children are now old enough to work on the farm), as well as financial pressures. The falling numbers may reflect the changing community mixes, with decreased local employment and increased commuting²⁴.

7.7 Labour inputs. There was an increase in the number of farms with labour inputs between 250 to 1999 SMDs:

- 250-499 SMD holdings increased by 88%, from 48 farms to 90 farms;
- 500-999 SMD holdings increased by 279%, from 33 farms to 125 farms; and
- 1000-1999 SMD holdings increased by 19%, from 80 farms to 95 farms.

Many of these changes are probably a result of increased farm mechanisation, the overall decline in the number of farms and fewer labour intensive livestock enterprises. In addition, some smaller holdings may have intensified farming in order to remain viable.

- 7.8 Tenure. The area of rented land fell by 30% from 52,975ha to 37,344ha, probably due to tenancy laws and inheritance tax rules which discouraged landlords from letting land. It is too early to assess whether the new Farm Business Tenancies (introduced in September 1995) and the current 100% inheritance tax relief on let land will reverse the decline of the tenanted sector. One impact of the decline will have been reduced opportunities for new entrants to farming, which may possibly be reflected in the increase in the number of family workers on the NA's farms.

Summary of Principal Changes to Farm Types

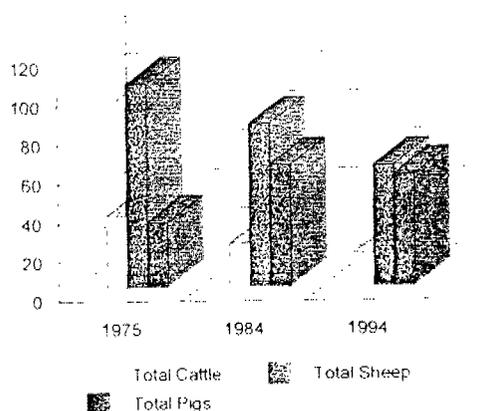
- 7.9 Cropping Farms. Full-time cropping farms remain the most common farm type in the NA, despite falling in number by 14% from 308 farms to 265 farms. However, as the total arable area increased by 19% over the same period, the remaining cropping farms would appear to have increased in size, probably for economies of scale and to reduce the impact of set-aside.

- 7.10 There have also been significant changes in the types of crop grown in the NA, with wheat replacing barley as the main crop in the area due to its better price and yield. The wheat area increased by 72% from 17,995ha to 30,889ha, while the barley area fell by 60% from 26,284ha to 10,486ha. Other crops that have increased in area include beans and peas (up 103% from 1,783ha to 3,627ha) and oilseed rape (up 1,185% from 461ha to 5,928ha), the planting of both of which were largely encouraged by high levels of subsidy. Sugar beet areas are unreliable - the factory at Brigg has been closed but the Bardney factory improved.

- 7.11 Cattle and Sheep Farms. Full-time cattle and sheep farms fell overall by 18% from 55 to 45 farms between 1975-1994, reflecting the movement to arable enterprises in the NA. However, despite this overall decrease, cattle and sheep farms increased from 31 farms in 1984 to 45 farms in 1994. This increase of 14 farms since 1984 was despite the fall in the grassland area and may be the result of mixed farms becoming specialist livestock units; the number of mixed farms fell by 13 over the same period and between 1975-1994 fell by 86% from 35 farms to 5 farms. Such farms may have had to specialise due to economic pressures and the marginal nature of their arable land.

- 7.12 The overall decline in the number of livestock farms (including the few dairy farms) is reflected in the 53% fall in the total number of cattle and calves (37,495 cattle to 17,505 cattle) and the 40% fall in the total number of sheep and lambs (105,053 sheep to 62,687 sheep). This decline in cattle and sheep numbers represents a 50% fall in the NA's total grazing livestock units (LUs), from 30,647 LUs to 15,380 LUs. As the total forage area fell by 46% over the same period (21,814ha to 11,692ha), stocking levels fell slightly from 1.4LU per ha to 1.3LU per ha. Care is needed in this analysis, however. A general trend towards early lambing may mean that a greater proportion of lambs have been sold before the June Census date and are not, therefore, recorded in the statistics. Nevertheless, the decline in sheep numbers is contrary to the national trend over the period.

Figure 7.2 : Livestock Number Changes (in thousands)



7.13 Dairy Farms. Although the number of dairy holdings fell by 57% (35 farms to 15 farms), the remaining dairy farms increased their stocking rate by 10% from 89 cows/farm to 98 cows/farm.

7.14 Pig and Poultry Farms. The number of full-time pig and poultry farms fell by 8% from 38 farms to 35 farms, reflecting the economic pressures on the industry. However, the total number of pigs rose by 72% (33,666 to 57,800) over the same period, while total poultry numbers rose 33% (385,269 to 513,783). This suggests that the remaining farms have increased the intensity or size of their enterprises since 1975. The increase in pig numbers may also be a reflection of the increasing popularity of outdoor pig enterprises, due to their usually higher welfare standards and lower capital requirements compared to intensive farming methods, and known to be operated within the NA. The NA's well drained soils and low rainfall are well suited to such enterprises

7.15 Part-time Farms. The 11% increase in part-time farms since 1984 has already been noted and they now make up 40% of farms in the NA. The increase may be the result of some farmers having to supplement their income with off-farm employment. It may also be a consequence of an increase in hobby farms.

Effects on Nature Conservation

7.16 The changes in agriculture in the NA over the last 20 years will have had a number of direct and indirect impacts on nature conservation.

7.17 Direct Effects. These will include:

- *increase in the arable area.* 10,342ha of grassland has been lost since 1975, most of which will have been converted to arable use. Hedges and walls may also have been removed and the remaining field boundaries neglected. Improved drainage and greater irrigation may also have lowered the NA's water-table, leading to a reduction in ponds and marshes. The trend may now be reversing, however. CRC noted²⁴ that new incentives for conservation and extensification are having positive effects. Whilst water abstraction is predicted to increase by 13% in the 10 years to 2002, levels (at 0.7% of total licenced abstraction) do not give rise to concern²⁵;

- *more intensive cropping practices.* The arable area may be used more intensively. For example, the decline in the use of grass leys indicates permanent arable cropping, with increased chemical use as a result. The increasing area of winter crops, especially of winter wheat, will also have led to an increase in inputs and reduced the area of winter stubble available for seed-eating birds. However, the introduction of set-aside, with its range of management options, will have introduced a number of opportunities for nature conservation on many intensive arable holdings. Of particular concern is the damage of arable practices on archaeological features;
- *decline in livestock numbers.* Despite the small increase in the number of cattle and sheep farms since 1984, the number of livestock in the NA has fallen dramatically between 1975-1994. This may mean that some of the remaining grassland may be used less intensively, with beneficial consequences where it had originally been overgrazed or managed intensively. However, on other grassland sites the fall in livestock numbers may result in undergrazing, leading to scrub encroachment. Small, fragmented areas of tough pasture are unlikely to be grazed without encouragement;
- *increased stocking on dairy farms.* On the few remaining dairy farms, the increase in stocking rates may have resulted in increased grazing pressure and greater risk of pollution;
- *increase in pig and poultry numbers.* The increase in pig and poultry numbers may result in the increased risk of water pollution;
- *woodland planting.* The 110% (837ha) increase in the area of farm woodland (twice the national average) may have benefitted wildlife, providing the sites for the new planting were not valuable habitats beforehand (such as rough grazing) and the new woodlands receive sympathetic management. However, farm woodlands still only cover 2% of the NA. Cobham Resource Consultants (1993) reported misguided planting of grass slopes and wide verges, with negative results.

7.18

Indirect Effects. These will include:

- *decreased labour.* The fall in the number of full-time workers and farmers may have led to less labour availability for the management of wildlife habitats, such as the sympathetic management of hedgerows, ponds and woodlands. Conversely, there may have been an increase in those sympathetic to nature conservation, especially from the increasing number of part-time and hobby farmers. Some full-time farms may also be sympathetic to conservation schemes, such as Countryside Stewardship, where they allow them to reduce costs and receive a regular source of income;
- *decrease in rented land.* The fall in the area of rented land may reflect the fragmentation of large estates, many of which maintained valuable habitats for their sporting potential, such as small woodlands. It is unclear whether such land will receive such beneficial management when farmed by smaller holdings.

8.0

STRATIFICATION OF FARM TYPES : LINCOLNSHIRE WOLDS NA

8.1

The analysis of farm census data in the previous section allows farms to be categorised according to their impact on nature conservation over the last 20 years. This will allow those farms most vulnerable to change, or which present the greatest opportunities for nature conservation, to be identified and targeted.

8.2

By examining the impact of changes on different farm types between 1975-1994, it is possible to score farm types according to their importance to nature conservation issues. These categories are given in **Table 8.1**:

Table 8.1 : Summary of Effects on Main Farm Types

Farm Type	Farming Change	Possible Impact on Environment	Importance to NA
Cropping	increase in arable area more intensive cropping, more drainage and irrigation, increase in autumn sown crops set-aside fall in number of full-time workers	loss of grassland, removal or neglect of field boundaries and ponds more fertilisers and sprays, fewer arable weeds, less winter stubble, lower water-table opportunities for conservation neglect of wildlife habitats and beneficial activities	HIGH
Cattle & Sheep	fall in number of cattle and sheep	reduced grazing pressure on some remaining grassland, especially small areas within arable farms Undergrazing and scrub encroachment in other areas	HIGH
Pigs & Poultry	increase in pig and poultry numbers	greater risk of water pollution. Disposal of effluents may increase nutrient input to grassland	MEDIUM/ LOW
Dairy Farms	increased stocking rates on few remaining farms	more intensive grassland use greater risk of water pollution	LOW

Part-time	increase in part-time farms and farmers	neglect or damage of wildlife features on some farms	
		increased opportunities for wildlife on other farms	MEDIUM

8.3

Within the general farm types described above, those farms most vulnerable to change or offering greatest potential for enhancement may be further categorised and identified. From the analysis of farm census data these farms would appear to be as follows:

- *Cropping Farms Less Than 100 Hectares*
The trend towards fewer but larger farms in the NA, coupled with the fall in the number of farms in the <100ha size category, suggests that the smaller cropping farms may be particularly vulnerable to economic change. Some small farms may have intensified their activities. Equally, small cropping farms may be attracted by the regular income provided by conservation schemes (such as Countryside Stewardship), which may also help reduce their fixed costs and provide the capital expenditure necessary for a return to mixed or livestock farming. These farms therefore offer potential to stem negative changes and to maximise positive benefits;
- *Cropping Farms Greater Than 100ha*
Although the number of large cropping farms has declined over the period they may not be feeling the economic pressure to the same degree as smaller cropping farms. Therefore, whilst they may not be suffering from change, they offer higher levels of opportunity for enhancement. These farms cover a large part (by area and number) of the NA;
- *Large Estates*
The decline in the rented area and the fall in the number of farms larger than 100ha suggests that a number of estates may have fragmented, with consequences for the habitats previously under their ownership and management. Furthermore, the decline in labour inputs on the largest holdings suggests that some estates may have had to reduce their labour force, which may have led to the neglect of wildlife habitats and beneficial activities;
- *Cattle and Sheep Farms*
The large fall in the number of grazing livestock has important implications for the NA's remaining calcareous grassland and policies intended to increase the NA's grassland area. It is probable that cattle and sheep farms retained their livestock enterprises largely because their land was unsuitable for cropping or because they were too small to be viable as arable enterprises. As they probably occupy the more marginal land in the NA, along with other pressures on livestock enterprises (eg long-term falling prices, BSE), they may be under significant economic pressure. However, for similar reasons such farms may be attracted by the regular income of conservation schemes;

- *Part-time Farms*

The increase in part-time holdings since 1984 may have led to the neglect of features important to wildlife, as part-time farmers may no longer have the resources to properly maintain them. Other part-time farmers may have a strong interest in nature conservation and may be attracted by less intensive farming methods and conservation schemes.

Sample Selection

8.4 We therefore suggest a sample as follows based on the above analysis:

Table 8.2 : Suggested Sample Structure

Type	Number	Reason
Cropping Farms <100ha	3-4	Pressure for change. Cover significant area. Will include some part-time farms.
Cropping Farms >100ha	4-5	To include 2 x estates. These cover a large part of the NA.
Stocking Farms	2	Localised, of medium importance.
Pig, Poultry and Dairy Farms	0	Of lower importance and potential.

PART D : NORTH PENNINES

9.0 **DESCRIPTION OF FARMING IN THE NORTH PENNINES NATURAL AREA**

Physical Characteristics

9.1 Farming in the NA is a consequence of the relatively harsh physical conditions of the North Pennines. The NA has a mean altitude of 348 metres above sea level (range 35-765m), relatively high average rainfall (1,158mm compared to 908mm for England as a whole) and low temperatures (accumulated temperature above 0°C of 986°C compared to 1344°C for all England). Much of the moorland, especially to the west, is dominated by the blanket peat of the **Winter Hill** soil association, while the coarse acid soils of the **Belmont** association are found on the high ground to the east²⁶. Both areas are of poor grazing value. There are also a number of limestone outcrops and localised areas of limestone pavement.

9.2 Smaller hills and valley sides are characterised by the slowly permeable and seasonally waterlogged soils of the **Wilcocks 1** soil association, which provide moderate and poor quality grazing. The soils in the valley bottoms are of better quality, with the most widespread soils being the slowly permeable and seasonally waterlogged **Brickfield 3** association, which allow for more intensive farming use such as dairying, limited cereal cropping and more intensive stock rearing.

9.3 The Agricultural Land Classification (ALC) of the NA reflects the limitations imposed by altitude, topography and geology. The ALC of the area is compared to the average for England:

Table 9.1 : ALC of the NA and England (rounded)

ALC Grade	% of NA in Grade	% of England in Grade
1 and 2	<1	16
3	15	44
4	21	13
5	59	8
Non-agricultural	5	10
Urban	<1	9

Agricultural Land-Use

9.4 The total agricultural area was 187,081ha in 1994, with the land-use broken down as follows, with the UK breakdown in brackets for comparison²³:

- 46% was classified as rough grazing (UK - 26.4%);
- 41% comprises grassland more than 5 years old. This grassland is usually found along the river valleys and valley sides of the NA and often forms invaluable "in-bye" land for hill farms (UK - 30.8%);

- grass leys less than 5 years of age cover only 5% of the NA in total and are limited to those localised areas along the river valleys and on the periphery of the North Pennines where the soils are deep enough and the climate suitable for cropping (UK - 8.3%);
- the total area under crops (excluding grass) covers just 6% of the NA, in areas similar to grass leys (UK - 26.2%).

9.5 These figures do not include land in commons. In the AONB, commons were estimated to cover 25% of the area, some 55,400ha in 1984 (AONB Steering Group 1995)²⁷.

Farm Types

9.6 With much of the moorland only suitable for sheep grazing, extensive livestock enterprises are the principal farming enterprises for much of the NA. There were over 1.1 million sheep and lambs in the Natural Area in 1994, and 34,252 beef suckler cows. Out of 1,870 holdings in 1994, the farm types were as follows:

- 44% of all farms were full-time cattle and sheep enterprises, which includes hill and upland farms. Hill farms are those in mountainous country where 95% or more of their land is rough grazing, and upland farms have about 30% rough grazing, are more fenced and have more cattle;
- 11% of farms are full-time dairy units. The dairy farms are located along localised stretches of the river valleys where the conditions are suitable for intensive grass use;
- other full-time farm types make up only 3% of all holdings in the NA;
- 43% of farms in the 1994 Census were part-time holdings, where farmers take employment off the farm to supplement their income. This is partly a consequence of the area's industrial heritage, in which miners from the 19th and early 20th centuries farmed smallholdings as well as working in the numerous mines and quarries of the North Pennines. It is also a reflection of the current marginal nature of hill and upland farming in the North Pennines, especially for smaller holdings.

9.7 By cross-referencing the data, it is possible to ascertain the approximate numbers of part-time farms within the groupings:

- 57% (1065) of full and part-time farms are LFA cattle and sheep units;
- 12% (230) of holdings are non-LFA cattle and sheep units;
- 12% (215) of all holdings are dairy farms;
- the remaining 19% of farms comprise pig and poultry farms and cropping farms, many of which would appear to be part-time;
- cross-referencing the data suggests that there are 475 part-time cattle and sheep farms;
- there are 50 part-time mixed farms.

Farm Tenure

- 9.8 50% of agricultural land in the NA is rented, with 50% owner-occupied. This compares to 37% rented and 63% owner-occupied for England as a whole in 1993²⁵. The large area of rented land may, in part, be a consequence of the number of large estates within the NA, such as the Raby, Strathmore, Lord Crewe Trustees and Allendale estates. Many of these have important sporting interests, especially grouse shooting. 90% of heather moorland in the AONB is grouse moor. Moorland areas in total cover 38% of the AONB and make up 24% of all heather moorland in England and Wales²⁶.

Farm and Enterprise Size

- 9.9 Most farms within the North Pennines Natural Area are less than 100 hectares in area, with over 60% of farms under 50ha and 85% under 100ha. Nevertheless, by calculation the average farm size is 101ha (total area divided by number of holdings) which compares to the average farm size in the UK which is 69ha²⁸. The distribution of farm sizes is as follows:

Table 9.2: Holding Sizes in the NA

Holding size in hectares	% of total
Less than 5ha	13
5ha and <20ha	22
20ha and <50ha	26
50ha and <100ha	24
100 ha and greater	15

- 9.10 Farm labour requirements are measured by Standard Man Days (SMDs). 1 SMD is equivalent to 8 labour hours. This gives a better picture of a farming enterprise than holding size alone. A farm worker is usually assumed to provide labour worth 250-300 SMDs a year (Nix 1995). Part-time farms are defined as those with a SMD of <200. The 1994 census divided farms into holdings ranked by SMD labour inputs:

Table 9.3 : Enterprise Size By SMD

Holding size by SMD	% of total
0-249 SMD	43
250-499 SMD	22
500-999 SMD	23
1000-1999 SMD	11
2000+ SMD	2

9.11 Thus 43% of holdings do not require a full-time input, and only 13% of holdings can provide employment for three or more workers.

Labour Force

9.12 The agricultural workforce totalled 4,159 people in 1994. 68% of this workforce is in full-time employment, 22% in part-time employment and a further 10% in casual employment.

Summary of Farm Types in the North Pennines

9.13 From the above analysis it is possible to draw a number of general conclusions about the main farm types in the Natural Area:

- 1) The majority of holdings in the North Pennines are hill and upland livestock farms;
- 2) There is a small but significant number of dairy farms;
- 3) A large number of farms are part-time;
- 4) There is only a very small number of mixed or cropping farms;
- 5) Half of the agricultural area is rented and half owner-occupied;
- 6) The most common farm size is between 20-50ha.

10.0 **CHANGES IN FARMING IN THE NATURAL AREA, 1975 TO 1994**

10.1 This section analyses the changes over the period 1975-1994.

10.2 The North Pennines has traditionally been a hill and upland farming area, based mostly on extensive livestock enterprises. This remains the case. However, analysis of data from census returns over the period 1975 to 1994 indicates that there have been a number of significant changes in the intensity and structure of farming in the NA. There are limitations to the extent that the data can be analysed. For example, an improved rye grass pasture and a traditional dales hay meadow may both be categorised as grassland older than 5 years old, despite their very different conservation interests. The data do not, therefore, provide an accurate tool with which to monitor changes to unimproved grassland, which is one of the most important wildlife habitats in the North Pennines. In addition, the data do not differentiate between hill and upland farms.

Summary of Principal Structural Changes in the Industry

10.3 Land Use. Principal changes are as follows:

- the area of rough grazing fell by 5% between 1975-1994 to 87,424ha;
- the area of grassland older than 5 years of age increased by 6% over the same period (to 78,457ha);
- the area of grassland less than 5 years old (covering just 5% of the NA) declined by 8% (to 9,238ha);
- although representing only a small part of the NA, the area of farm woodland rose by 118% to 2,863ha.

10.4 Farm Holdings. The total number of holdings in the NA decreased from 2067 in 1975 to 1847 in 1984, climbing back to 1870 by 1994. Within these holdings, there has been a decline in full-time farming and an increase in part-time farming over the period:

- the number of full-time cattle and sheep farms fell by 5% between 1975-1994 (to 820);
- nevertheless, full-time cattle and sheep farms remain the most common farm type in the NA (44% of all farms) and the decline is less than 5% over the period;
- the number of full-time holdings fell by 19%, from 1327 in 1975 to 1075 in 1994 (a fall of 252);
- part-time holdings actually increased by 7% between 1975 and 1994, from 740 to 795 (increase of 55), and made up 42% of all farms in the NA in 1994.

10.5 Farm Size. Against the backdrop of increasing numbers of part-time holdings, the average farm size actually increased over the period from 90.5 to 101ha, despite an increase in the numbers of farms of less than 5 ha:

Table 10.1 : Farm Numbers By Size Grouping

Farm Size (ha)	% Change 1975-1994	Actual Number in 1975	Actual Number in 1994	% Of Total In 1994
<5	+ 39%	180	250	13
5 - <20	- 20%	515	410	22
20 - <50	- 31%	707	485	26
50 - <100	- 5%	466	445	24
>100	+ 41%	199	280	15
Total	-10%	2067	1870	100

10.6

If the enterprises are analysed by Standard Man Day requirements, there is a decrease in the number and proportion of farms with a requirement of less than 1 full-time worker (approximately 250 SMD) yet there are increases in the numbers of holdings with labour requirements of 1-3 workers:

Table 10.2 : Farm Numbers By Labour Requirement

SMD Requirement	No. of farms in 1975	% of farms in 1975	No. of farms in 1994	% of farms in 1994	% Change 1974-1994 (rounded)
0 - 249	1074	52	800	43	-25
250 - 499	241	12	405	22	+68
500 - 999	202	10	430	23	+113
1000 - 1999	324	15	205	11	-37
2000+	226	11	30	1	-87
Total	2067	100	1870	100	-10

10.7

Employment. Overall, the total workforce has changed very little. Part-time workers increased by 30% and casual workers by 35%, with the total full-time workforce falling by less than 1%. The main trends have been:

- the number of full-time farmers fell by 12%, from 1902 to 1666;
- this compares to a 64% increase in part-time farmers, from 382 to 628;
- the number of full-time farm labourers and managers fell by 25%, from 648 to 484;
- the use of family workers and spouses increased by 58% over the same period, with an increase from 623 to 982;

- casual worker numbers also increased by 35%, from 295 to 399;
- it would appear that farms have replaced at least some of their hired workforce with family labour or casual labour, perhaps in order to reduce costs;
- the result is that the total workforce increased by 8%.

10.8 Tenure. Although the proportion of rented land in the North Pennines is still significantly greater than the national average for England, over the last twenty years the area of rented land has declined by 18.5%. The area of owner-occupied land has increased by 34%.

Summary Of Principal Changes Within Farm Enterprises

10.9 There have been a number of significant changes within the individual farm types of the NA.

10.10 Cattle and Sheep Farms. The main trends over the 1975-1994 period were:

- the number of full-time cattle and sheep farms fell by 5% to 820;
- nevertheless, sheep numbers increased by 67% to over 1.1 million sheep and lambs;
- in contrast, there was a fall in the number of beef cattle over the same period, with the breeding herd falling by 18% and the number of cattle older than 1 year falling by 31%.

10.11 Dairy Farms. The number of dairy farms fell by 46% between 1975-1994. The fall in the number of dairy cattle was, though, only 20%, suggesting that at least some of the remaining dairy units may have increased herd size.

10.12 Other Farm Types. Other full-time farm types make up only 3% of holdings in the NA:

- the cropping area remains almost unchanged and barley the most common arable crop;
- the wheat area has increased by 554% and oilseed rape by 2053%;
- there has been an increase in horticultural units to 10 holdings.

10.13 *Grazing Intensity.* Combining the figures for cattle and sheep, there has been a small degree overall of increased grazing intensity, as shown in the following table which crudely ascribes Livestock Units to the farm types in the census. There are limitations to the analysis because the area of common grazing is not accounted for. Farmers complete the total number of stock on the census form, however, and the direct comparison between 1975 and 1994 therefore remains valid.

Table 10.4 : Estimation Of Average Grazing Intensity Within The NA

Enterprise	Livestock Units	1975 LU's	1994 LU's
Dairy cows	1.0	19240	15353
Beef cows	0.75	27314	25689
Replacements	0.8	17863	11382
>1 year cattle	0.65	17045	11824
<1 year cattle	0.34	17694	14179
Total Cattle	-	99156	78427
Ewes	0.08	26151	40548
Lambs	0.04	12550	23059
Other sheep	0.06	1537	1613
Total Sheep	-	40238	65220
Total Cattle and Sheep	-	139394	143647
Total grazing area	-	176034ha	175119ha
LU's per Grazing Hectare owned/rented		0.79	0.82
Common land in AONB	-	55400 (1984)	55400 (1984)
Lu/ha		0.60	0.62

The Causes of Agricultural Change

10.14 There are a number of potential causes of agricultural change, including economic pressures, enterprise management developments, and land ownership and occupation changes.

10.15 Economic Pressures. Analysis of the individual parish summaries does not provide data on the financial performance of the farms. Nevertheless, the general decline nationally of livestock enterprises over the last two decades is well reported. Low hill and upland farming incomes are probably the reasons for the following changes:

- *falling full-time farmer numbers.* Economic pressure is a likely cause of the decrease in the number of farmers and farm workers fully employed, with farmers working off the holding to supplement farm income. The fall has been matched by increased reliance on family (including spouse) labour;
- *changing farm sizes.* There has been pressure on the “middle” sized farms (20 - 100 ha.). Many farmers would appear to have had to either increase their farm sizes to remain viable or sell most of their land, perhaps retaining a smallholding to keep their interest in farming. The change may also indicate newcomers moving into the area and buying smallholdings;

- *labour needs of holdings.* There has been a degree of increased labour on many farms which, when coupled with the decreasing number of full-time farms, suggests that farms have either intensified or moved into more labour intensive farming and yet have still been forced to take work off the farm to supplement farm income. The work that needs doing appears to be increasingly taken on by spouses and family labour;
- *intensification.* It has been noted that there has been an increase in the labour requirements of many holdings. This may suggest that smallholdings and small farms have increased the intensity of farming on their holdings in order to generate more income. The total grazing area has not increased, however, and the overall intensity of grazing use has increased only marginally from a crudely estimated 0.79 LSU/ha in 1975 to 0.82 LSU/ha in 1994. This figure excludes commons and is a comparative figure only. Intensification of grazing within the NA is considered in many publications to be a serious concern.^{29,30}

Analysis of the farming suggests that there has been a move away from cattle and into sheep. It is our interpretation that this has probably been on the higher holdings, with beef cattle replacing dairy in the lower lands. Effectively, beef cattle enterprises have moved “down the hill”. This suggests that increased problems of overgrazing over the period may be a localised problem. It is anticipated that in some areas the use of grassland will be more intensive than in 1975 - for example, the production of silage has only become widespread over the last twenty years.

These bald statistics do not reveal trends within the farming systems. For example, lambing may now take place earlier with consequent grazing increases earlier in the season, sheep breeds may be larger and eat more, there may be greater access to the hill land, supplementary feeding may be increased, and sheep are more likely to graze over winter than cattle which are often housed. Such changes will impact on overgrazing, but cannot be discerned from the statistics. Trends towards early lambing may mean that lambs are sold before the June Census, and are not therefore included. It is clear from published studies that overgrazing is problematic for the NA - this may be a pre 1975 problem.

10.16 Government Intervention. The policies and mechanisms of Government intervention in the industry, and the measures of support provided, may have influenced the following changes:

- *livestock numbers.* Whilst it is not possible to define the extent to which policies of agricultural support have affected numbers with accuracy, policies from the 1970's to the mid-1980's were designed to increase production within the industry. In the NA the increases in sheep numbers have been matched by decreasing cattle numbers. The introduction of subsidies on a quota system in 1992 may stem this change;
- *dairy numbers.* Milk quotas were introduced in 1984. In the late 1980's the regulations protecting watercourses from farm pollution were increased. Both these factors may have influenced dairy production.

10.17 Land Ownership Changes. The decline in the area of rented land reflects the national decline of the rented sector and is probably largely the result of historic tenancy legislation and inheritance tax rules that discouraged landlords from letting land. As a consequence, formerly rented land has been taken back either for farming in-hand, thereby increasing the size of some farms, or sold to sitting tenants. It still remains to be seen whether the new Farm Business Tenancies introduced in September 1995, and the current 100% inheritance tax relief for let land, will reverse the decline of the tenanted sector.

Effect on Nature Conservation

10.18 The effects of agricultural change on the nature interest of the area can be divided into direct and indirect effects.

10.19 Direct Effects. These have come about because of land use changes. They include:

- *the intensification of farming activities.* Although widely considered to be a consequence of increased sheep numbers, global analysis of the NA indicates that across the NA the increase in intensification is slight. Most of the capital grants that encouraged land improvement, such as those for drainage and building new tracks, are also no longer available and many of today's grants encourage the sympathetic management of upland land.

The main impact of localised increased sheep numbers on the ecology of the North Pennines will have been through the overgrazing and degradation of fragile upland habitats, drainage of moorland by gripping, the overgrazing of woodlands and the improvement of existing grassland to increase stocking by drainage, increased fertiliser application and reseeding. Increased use of silage to feed both sheep and cattle would have led to increased fertiliser use and more frequent grass cutting, which in turn would lead to the loss of many traditional grassland plant species and pose a threat to ground nesting birds. In places, the location of supplementary feeding areas will have led to the localised overgrazing and degradation of surrounding areas.

There is no overall significant increase in grazing intensity in the NA. The implication is that there must be areas where extensification has occurred to contrast the intensification reported elsewhere. There may be areas where cattle enterprises have been replaced by less intensive or part-time farming activities (there are about 475 part-time cattle and sheep farms). Overgrazing is a significant problem. The data indicates that this level of problem was possibly already in place in 1975 and is not a product of change since that time, or is localised in extent. Nevertheless the effect of replacing cattle grazing with sheep will impact on the overgrazing problems, as outlined in section 10.15 above;

- *loss of rough grazing.* The loss of rough grazing to improved pasture has been limited, only 5% of the area in 20 years. This will have resulted in the localised loss of upland habitat and species;
- *decreased beef cattle grazing.* Cattle grazing creates an uneven, tussocky sward which provides cover and feeding areas for breeding waders, as well as micro-habitats for plants and invertebrates. The decline in the beef herd may have adverse effects;

- *decline in dairy numbers.* The decline in dairying has possibly been met by increased sheep production, although the beef production may have moved towards dairy areas and sheep production replaced beef closer to the hill. There may be localised effects similar to those associated with beef although with dairy traditionally an intensively managed industry the effects are likely to be slight. In localised areas, the changes in management practice over the study period (such as silage rather than hay) may have affected particular habitats such as important hay meadows;
- *mixed farming.* In the localised areas where mixed farming has declined, there may be effects associated with the changes in the growing of crops, including greater reliance on autumn sown crops and the increased growing of oilseed rape.

10.20

Indirect Effects. There have been structural changes in the NA over the last twenty years. Some of these are likely to have come about because of pressures on the industry. Indirect effects on nature conservation may include the following:

- *economic pressures.* The stresses of marginal farm businesses often result in the avoidance of expenditure on other than essential repairs and maintenance. The loss in these situations can be the management of areas of marginal or non-farmland, and the upkeep of hedges and landscape features such as walls;
- *part-time farming.* The increase of part-time farming may have benefits and disbenefits. Where the farmer retains the farming as a secondary income or hobby, nature conservation may play a part in the objectives for the land with consequent benefits. In other cases the farming may be relegated out of necessity, and management of the land and the effective grazing of the holdings could equally have disadvantages for nature interest;
- *sporting interest.* The importance of management of habitats for sporting reasons is recognised as a benefit (in many cases) for wildlife. The data do not enable these changes to be ascertained. However, the area of rented land (traditionally held by landlords for sporting reasons) has declined over the last two decades and the area devoted to sporting may therefore have altered.

11.0 **STRATIFICATION OF FARM TYPES : NORTH PENNINES
NA**

11.1 The main changes of relevance to the objective of this study, namely to develop a stratification of farms in order to aid the convergence of EN objectives with the prevailing farming character, are as follows:

- economic pressures, resulting in structural changes;
- increased numbers of part-time farmers, with land management implications;
- localised land use intensification;
- grazing changes and the effects on swards, such as from increased sheep and decreased cattle.

11.2 It is clear that there has been a change in the size and structure of farms in the area over the last twenty years. Those farms which have undergone the greatest changes in terms of decreasing numbers are those in the size bracket 20-100 hectares.

11.3 These changes are summarised in the table below:

Table 11.1 : Summary Of Farm Type Effects

Farm Type	Main Farming Changes	Possible Impact on Environment	Importance of Farm Type to Natural Area
Cattle & Sheep Farms	increased sheep numbers	overgrazing of moors and woodlands	HIGH
		improvement of grassland and rough grazing	
	decrease in cattle numbers	reduction in value of grassland for breeding birds	
	fall in number of full-time farms and hired workers	neglect of wildlife habitats and beneficial activities	
Part-Time Farms	increase in number of part-time holdings and farmers	neglect of wildlife habitats and beneficial activities on some farms	HIGH
		increased opportunities for nature conservation on other farms	

Dairy Farms	fall in number of dairy farms increase in stocking on some farms	improvement of grassland	MEDIUM
Other Farm Types	Decline of mixed farming	localised decline in habitat diversity	LOW

11.4

It is then possible to identify the types of farm most likely to have a negative effect on the objectives for the NA, or to offer the greatest potential for enhancement to meet these objectives. These farm types are stratified as follows:

- *family farms, 40-120 hectares.* This sector appears to be under the most pressure. This may lead to insufficient time resources to manage land sympathetically for nature conservation, and the neglect of certain features such as dry-stone walls, field barns, hedgerows, woodlands and hay meadows. There may be intensification pressures as farms seek to generate income sufficient to cover the labour requirements. The data indicate that these farms have potential for improved nature conservation but most probably success will depend on financial incentives;
- *part-time holdings, 5-50 hectares.* The data do not enable accurate identification of sizes of full and part-time holdings. There is likely to be an overlap. Part-time holdings, where farming is no longer the principal income or where the farmer is semi-retired, offer an opportunity for environmental improvement without the commercial necessity of survival from the farm income. Conversely, some part-time farms will be reliant on farm income as well as outside income - they may work elsewhere to sustain the farm - and in such cases there may be neglect of beneficial management and an unwillingness to extensify;
- *large owner-occupied hill farms, of in excess of 120 ha.* The change from beef to sheep is most likely to have occurred in the hill and upland farms. It has been seen that there has been an increase in the number of farms over 100 ha yet a decrease in the labour on these holdings (fewer farms employing more than three men). This may have effects as such farms may no longer have the labour to pursue activities such as keeping, drystone walling and active shepherding (ie regularly moving sheep around the moor to prevent overgra

- *dairy farms, all sizes.* Although affecting a limited part of the NA by area, the dairy farms affect the habitats of the river valleys and may affect a higher proportion of hay meadows than their numbers would otherwise suggest. These farms are under pressure and may be switching to beef or sheep production;
- *all other farm types.* These include cropping and horticultural farms with little influence by area within the NA. Many will occupy improved land and the potential for enhancement will depend upon significant changes in farming practice and management.

Sample Structure

11.5

On the basis of this stratification, it is suggested that the sample structure for the North Pennines NA be as follows, based on Table 11.1 and section 11.4:

Table 11.2 : Draft Sample Structure

Type	Importance	No in sample for interview/survey
Family farms, 50-120ha, cattle and sheep	High	2
Part-time holdings, cattle and sheep	High	2
Large owner occupied hill farms	Very high	3
Large tenanted hill farms	Very high	3
Dairy farms	Medium	0
Others	Low	0