# AN OPTION FOR THE DEVELOPMENT OF THE COASTAL PLAIN ON ANNA PLAINS STATION.

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## 1.0 INTRODUCTION

The range inventory report on Anna Plains has identified nine Land Systems. The following table gives a brief summary of the Land Systems including brief landscape descriptions, areas and carrying capacities.

TABLE 1.0 Summary of Land System areas and suggested carrying capacities.

| LAND SYSTEM | DESCRIPTION | AREA(ha) | % | SUGGESTED CARRYING CAPACITY L.S.U./ha | | |
|---|---|---|---|---|---|---|
| | | | | High | Medium | Low |
| Nita | Pindan | 163,620 | 43 | 1:17 | 1:40 | 1: 80 |
| Anna | Coastal flats | 69,020 | 18 | 1: 4 | 1: 6 | 1: 20 |
| Mannerie | Cadjebut seeps | 22,730 | 6 | 1:25 | 1:40 | 1: 80 |
| Eighty Mile | Coastal dunes | 26,330 | 7 | 1: 4 | 1:10 | 1: 40 |
| Great Sandy | Sand plain/ dune | 36,630 | 10 | 1:40 | 1:50 | 1: 80 |
| Phire | Lateritic gravels | 13,075 | 4 | 1:50 | 1:70 | 1:100 |
| Ellel | Saline/dune country | 18,840 | 5 | 1:30 | 1:40 | 1: 80 |
| Samphire | Samphire flats | 19,285 | 5 | 1:35 | 1:60 | 1:100 |
| Mandora | Bare mud flats | 9,455 | 3 | - | - | - |

This report only covers the development of the Anna and Eighty Mile Land Systems and to a lesser extent, the Nita Land System. Because of their inherent high productivity development will concentrate on the coastal Land Systems.

The Anna and Eighty Mile Land Systems are highly productive mainly because of the dominant presence of buffel and birdwood. These species tolerate heavy grazing and produce a large quantity of good quality feed. Native grasses such as couch and bundle bundle are also highly regarded and add to the systems high productivity.

The Nita Land System is very much less productive than the coastal plain. Here grazing is based on annuals during and immediately after the wet and perennials, such as soft spinifex and ribbon grass, for the remaining part of the year. Because this system has good drought reserves and reasonable wet season grazing it can be run concurrently with the coastal plain, especially if the plain needs a spell from grazing.

Coastal plains pasture in good condition should be able to safely carry one beast to four hectares. Furthermore, observations suggest that the majority of the cattle only graze 3-4 km from water. Water supply distribution and stocking rates in the report have been based on this criteria.

A major constraint to the development of the plain is the lack of suitable stock water. However, by piping fresh water from bores bordering the plain, this can be overcome. Consequently the development option involves fencing and watering the undeveloped areas of the plain.

The major objective of this document is to determine the profitability from fully developing the coastal plain on Anna Plains Station, and to compare this profitability with the alternative option of doing nothing.

Other objectives include detailing the costings of development and determining the overall stocking rate of the plain in relation to improvements and present pasture condition. Furthermore, management implications resulting from proposed improvements are highlighted.

## 2.0 THE PROPOSED DEVELOPMENT PLAN

The development can be broken up into four sections. Section A includes development of unwatered areas within existing paddocks; Sections B, C and D are sections outside this area. Table 2.1 gives a breakdown of the carrying capacity and development needs for each section. These areas correspond to the developments shown on the accompanying map. Furthermore, costings of materials for stock water and fencing are shown in the Appendices.

### Section A

This section comprises the country between Calanjardie and Tank paddocks. Currently this area carries 4,030 head of mixed cattle. Developed, this area has the potential to support approximately 6,900 head (see Table 2.1 for details). Developments would cost in the vicinity of $71,500 including $25,000 for 5 water points and $46,000 for 20 km of pipeline and fittings.

### Management Implications

The proposed developments will enable overgrazed areas around Top Tank bore, and to a lesser extent Pinchers bore, to be rested or lightly stocked. Excess cattle from these areas can be moved to new waters in these paddocks.

### Section B

This section comprises the area outside existing paddocks extending from Nurdy's well to Widjubb well. Currently the area carries 6,000 head. Developed, this area has the potential to support 6,000 head. Developments would cost in the vicinity of $137,000 including $44,000 for 4 water points, $52,000 for 23 km of piping and $40,800 for 73 km of fencing.

### Management Implications

The area is overgrazed and fences with new water points are needed to spread cattle out and relieve grazing pressures around existing waters.

The outlay of money for improvements will not result in increased carrying capacity but should improve individual animal productivity in the short term, while in the long term, ensure maintenance of the pasture resource.

Section C

This section comprises the area outside the existing paddocks from Rocky's bore to Samphire bore. At present the area is carrying about 900 head. Numbers are down because surrounding areas have been destocked for TB control.

Fully developed this area has the potential to support about 6,300 head of mixed cattle. Materials for development would cost approximately $88,800, which includes $29,500 for 4 water points, $38,000 for 15 km of pipeline and $21,300 for 38 km of fencing.

Management Implications

The additional improvements will reduce grazing pressure on areas around Rocky's bore and will assist regeneration of this recently heavily stocked area.

Scotland and Death Adder paddocks would be used as safety areas to be grazed in the event of poor seasons or signs of deterioration of plain vegetation. A system of wet season spelling (plains) and dry season stocking, whereby cattle from the plains graze the pindan during the wet season, could help regenerate overused pastures on the plain.

Section D

This area extends from Samphire bore to Wotens bore. At present the area is destocked for TB purposes. Prior to destocking the area ran about 3,000-4,000 head of cattle. Fully developed the area has the potential to safely carry 5,200 head. Development would cost in the vicinity of $105,000. This includes $42,000 for 5 water points, $51,000 for 22 km of pipeline and $5,880 for 10-15 km of fencing.

Management Implications

The large area of the Eighty Mile Land System in this area has been rated at six hectares per beast. A high stocking rate considering the area supports mainly native species. Once open to grazing, buffel grass and birdwood grass should spread and eventually colonise the area, increasing the productivity and stability of this system.

New fences and water points will enable a reduction in stock numbers so that degraded pastures around Wotens bore can regenerate.

TABLE 2.1 CARRYING CAPACITIES AND DEVELOPMENT NEEDS FOR EACH DEVELOPMENT SECTION

SECTION A - WITHIN PADDOCKED AREA (CALANJARDIE TO TOP TANK).

| PADDOCK | LAND SYSTEM | AREA (ha.) | STOCKING RATE ha /BEAST | CARRYING CAPACITY (MIXED CATTLE/PADDOCK) CURRENT | CARRYING CAPACITY (MIXED CATTLE/PADDOCK) POTENTIAL | DEVELOPMENT NEEDS PIPE(km) | DEVELOPMENT NEEDS WATER POINTS (NO) | DEVELOPMENT NEEDS FENCE(km.) |
|---|---|---|---|---|---|---|---|---|
| Calanjardie | Eighty Mile | 1990 | 4/1 | | 590 | | | |
| | Anna | 3210 | 4/1 | | 940 | | | |
| | Mannerie | 1280 | 60/1 | | 25 | | | |
| | Nita | 2930 | 15/1 | | 230 | | | |
| TOTAL | | 9410 | | 1100 | 1785 | 5 | 1.0 | Nil |
| Cardingy | Eighty Mile | 630 | 4/1 | | 190 | | | |
| | Anna | 1830 | 4/1 | | 540 | | | |
| | Mannerie | 640 | 60/1 | | 10 | | | |
| | Nita | 530 | 15/1 | | 40 | | | |
| TOTAL | | 3630 | | 800 | 780 | - | | |
| Stud | Eighty Mile | 1070 | 4/1 | | 320 | | | |
| | Anna | 2220 | 4/1 | | 660 | | | |
| TOTAL | | 3290 | | 250 | 980 | 5 | 1.0 | |
| Pinchers | Eighty Mile | 750 | 4/1 | | 220 | | | |
| | Anna | 2770 | 4/1 | | 810 | | | |
| TOTAL | | 3520 | | 700 | 1030 | 5 | 1.5 | |
| Tank | Eighty Mile | 3280 | 4/1 | | 960 | | | |
| | Anna | 4520 | 4/1 | | 1330 | | | |
| TOTAL | | 7800 | | 1180 | 2290 | 5 | 1.5 | |
| | | | | | TOTAL | 20 | 5.0 | |

SECTION B - OUTSIDE PADDOCK AREA (NURDY'S TO WIDJUBB)

| PADDOCK | LAND SYSTEM | AREA (ha) | STOCKING RATE ha/BEAST | CARRYING CAPACITY (MIXED CATTLE/PADDOCK) CURRENT | CARRYING CAPACITY (MIXED CATTLE/PADDOCK) POTENTIAL | DEVELOPMENT NEEDS PIPE(km) | DEVELOPMENT NEEDS WATER POINTS (NO) | DEVELOPMENT NEEDS FENCE(km) |
|---|---|---|---|---|---|---|---|---|
| Nurdy's | Eighty Mile<br>Anna | 1410<br>5360 | 4/1<br>4/1 | | 410<br>1580 | | | |
| TOTAL | | 6770 | | 1790 | 1990 | 5 | 1.5 | 21 |
| Dallas | Eighty Mile<br>Anna | 1240<br>4560 | 4/1<br>4/1 | | 350<br>1300 | | | |
| TOTAL | | 5800 | | 1350 | 1650 | 11 | 1.5 | 19 |
| Widjubb | Eighty Mile<br>Anna | 1440<br>5130 | 10/1<br>4/1 | | 420<br>1500 | | | |
| TOTAL | | 6570 | | 1870 | 1920 | 7 | 1.0 | 19 |
| Three Ways | Anna<br>Mannerie<br>Nita | 30<br>1310<br>4880 | 6/1<br>60/1<br>60/1 | | 60<br>160 | | | |
| TOTAL | | 6220 | | 450 | 220 | | | 6 |
| Joey's | Anna<br>Mannerie<br>Nita | 190<br>830<br>8190 | 6/1<br>60/1<br>30/1 | | 35<br>15<br>260 | | | |
| TOTAL | | 9210 | | 600 | 310 | | | 8 |
| | | | | | TOTAL | 23 | 4.0 | 73 |

SECTION C - OUTSIDE PADDOCK AREA (WIDJUBB TO SAMPHIRE).

| PADDOCK | LAND SYSTEM | AREA (ha) | STOCKING RATE ha/BEAST | CARRYING CAPACITY (MIXED CATTLE/PADDOCK) CURRENT | CARRYING CAPACITY (MIXED CATTLE/PADDOCK) POTENTIAL | DEVELOPMENT NEEDS PIPE(km) | DEVELOPMENT NEEDS WATER POINTS (NO) | DEVELOPMENT NEEDS FENCE(km) |
|---|---|---|---|---|---|---|---|---|
| Rockys | Eighty Mile<br>Anna<br>Mannerie<br>Nita | 2370<br>5750<br>140<br>150 | 4/1<br>4/1<br>30/1<br>15/1 | | 700<br>1700<br>10 | | | |
| TOTAL | | 8410 | | | 2410 | 6 | 1.0 | 21 |
| Samphire | Eighty Mile<br>Anna | 3210<br>6920 | 10/1<br>4/1 | | 380<br>2000 | | | |
| TOTAL | | 10130 | | | 2380 | 4 | 1.5 | 10 |
| Scotlands | Anna<br>Mannerie<br>Nita | 2240<br>900<br>4140 | 4/1<br>30/1<br>60/1 | | 660<br>30<br>100 | | | |
| TOTAL | | 7280 | | | 790 | 5 | 0.5 | - |
| Death Adder | Mannerie<br>Nita | 1310<br>4880 | 30/1<br>60/1 | | 55<br>120 | | | |
| TOTAL | | 6190 | | 900 | 175 | | 1.0 | 6.5 |
| | | | | | TOTAL | 15 | 4.0 | 37.5 |

SECTION D - OUTSIDE PADDOCK AREA (SAMPHIRE TO WOTENS)

| PADDOCK | LAND SYSTEM | AREA (ha) | STOCKING RATE ha./BEAST | CARRYING CAPACITY (MIXED CATTLE/PADDOCK) CURRENT | CARRYING CAPACITY (MIXED CATTLE/PADDOCK) POTENTIAL | DEVELOPMENT NEEDS PIPE(km) | DEVELOPMENT NEEDS WATER POINTS (NO) | DEVELOPMENT NEEDS FENCE(km) |
|---|---|---|---|---|---|---|---|---|
| | Eighty Mile | 7940 | 10/1 | | 930 | | | |
| Eighty Mile | Anna | 2660 | 4/1 | | 780 | | | |
| TOTAL | | 10600 | | NIL | 1710 | 16 | 3.0 | 10.5 |
| | Anna | 11220 | 4/1 | | 3300 | | | |
| | Samphire | 5710 | 50/1 | | 135 | | | |
| Wotens | Great Sandy | 1160 | 50/1 | | } 30 | | | |
| | Mannerie | 570 | 100/1 | | | | | |
| TOTAL | | 18660 | | | 3465 | 6 | 2.5 | - |
| | | | | | TOTAL | 22 | 5.5 | 10.5 |
| TOTALS | | | APPROX. | 11000 | 23885 | 80km | 18.5 | 121km |

## 3.0 TOTAL DEVELOPMENT COSTS AND ESTIMATED INCREASE IN STOCK NUMBERS

To develop fully the coastal Land Systems on Anna Plains Station with water points and fences, the cost would be approximately $400,000. It is important to note that this is an estimate of cost, which includes equipment and labour but does not include freight, small accessories and discounts for bulk orders.

The expected increase in stock numbers would be in the order of 12,000-13,000 head, boosting the overall carrying capacity of Anna Plains from 18,000-30,000 head.

## 4.0 FURTHER CONSIDERATIONS

Below average seasons occur frequently on Anna Plains. Droughts on the other hand, are less frequent, but nevertheless devastating if not planned for.

Mentioned below are alternative management strategies useful during poor seasons or drought years. These considerations are especially important when the coastal plain is developed and fully stocked. A bad year could see a feed shortage on the plain and unless alternative strategies are planned mortalities could be high.

### Drought Reserves

In poor seasons the yield of grasses (especially buffel and birdwood) can drop to a quarter of that expected during normal seasons. Under these conditions, especially when pastures on the plain are stocked to capacity, a drought reserve is necessary. Strategic use of the Nita Land System, which contains drought reserves of soft spinifex, will improve cattle survival during a drought.

To safeguard against the effect of droughts or poor seasons, new water points located east of the highway, if established, could help relieve grazing pressures on the plain during poor or drought seasons. During normal years some of these waters would need to be lightly stocked so that in the event of a drought there are sufficient drought reserves available.

### Supplements

During drought or poor seasons, there is less forage available to cattle, which in turn means there will be less of the major nutrients, protein and energy available from native pasture. Apart from moving cattle onto new waters or spelled pastures, protein and energy can be supplied using supplements.

A supplementation programme should concentrate on the breeding herd and in particular the 3.5 to 6.5 year old cows, heifers and weaners. Each of these groups have different requirements and should be run separately.

There are basically two options to follow when supplementing cattle. One is to feed low energy, high nitrogen supplements throughout the dry season ie: from June through to December. The primary role being to reduce liveweight loss during the dry season. The types of supplements include urea based dry licks, phosphorus and nitrogen through the drinking water, and blocks. This method is a low cost, long term annual supplementation programme.

The second option is to feed cattle high protein, high energy supplements during crisis periods ie: drought or poor season. These supplements are molasses based and usually contain urea or meatmeal. The common method is to feed them out in open troughs. This is a high cost, short term crisis supplementation programme.

Fire

All roughage is important during a drought, fire prevention during this time is paramount. Burning firebreaks around areas that are planned to be used for drought reserves will safeguard against the loss of forage as a result of wildfire.

On the other hand, fire can be a useful tool in managing drought reserve areas by removing shrubs and old unpalatable plants, generally maintaining the area in an attractive condition to stock.

Areas not watered by bores could be used as drought reserves and should be burnt, if not already burnt, two or three years before stocking.

## 5.0 ECONOMIC ASSESSMENT OF THE DEVELOPMENT PLAN

To assess the economics of developing the coastal plain, the outcome from capital invested in fences and water points needs to be examined.

With the aid of a computer program that generates gross incomes from varying inputs such as cattle numbers, sales and branding percentages, two options were compared.

(a) Develop the coastal plain and build up herd numbers to 30,000 head.

(b) Do nothing and keep the herd static at around 18,000 head.

Furthermore, to make the exercise more realistic, two branding percentages (65% and 75%) were examined under each option. Therefore the following four scenarios were assessed using the program.

1. 75% branding, build herd numbers up to 30,000 head (develop the plain). Sell old cows, 2.5 year old steers and old bulls.

2. 65% branding, build herd numbers up to 30,000 head (develop the plain). Sales similar to 1 above.

3. 75% branding, keep herd static at 18,000 head (no development). Sell old cows, some breeding cows and heifers, also 2.5 year old steers and old bulls.

4. 65% branding, keep herd static at 18,000 head (no development). Sales similar to 3 above.

The major assumptions incorporated into the computer program include:

* Prices are set to the opening prices at Broome Meatworks, values do not change from year to year.

* The branding percentage is the number of calves branded over the total number of breeders at the end of each year.

* Each year 3% of male calves become herd bulls.

SCENARIO 1 75% BRANDING, BUILD HERD NUMBERS UP TO 30,000 HEAD (ie: DEVELOP THE PLAIN). SELL SOME OLD COWS, 2.5 YEAR OLD STEERS AND OLD BULLS.

| | YEARS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| GROSS INCOME | 594,710 | 491,969 | 665,634 | 1,008,383 | 1,080,534 | 1,800,000 | 1,834,425 | 2,156,974 | 1,876,692 |
| DEVELOPMENT COSTS: | | | | | | | | | |
| LOAN REPAYMENTS | | 18,430 | 36,860 | 55,290 | 73,720 | 73,720 | 73,720 | 73,720 | 73,720 |
| EXTRA RUNNING COSTS | | 12,500 | 25,000 | 37,500 | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 |
| PRESENT STATION RUNNING COSTS | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 |
| TOTAL COSTS | 470,000 | 500,930 | 531,860 | 562,790 | 593,720 | 593,720 | 593,720 | 593,720 | 593,720 |
| TOTAL NET INCOME | 124,710 | - 8,961 | 133,774 | 445,593 | 486,814 | 1,206,280 | 1,240,705 | 1,563,254 | 1,282,972 |
| DISCOUNTED N.I. | | - 9,992 | 104,758 | 308,796 | 298,563 | 654,769 | 595,911 | 664,539 | 482,654 |
| CUMULATIVE D.N.I. | | | 94,766 | 403,562 | 702,125 | 1,356,894 | 1,952,805 | 2,617,344 | 3,099,998 |

SCENARIO 2 65% BRANDING, BUILD HERD NUMBERS UP TO 30,000 HEAD (ie: DEVELOP THE PLAIN). SELL OLD COWS, 2.5 YEAR OLD STEERS AND OLD BULLS.

| | YEARS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| GROSS INCOME | 594,710 | 516,999 | 684,821 | 855,219 | 966,357 | 1,004,000 | 1,222,159 | 1,561,213 | 1,797,034 | 1,797,034 | 1,797,034 | 1,797,034 |
| DEVELOPMENT COSTS: | | | | | | | | | | | | |
| LOAN REPAYMENTS | | 18,430 | 36,860 | 55,290 | 73,720 | 73,720 | 73,720 | 73,720 | 73,720 | 73,720 | 73,720 | 55,290 |
| EXTRA RUNNING COSTS | | 12,500 | 25,000 | 37,500 | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 |
| PRESENT STATION RUNNING COSTS | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 |
| TOTAL COSTS | 470,000 | 500,930 | 531,860 | 562,790 | 593,720 | 593,720 | 593,720 | 593,720 | 593,720 | 593,720 | 593,720 | 575,290 |
| TOTAL NET INCOME | 124,710 | 16,999 | 152,961 | 292,429 | 372,637 | 410,280 | 628,439 | 967,493 | 1,203,314 | 1,203,314 | 1,203,314 | 1,221,744 |
| DISCOUNTED N.I. | | 15,042 | 119,784 | 202,653 | 228,535 | 222,700 | 301,839 | 411,281 | 452,687 | 400,383 | 354,496 | 318,509 |
| CUMULATIVE N.I. | | | 134,826 | 337,479 | 566,014 | 788,714 | 1,090,553 | 1,501,834 | 1,954,521 | 2,355,104 | 2,709,600 | 3,028,109 |

SCENARIO 3 75% BRANDING, KEEP HERD STATIC AT 18,000 HEAD (IE: NO DEVELOPMENT). SELL OLD COWS, BREEDING COWS AND HEIFERS. ALSO 2.5 YEAR OLD STEERS AND OLD BULLS.

| | YEARS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| GROSS INCOME | 594,710 | 1,151,967 | 1,278,187 | 1,099,132 | 1,089,944 | 1,042,800 | 1,042,800 | 1,042,800 | 1,042,800 |
| PRESENT STATION RUNNING COSTS | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 |
| TOTAL COSTS | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 |
| TOTAL NET INCOME | 124,710 | 681,967 | 808,187 | 629,132 | 619,944 | 572,800 | 572,800 | 572,800 | 572,800 |
| DISCOUNTED N.I. | | 603,472 | 632,891 | 435,988 | 379,714 | 310,916 | 275,116 | 243,497 | 215,487 |
| CUMULATIVE N.I. | | | 1,236,363 | 1,672,351 | 2,052,065 | 2,362,981 | 2,638,097 | 2,881,594 | 3,097,081 |

SCENARIO 4 65% BRANDING, KEEP HERD STATIC AT 18,000 HEAD (NO DEVELOPMENT). SELL OLD COWS, BREEDING COWS AND HEIFERS ALSO 2.5 YEAR OLD STEERS AND OLD BULLS.

YEARS

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GROSS INCOME | 594,710 | 897,040 | 998,795 | 1,088,722 | 1,087,156 | 933,285 | 933,285 | 933,285 | 933,285 | 933,285 | 933,285 | 933,285 |
| PRESENT STATION RUNNING COSTS | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 |
| TOTAL COSTS | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 | 470,000 |
| TOTAL NET INCOME | 124,710 | 427,040 | 528,795 | 618,722 | 617,156 | 463,285 | 463,285 | 463,285 | 463,285 | 463,285 | 463,285 | 463,285 |
| DISCOUNTED N.I. | | 377,888 | 414,099 | 428,774 | 378,502 | 251,471 | 222,516 | 196,942 | 174,288 | 154,228 | 136,484 | 120,778 |
| CUMULATIVE N.I. | | | 791,987 | 1,220,761 | 1,599,263 | 1,850,734 | 2,073,250 | 2,270,192 | 2,444,480 | 2,598,708 | 2,735,192 | 2,855,970 |

## NOTES TO THE TABLE

### Gross Income

This is the income from stock sales including aged cows and bulls, 2.5 year old steers, breeding cows and heifers.

The computer program generated income for the first five years for scenarios 3 and 4 (no development), and thereafter income remained stable. For scenarios 1 and 2 (ie: develop the plain) the computer program generated income for eight years in order to show the full effects of the development plan on gross income.

### Development Costs

Development costs are the extra fixed and variable costs (excluding depreciation) needed to cover the initial capital outlay for development and the subsequent extra running costs essential for the repair and maintenance of improvements.

The capital cost of developing the plain is about $400,000. To cover this cost a loan of $100,000 taken out each year over the first four years would be needed. The payback period will be ten years at 13% interest. Loan repayments include principle and simple interest.

To maintain proposed improvements, extra running costs need to be accounted for. These costs include controlling vegetation along electric fence lines (grading and applying herbicides), maintaining water points and pumping costs. A total cost of $50,000 over four years or $12,500 per year.

### Present Station Running Costs

These are the present costs incurred in running the Station. The cost has been estimated at $470,000 excluding depreciation. Costs to run the Station will remain the same each year over the eight to eleven year period.

### Total Costs

Total costs include development costs, extra running costs and present Station running costs.

### Net Income

Total net income is the difference between gross income and total costs. To assess the present worth of net income values were discounted using an interest rate of 13%.

From the discounted income, a cumulative net income was calculated in order to make comparisons between the four scenarios in Table 5.1. To calculate cumulative net income each successive years discounted net income is added onto the previous years discounted net income (excluding the income in Year 0).

## Discussion on the Economic Benefits from Developing the Coastal Plain

In developing the coastal plain, there are two major economic factors that effect income during the development years and for some years following, these are (a) reduced income due to retaining nearly all female cattle in order to increase the herd numbers from 18,000 to 30,000 head, and (b) an increase in costs as a result of capital improvements and extra running costs.

Their effect is reflected in the cumulative discounted net income, for example, assuming the plain is developed and branding is 65% (scenario 2), it would take ten to eleven years to break even with the alternative of doing nothing (scenario 4). The situation is similar at 75% branding (scenarios 1 and 3), however the break even period is seven to eight years. The reason being that at a higher branding percentage there is a larger number of cattle available for sale.

It is not until after the break even point between developing and not developing the plain that the benefits from development come to fruition ie: an undiscounted net income of $1.2M (discounted to present day values of about $500,000) compared to a net income of $400,000 (about ($200,000 discounted) with no developments. This is of course assuming that both costs and sale prices remain static.

At the end of the fourth year developing the coastal plain adds an extra $123,720 to annual expenses. It is not until year ten when the loan taken out in year one will have been repaid. Net income following the repayment of the first loan should increase thereafter until year fourteen when all loan repayments cease, leaving the extra costs in maintaining improvements.

There is a marked decline in net income in the first two years of development however, the decline in net income is quickly eroded as the increase in stock numbers result in more saleable cattle. At this point cattle sales are limited to steers and a small number of old cows. This is in contrast to the no development scenarios whereby net income is high initially as a larger number of female cattle are sold in order to maintain cattle numbers.

There are many benefits arising from the development of the plain which have not been accounted for in the analysis, mainly because of the difficulty in determining whether the benefits are real, and, if so, how to evaluate them.

One possible benefit is an increase in branding rate. Presently the Stations branding rate is about 65%. It is not unreasonable to suggest that by developing the plain and controlling the cattle a 75% branding rate could be attained. Furthermore, by controlled mating and weaning, this or even higher branding rates, could be achieved. The economic benefits from a 10% rise in brandings has been shown to have a significant effect on net income.

Other possible benefits include an increase in cattle productivity resulting from pasture regeneration on spelled areas and an overall reduction in stocking rate per unit area over the plain. Also, by erecting fences mustering costs should decline as cattle are restricted in their movements across the plain and therefore made easier to muster.

## 6.0 CONCLUSIONS

An investment of around $400,000 for developments on the coastal plain (which includes fencing and water points) plus an extra $50,000 for their upkeep, should return about $300,000-$350,000 per year more than if developments were not undertaken. This return, when compared with the no development option, does not come to fruition until seven years at 75% branding and ten years at 65% branding. The major contributing factor to this slow return on investment is the income foregone in reduced cattle sales in the effort to build up stock numbers. The other alternative is to buy in breeders in order to accelerate the herd build up.

The economic analysis does not allow for increases in cost and fluctuations in sale prices. Also, the possible benefits from development such as increased brandings, reduced mustering costs and increased cattle productivity were not accounted for mainly because of the difficulty in evaluating them.

If a large number of cattle are to be dependent on coastal pastures, consideration needs to be given to alternative management strategies in the event of droughts, poor seasons or wild fires. Strategies include the provision of drought reserves, controlled burning to prevent wild fires and supplements to fulfil energy and protein deficiencies.

## 7.0 APPENDICES

### 7.1 Materials for stock water

The largest single cost in developing the plain is polythene pipe. Table A 1.1 shows pipe specifications and costs for each section of development. In working out these costs and others we have assumed the following:

1. 750 head of mixed cattle per water.
2. On average cattle drink 50 L(11 gal) of water per head per day.
3. The plain is relatively flat and no allowance is needed for pumping water up rises.
4. Labour cost for installing polythene pipe and tanks, mills etc. about 40% and 25% respectively of total costs.

TABLE A 1.1 POLYTHENE PIPE SPECIFICATIONS AND COST

| SECTION | POSITION | LENGTH (km) | SIZE* PIPE (mm) | PRESSURE HEAD (M/HEAD) | NUMBER OF ROLLS | CLASS AND TYPE | COST* ($) |
|---|---|---|---|---|---|---|---|
| Section A | Calanjadie | 5.0 | 50 | 21.0 | 34 | B | 8,300 |
| | Pinchers | 5.0 | 50 | 21.0 | 34 | B | 8,300 |
| | Tank | 5.0 | 50 | 19.5 | 34 | B | 8,300 |
| | Stud | 5.0 | 50 | 20.0 | 34 | B | 8,300 |
| Section B | Dallas | 7.0 | 50 | 77.0 | 47 | class 9 | 11,500 |
| | Dallas | 4.0 | 50 | 12.0 | 27 | B | 6,600 |
| | Widjubb | 6.5 | 50 | 20.0 | 44 | B | 10,700 |
| | Nurdy's | 5.0 | 50 | 55.0 | 34 | class 9 | 8,300 |
| Section C | Rocky | 6.0 | 50 | 32.0 | 40 | B | 10,000 |
| | Samphire | 4.0 | 50 | 16.0 | 27 | B | 6,600 |
| | Scotland | 5.0 | 50 | 16.0 | 34 | B | 8,300 |
| Section D | Wotens | 7.0 | 50 | 32.0 | 47 | B | 11,500 |
| | Eighty Mile | 5.0 | 63 | 40.0 | 34 | class 6 | 13,200 |
| | Eighty Mile | 6.0 | 50 | 28.0 | 40 | B | 9,800 |
| | Eighty Mile | 4.0 | 50 | 18.0 | 27 | B | 6,600 |
| TOTAL | | 80km | | | | | $136,300 |
| TOTAL COST PLUS 40% INSTALLATION COSTS | | | | | | | $190,820 |

* 50 mm 150 m coil $244.00 for class 9 and B type pipe
63 mm 100 m coil $264.00 for class 6 pipe

To supply large quantities of water onto the plain, motorized pumps will be needed at five locations - Stewarts, Nurdys, Rockys, Wotens and Artesian No 2. All motorized pumps are situated on pindan, facilitating year round operation and servicing.

Windmills would be suitable for pumping water shorter distances away from the main line, (ie from one point to another on the plain). Windmills are cheaper and require less servicing, they are also more convenient than motorized pumps particularly during the wet season.

The following additional equipment is needed to supply water for cattle on the plain .

TABLE A 1.2 ADDITIONAL EQUIPMENT NEEDED TO SUPPLY WATER ONTO THE PLAIN.

| EQUIPMENT | NUMBER | COST(APPROX) $ |
|---|---|---|
| 12' mill/30' tower with 4" pump produces 7,000 gals/day with 86' lift available | 8 | 24,000 |
| 2kW (3HP) diesel motor | 7 | 14,000 |
| Two stage Helical rotor pump | 7 | 12,600 |
| 90 KL (20,000 gal) Squatters Tank | 5 | 22,500 |
| 22.5 KL (5,000 gal) fibreglass tank | 10 | 20,000 |
| 24' galvanized steel troughs and fittings | 22 | 22,000 |
| TOTAL | | $115,100 |
| Total cost plus 25% extra for labour | | $143,875 |

7.2 Fencing

All fences would be electric similar in design to the new electric fence dividing Samphire and Wotens/Eighty Mile paddocks. A relatively cheap and effective fence at $560/km, for the 121 km of fence needed to develop the plain total cost would be around $68,000.

# ANNA PLAINS STATION

## INVENTORY OF THE RANGE AND ASSOCIATED MANAGEMENT GUIDELINES

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Rangeland Management Branch
Department of Agriculture
DERBY. W.A. 6728

November 1985

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SUMMARY

* A total of nine Land Systems were identified, described and mapped. Each Land System has been characterised into land units and the vegetation is described.

* During the survey an assessment was made of the range condition and erosion status of the Station. The two major Land Systems (Anna and Nita) are in fair-good condition. The remaining Land Systems-Phire, Mannerie, Ellel, Samphire, Great Sandy, Mandora and Eighty Mile-are in good condition.

* The survey identifed some areas of the Nita and Anna Land Systems that are in poor condition, these being Pidgeon, Pindan, Bakers, Bauhinia and Molly Milly bores on the Nita Land System, and Nurdy's, Dallas, Wotens and Widjubb bores on the Anna Land System. Flooding has affected Erinbee, Sandy and Yellow Gap paddocks. Most palatable grasses such as buffel and couch have died. By resting overgrazed and flood affected areas, and possibly reseeding some areas, pastures will regenerate and improve productivity.

* Taking into account degraded areas throughout the lease and the proportion of country artificially watered, the current suggested carrying capacity for Anna Plains is around 13,000 Large Stock Units or 15,346 mixed cattle units. Fully watered and in good to excellent condition, the optimal carrying capacity for Anna Plains is around 29,000 L.S.U.'s or 34,200 mixed cattle units.

* Water distribution on Anna Plains is poor. Only fifty percent of the coastal Land Systems and sixty four percent of the Nita Land System is watered. By establishing waters to fully utilise the Station, stock numbers could be increased by fifty percent.

* A rangeland monitoring system has been installed on Anna Plains. Twenty one range monitoring sites were installed throughout the lease with the aim of identifying change in range condition to help make adjustments of stocking rates.

* Supplements and improved pastures have been suggested as improved management strategies to lift productivity. Supplements will lift calving percentages and reduce mortalities. Improved pastures established around water points will give stability to the range and may lift stocking rates.

## 1.0 INTRODUCTION

Anna Plains Station (379,433 ha) is located adjacent to the Eighty Mile beach and extends inland across stabilised supratidal mud flats, through areas of shrubby pindan to the fringes of the Great Sandy Desert. Highly productive grass pastures near the coast provide the bulk of the station's carrying capacity, however, there has been no formal survey of the vegetation types or their carrying capacities.

The purchase of the property by Yokine Pastoral Company has resulted in proposed changes in management that will require sound information about the vegetation and soil resource. This report is aimed at providing an inventory of those resources in a form suited for incorporation into management decision making. Assessments of the current condition of the vegetation and the extent of soil erosion have been used to derive estimates of the carrying capacity of each Land System and for each paddock (management unit). A number of aspects of animal husbandry and pasture management are discussed in the context of improved cattle production.

An additional report examines some options for the development of areas of highly productive but under-watered plain country. Reducing the areas subject to overgrazing and increasing the efficiency with which the cattle can utilise these highly productive pastures will result in considerable increases in carrying capacity and profitability as well as reducing the risk of further pasture degradation. The economic consequences of several avenues by which this development can be achieved are examined in the light of current prices and costs.

During the field recordings associated with compiling the vegetation inventory a number of sites were established to monitor the effects of future management on the vegetation resource.

## 2.0 LAND SYSTEMS AND DESCRIPTIONS

Land Systems have been identified and mapped from 1:86,000 scale aerial photographs using ground inspections to verify photo patterns.

Condition of the pastures was rated from excellent to poor (Appendix 9.2) on a 1-5 scale. These ratings were based primarily on the density and production of palatable perennial species. A large proportion of the station has been colonised by Cenchrus spp, and there is little evidence of erosion or widespread pasture degradation. The condition ratings were independent of the degree of utilisation to which the pastures were currently subjected.

### Condition ratings

1 - Excellent
2 - Good
3 - Fair
4 - Poor
5 - Very poor

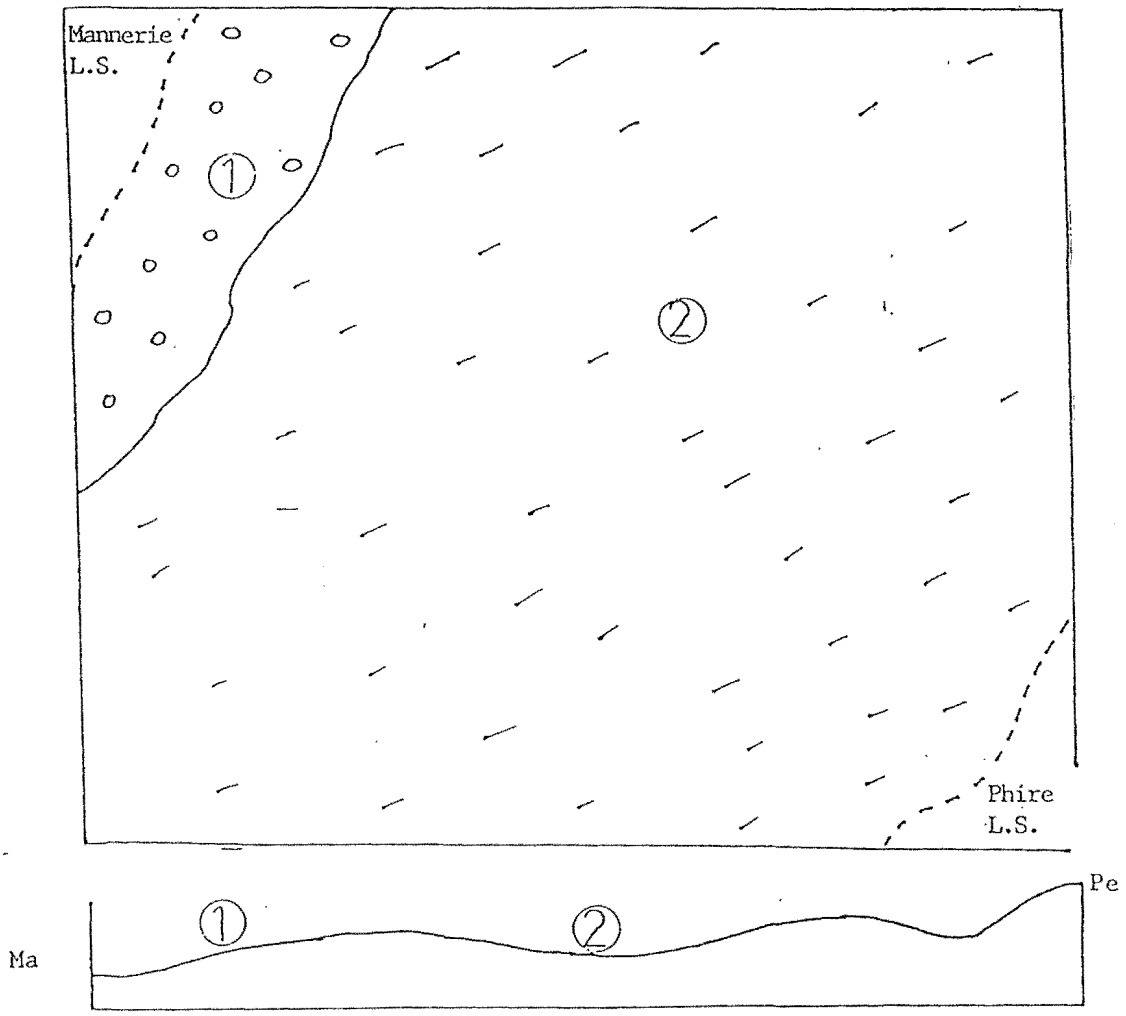
Carrying capacities have been estimated by considering:

1. The productivity and palatability of plants present.
2. The grazing tolerance of plants present.
3. Comparing reported carrying capacities of other similar Land Systems with those found on Anna Plains.

All carrying capacities are listed as Large Stock Units (see Appendix 9.1).

2.1 Nita Land System (Ni) 163,620 ha (43% of total area)

Undulating sand plain country characterised by deep red sands and pindan type vegetation.



| UNIT | NAME | EXTENT | LAND FORM | SOILS | VEGETATION |
|---|---|---|---|---|---|
| 1 | Bauhinia/ buffel | Small(approx 10%) | Marginal sand plain | Loamy sands | Dominant perennial grasses include buffel, woolybutt and soft spinifex. Kapok bush forms dense stands in some areas. Bauhinia and poverty bush dominate the trees and shrubs. |
| 2 | Spinifex grasslands | Large(approx 90%) | Undulating sand plain | Deep red sands | There are extensive areas of soft and feathertop spinifex in this unit. Associated grasses include woolybutt, ribbon grass, kerosene grass and wire grass. There is a varied overstorey dominated by bauhinia, wattles and caustic bush. |

### 2.1.1 Range Condition and Erosion

A total of one hundred and three range condition and erosion indices were collected. They were concentrated in the western portion of this Land System. Erosion - Nil.

| Range condition: | Good | 22% |
|---|---|---|
| | Fair | 50% |
| | Poor | 28% |

A large proportion of the Nita Land System west of the highway is poorly watered. As a consequence grazing effects are limited and access is poor.

### 2.1.2 Land Use and Management

Although the system is mainly low carrying capacity country, there is a bauhinia/buffel unit which provides good grazing. In the spinifex grasslands useful grasses are naturally thin on the ground but the system is capable of providing useful grazing and has some drought and dry season reserves if stocked lightly.

During and immediately after the wet season this system supplies reasonably good quality feed but quality is poor later in the year. The Nita System adjacent to the plains country could be used for wet season grazing in preference to the plain, in particular, overused areas around Widjubb, Dallas and Nurdy's bores. It will enable spelling of coastal plain pastures during their most critical growing period.

Some areas of Nita are in poor condition, these being Pidgeon, Pindan, Bakers, Bauhinia and Molly Milly bores where spinifex, ribbon and woolybutt grass have been replaced by kerosene grass, flannel bush and poverty bush. Stock numbers would need to be reduced in these areas if regeneration of more palatable species is to occur. A series of wet season spelling and sowing introduced plants (buffel, birdwood, verano) around water points where overuse occurs.

A useful management tool in spinifex grasslands is fire. Strategic use of fire by periodic controlled burning to maintain pindan country in an attractive condition for stock. In most cases burning should be no more frequent than about every three to four years. Old, coarse stands of soft spinifex are unattractive to stock and as they may form almost closed communities, compete strongly with other perennials and useful annuals.

Burning should be in October-December as a hot burn killing most of the spinifex will result. Burnt areas should be given a three month spell from grazing, over the wet, to assist growth of desirable species and aid seed set. There will be a return to spinifex dominance by the third or fourth year, at which time the cycle should be repeated.

Burning during or immediately after the wet season is undesirable as fires are comparatively cool. They do not kill many old spinifex tussocks but do kill many useful grasses and grass seed. Spinifex regeneration is rapid.

Too frequent burning, or burning at the wrong time, can result in a decline in pasture condition to almost total dominance by undesirables such as kerosene grass. It will also favour the establishment of wattles and cockroach bush.

2.1.3 Suggested Carrying Capacity

The majority of condition assessments were recorded from the western fringes of the Land System where colonisation by buffel grass is widespread. Adjustment to the estimates of carrying capacity have thus been made to compensate for this more productive pasture. Ten percent of the area east of the highway (including paddocks) is colonised by buffel including the Buffel/Bauhinia unit and scattered areas where buffel and spinifex form a mosaic. Here the suggested carrying capacity is 1:13 ha. A fair proportion of the remaining area is unwatered, and thus in good condition and has been assessed as having a carrying capacity of 1:40 ha.

Adjustments were made to the areas carrying mixed buffel/bauhinia/spinifex pastures on the basis of their condition rating. Areas in good to excellent condition (22%) were rated at 1:40 ha; fair condition areas (50%) were rated at 1:60 ha while poor to very poor condition areas (28%) were rated at 1:80 ha.

2.1.4 Feed Status

Desirable plants (large quantity of good feed).

| | |
|---|---|
| Ribbon grass | Buffel |
| Soft spinifex | Birdwood |
| Kapok bush | |

Intermediate plants (large quantity of average feed).

| | |
|---|---|
| Wire grass or northern wandarrie grass | Woolybutt |
| | Flannel bush |
| Bauhinia | |

Undesirable plants (medium quantity of poor feed).

| | |
|---|---|
| Kerosene grass(Aristida hygrometrica) | (I) |
| Northern kerosene grass(Aristida browniana) | (I) |
| Poverty bush | (I) |
| Cockroach bush | (I) |

Other

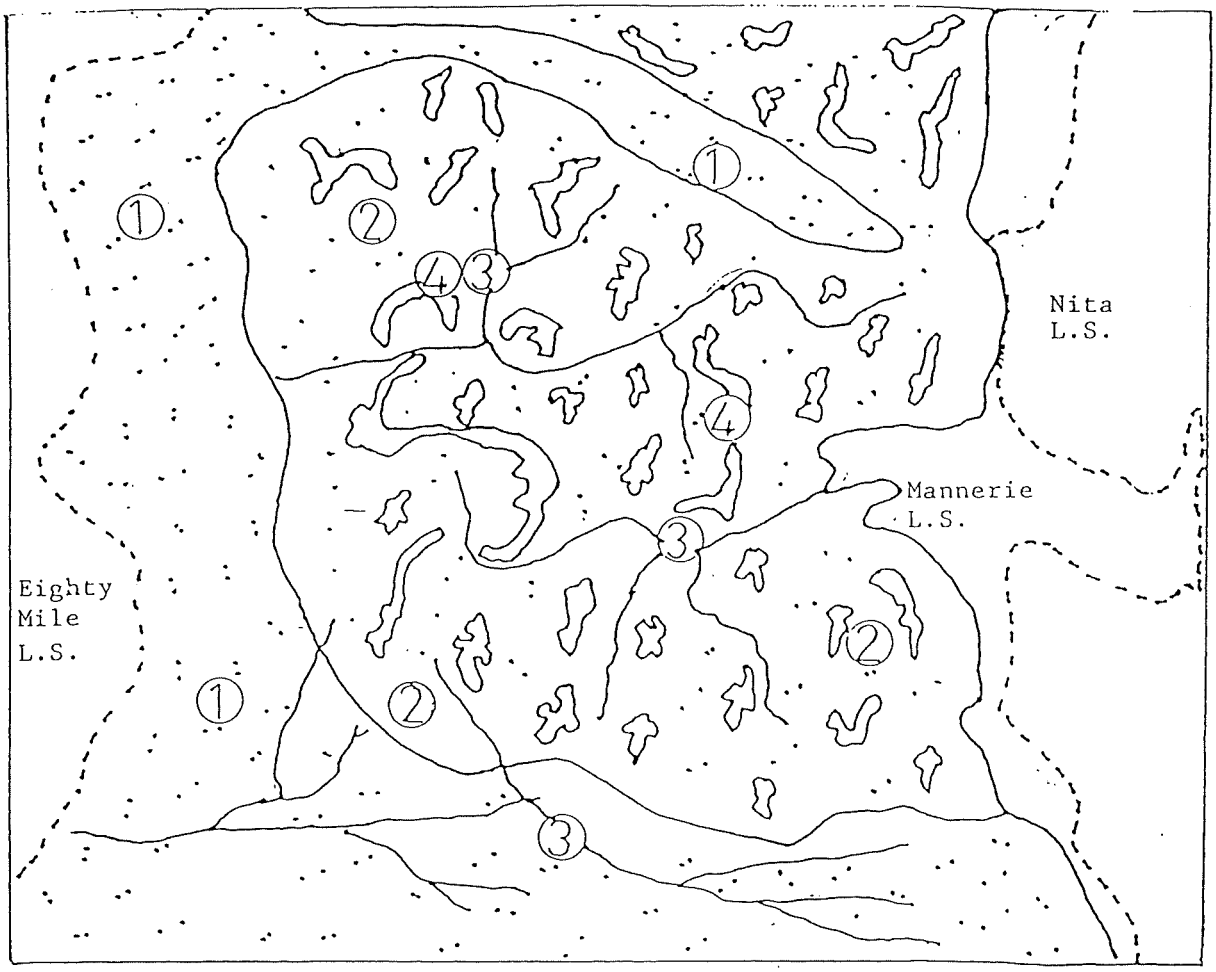
Many other annuals and forbs.

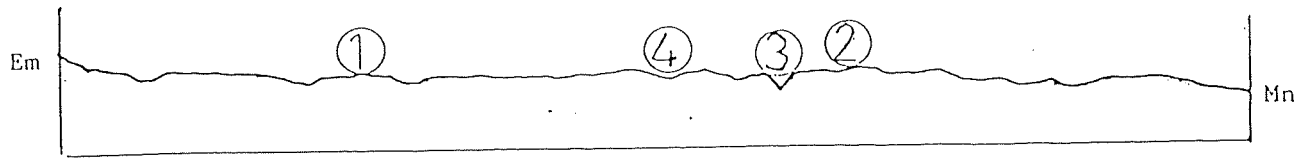
(I - Increaser species (unpalatable plants not grazed)).

2.2 Anna Land System (An) 69,020 ha (18% of total area)

Saline/calcareous coastal flats with broad plains of buffel, birdwood, salt water couch, samphire and lovegrass.

The plain varies in width from 4–5 km in the north to 15–20 km in the south and runs in a NE to SW direction adjacent to the coast.



| UNIT | NAME | EXTENT | LAND FORM | SOILS | VEGETATION |
|---|---|---|---|---|---|
| 1 | Tussock grass plains | Large(approx 50%) | Slightly elevated plains<br>Some microrelief | Calcareous Dark grey sand clays | The micro depressions support bundle bundle, native panic and salt water couch, scattered areas of birdwood/buffel, samphire and forbs. The micro rises support mainly buffel and birdwood grass. |
| 2 | Saline plains | Medium(approx 40%) | Complex mosiac with microrelief | Saline calcareous Very dark grey Light-medium clays | Mosaic of vegetation dominant species being lovegrass, salt water couch, samphire and ricegrass. There are minor species such as roly poly and Corchorus spp. |
| 3 | Drainage lines | Small(approx 5%) | Poorly defined internal drainage lines | Medium Very dark clays | Mainly couch (Cynodon dactylon) |
| 4 | Saline depress-ions | Small(approx 5%) | Often bare depress-ions | Super saline clays | Mainly samphire including black samphire which is highly salt tolerant and grows on the margins of these salty areas. |

## 2.2.1 Range Condition and Soil Erosion

A total of one hundred and eighteen range condition and erosion indices were collected from traverses well distributed across the plain.
Erosion - Nil.

| | | |
|---|---|---|
| Range condition: | Good to excellent | 50% |
| | Fair | 42% |
| | Poor to very poor | 8% |

## 2.2.2 Land Use and Management

This system is the most utilised and productive on the station. Approximately ninety two percent is at high to medium potential productivity. A fair proportion is unwatered country near the coast that is in pristine condition. However, pasture productivity on the plain declines within 2-3 km from water where constant heavy grazing has removed most of the more palatable species. Although the flat nature of the land and the common presence of couch (Cynodon dactylon) and samphire around waterpoints maintains stability and prevents soil erosion.

A combination of heavy use and periodic flooding in parts of Erinbee, Yellow Gap and Sandy paddocks has resulted in a marked decline in pasture productivity. Desirable species such as buffel, salt couch and couch have been replaced by lovegrass, inedible samphire and roly poly.

Overuse of pastures is apparent around Dallas, Nurdy's, Widjubb and Wotens bores. To regenerate the pasture and improve productivity, stock should be excluded from the area over the growing period, December-March. Moderately degraded coastal pastures will recover well provided that conservative stocking levels are practised over the dry season.

By 'opening up' the unused areas near the coast, stock from degraded country can be moved to these areas to give the pasture time to regenerate.

In situations where seed supplies of desirable species have been virtually exhausted it may be possible to hasten the recovery process by seeding buffel and birdwood. Erinbee, Yellow Gap and Sandy paddocks are areas that may need treatment.

NOTE: There is a separate report on the development of the coastal plain on Anna Plains. It deals with the physical and economic aspects of fencing, watering and stocking the plain.

## 2.2.3 Carrying Capacity

Because this system is highly productive and resilient to grazing, high carrying capacities have been recommended.

| | |
|---|---|
| Good to excellent | 1 L.S.U. per 4 ha |
| Fair | 1 L.S.U. per 6 ha |
| Poor to very poor | 1 L.S.U. per 20 ha |

2.2.4 Feed Status

Desirable plants (large quantity of good feed).

| | |
|---|---|
| Buffel | Birdwood |
| Bundle bundle | Native millet |
| Salt water couch | Couch |
| Desert bluegrass | |

Intermediate plants (medium quantity of average feed).

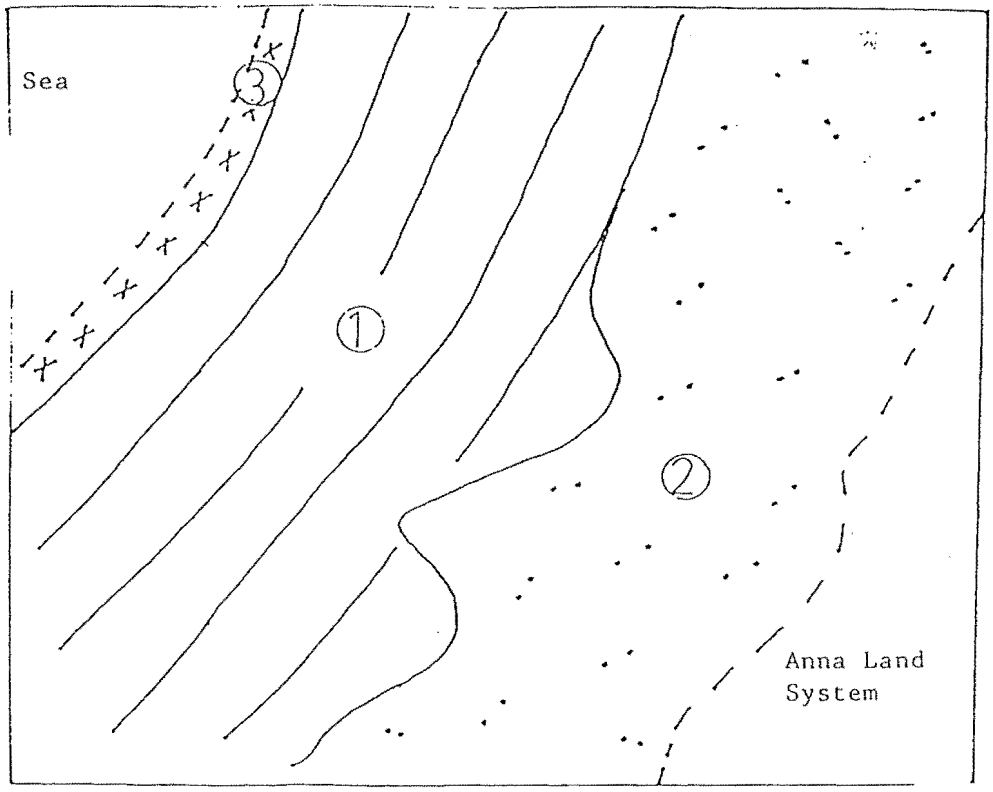
| | |
|---|---|
| Mallee lovegrass | Ricegrass |
| Sickle lovegrass | Whiteochloa airoides |
| Nineawn | Frankenia |
| Saltbush | |

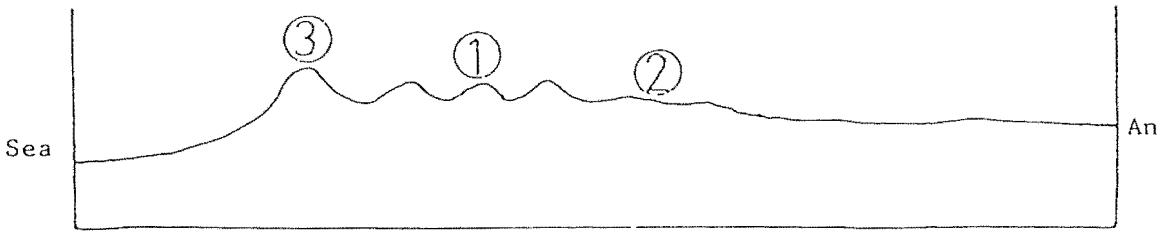
Undesirable plants (medium quantity of poor feed).

| | |
|---|---|
| Roly poly (I) | Samphire (possibly an Increaser species |
| Black wattle(I) | in some areas). |

2.3 Eighty Mile Land System (Em) 26,330 ha (7% of total area)

Active beach and consolidated dunes with tussock grasses and Acacia bivenosa. It is a narrow strip of country situated adjacent to the Eighty Mile beach.



| UNIT | NAME | EXTENT | LAND FORM | SOILS | VEGETATION |
|---|---|---|---|---|---|
| 1 | Consolidated dunes | Large(approx 60%) | Stable colonized dunes | Calcareous grey sandy clays | Dunes dominated by perennial tussock grasses mainly birdwood and buffel,also bundle bundle and native millet. In some areas Whiteochloa and soft spinifex form pure stands. Salt couch and samphire are also present but to a lesser extent. In the north,swailes can be dominated by couch. Acacia bivenosa is common on this unit. |
| 2 | Marginal plains | Medium(approx 40%) | Sand plains sloping to Anna L.S. | Dusky red calcareous sand | Buffel and Whiteochloa airoides,some bundle bundle native panic. Areas of salt couch and samphire becoming more prominent towards the Anna Land System. |
| 3 | Beach dune | Very small | Active sand dune | Beach sand | Dominated by Spinifex longifolius, also Whiteochloa airoides. |

### 2.3.1 Range Condition and Erosion

A total of twenty one range condition and erosion indices were collected from selected areas within this narrow Land System.

Erosion - Nil.

| | | |
|---|---|---|
| Range condition: | Good to excellent | 82% |
| | Fair | 18% |
| | Poor to very poor | nil |

### 2.3.2 Land Use and Management

This Land System is in excellent condition. A fair proportion is colonised by buffel and birdwood; the remainder (mainly in the southern part of the station) by native grasses Whiteochloa and spinifex. Buffel and birdwood tend to grow around water points to the extent that native grasses have been completely replaced, for example, McPhees, No 1 Artesian and Samphire bores

Areas that have not been subjected to grazing such as the south western corner of Tank paddock, do not show widespread colonisation of buffel/ birdwood. It could be that introducing cattle into these areas accelerates the spread of these species to the point of complete dominance.

In the past the lack of suitable bore water had prevented the development of this country. By piping water from the pindan to suitable areas adjacent to the Eighty Mile Land System, the country could then contribute to the overall productivity of the station.

By establishing waters in the area, the disturbance made from grazing cattle should help spread buffel and birdwood into the native pasture. Furthermore, seed could be sown near waters to assist the spread of these species.

This System is highly susceptible to disturbance. Overuse will remove the protective plant cover and expose the soil to wind erosion. Therefore, it is important that both pasture and stocking rates are monitored to avoid this happening.

### 2.3.3 Suggested Carrying Capacity

Where buffel and birdwood dominate the Land System carrying capacities are higher than areas of native pasture.

| | |
|---|---|
| Good to excellent | 1 L.S.U. per 4 ha |
| Fair | 1 L.S.U. per 10 ha |
| Poor to very poor | 1 L.S.U. per 40 ha |

2.3.4 Feed Status

Desirable plants (large quantity of good feed).

Buffel
Bundle bundle
Salt water couch
Birdwood
Native millet

Intermediate plants (large quantity of average feed).

Stemodia
Flinders river poison
Acacia bivenosa
Atylosia
Whiteochloa aïroides
Soft spinifex

Undesirable plants (small quantity of poor feed).

Roly poly (I)
Samphire (I)?

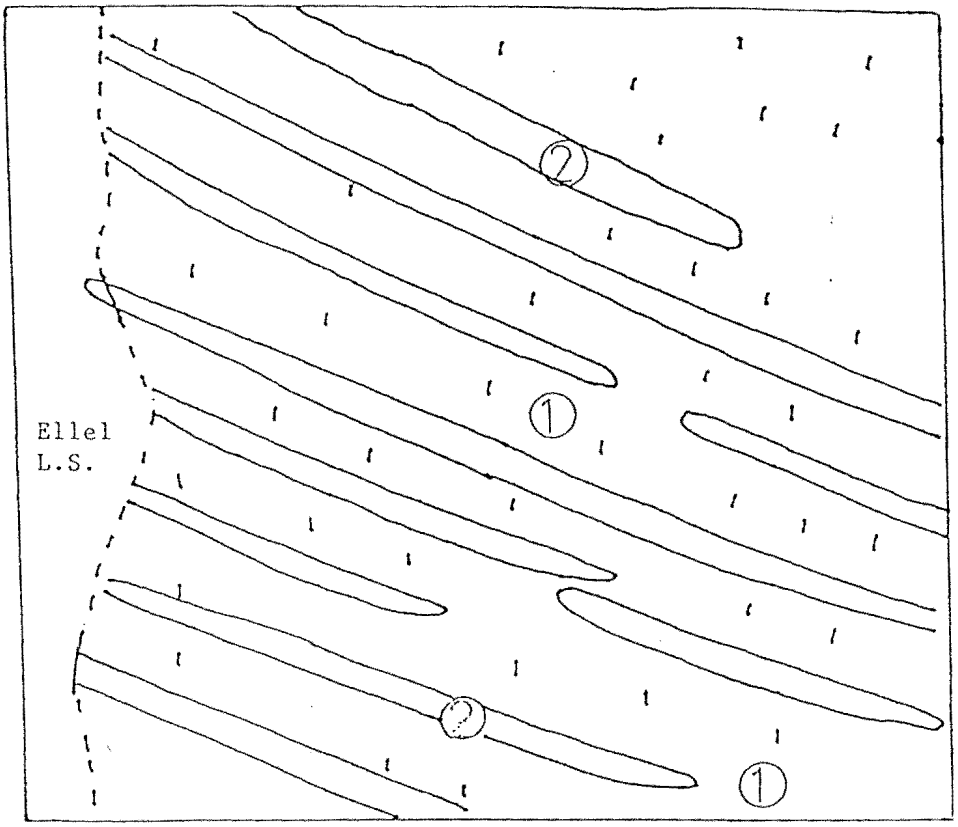
Other

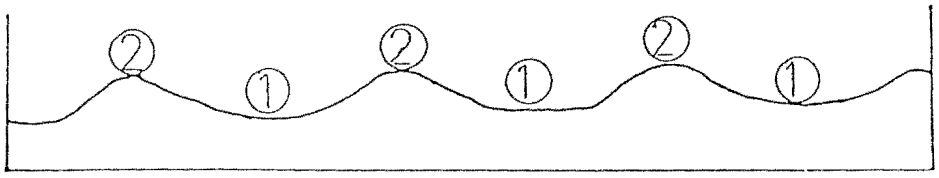
Few annuals and forbs

| UNIT | NAME | EXTENT | LAND FORM | SOILS | VEGETATION |
|---|---|---|---|---|---|
| 1 | Swales | Large(approx 70%) | Sand dune depressions and slopes | Red earthy sands | Typically pindan or Nita type vegetation. The slopes are colonized by wattles and bauhinia with an understorey of buffel,soft spinifex,woolybutt and other forbs. |
| 2 | Dunes | Medium(approx 30%) | Dunes up to 10 m high | Red siliceous sands | The tops of dunes are often bare,some cover of soft and feathertop spinifex. Trees and shrubs include desert walnut, Lemonwood,desert bloodwood and Grevillea spp |

2.4 Great Sandy Land System (Gs) 36,630 ha ( 10% of total area)

Undulating sand plain dominated by longitudinal dunes. The Land System engulfs the Lake Mandora complex in the south eastern corner of the station.



### 2.4.1 Range Condition and Erosion

Only brief observations of range condition and erosion were made and these were insufficient to justify a condition rating.

Carrying capacities are low on this Land System, although some areas observed had buffel growing on the slopes of sand dunes. The presence of buffel, although only limited, improves the productivity of this System.

The presence of many annuals and forbs provide good feed during the wet season. Less palatable perennial grasses are present and would be useful mainly during the dry season.

A portion of the System is watered by natural springs and artificial waters. The remaining area is unwatered and would need three new waters. Each water could carry around 500-600 L.S.U., that is, assuming stock graze portions of Mannerie, Ellel and Great Sandy Land Systems. Cattle grazing the area will have access to saline short grass pastures for dry season grazing and reasonably good annual feed from the sand plain country during the wet season.

Controlled burning should be used to stimulate new annual feed and improve the palatability of perennials. Burning every 3-4 years should be sufficient as more frequent burns stimulate undesirable species.

### 2.4.2 Suggested Carrying Capacity

| | |
|---|---|
| Good to excellent | 1 L.S.U. per 40 ha |
| Fair | 1 L.S.U. per 50 ha |
| Poor to very poor | 1 L.S.U. per 80 ha |

### 2.4.3 Feed Status

Desirable plants (small quantity of good feed).

| | |
|---|---|
| Buffel | Birdwood |
| Soft spinifex | Feathertop spinifex |

Intermediate plants (medium quantity of average feed).

| | |
|---|---|
| Naked woolybutt | Wire grass |
| Corchorus spp | Ptilotus spp |
| Crotolaria (birdflower rattlepod) | |

Undesirable plants (small quantity of poor feed).

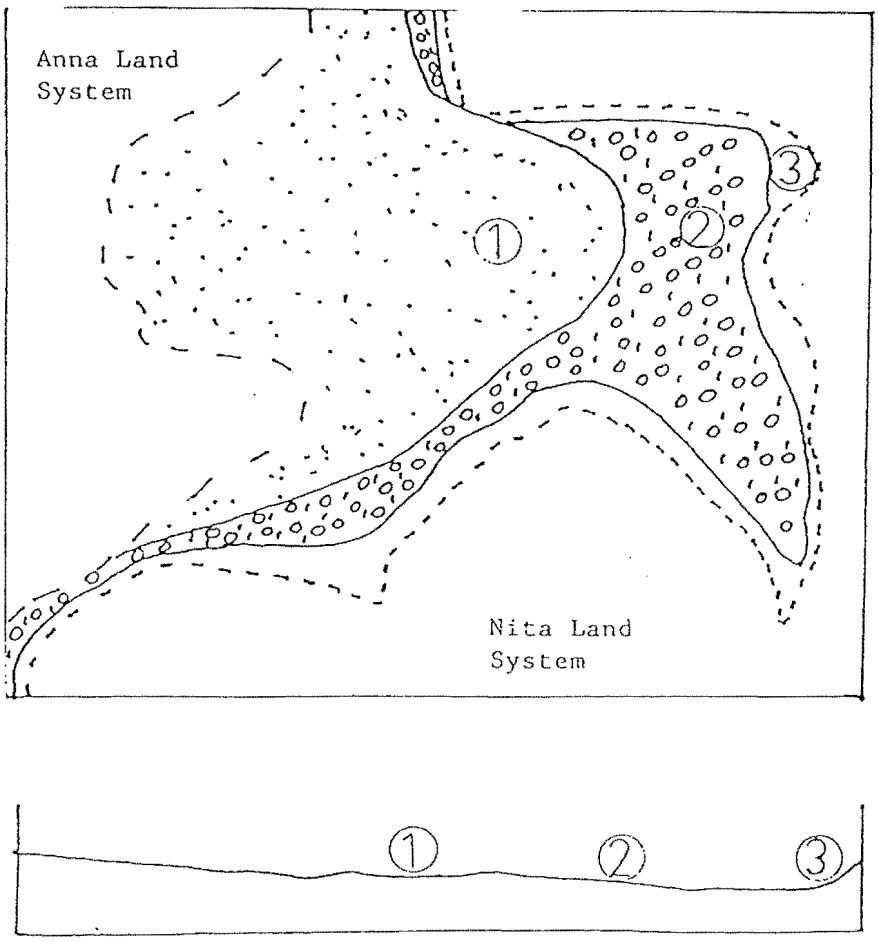
| | |
|---|---|
| Kerosene grass(I) | Poverty bush(I) |

Other

Many shrubs and trees, also forbs and annuals.

2.5 Mannerie Land System (Mn) 22,730 ha (6% of total area)

A major seepage zone between the Nita and Anna Land Systems. A major proportion of the area consists of Samphire flats and Cadjebut swamps.



| UNIT | NAME | EXTENT | LAND FORM | SOILS | VEGETATION |
|---|---|---|---|---|---|
| 1 | Samphire flats | Large(approx 45%) | Saline plains | Saline clays | Large areas of samphire. Interspersed patches of salt water couch,couch and lovegrasses. Outer margins of this unit,samphire becomes less dominant. |
| 2 | Cadjebut thickets | Large(approx 50%) | Seepage zone and swamps | Dusky red sands | Thickets of Melaleuca (Cadjebut) are present in the north of the station where large swamps occur ie: Mannerie swamp. Under-storey samphire, ricegrass and salt water couch. Some areas buffel grass is present. Bare ground under Cadjebut is also common. |
| 3 | Saline margins | Small(approx 5%) | Marginal plain | - | Mainly bare ground and samphire. Some ricegrass and salt water couch. |

### 2.5.1 Range Condition and Erosion

A total of fifty three condition and erosion indices were recorded.
Erosion - Nil.
Range condition: This Land System is stable and in good condition.

A major proportion of the Land System is unproductive samphire flats and paperbark thickets. Some areas are productive, particularly in the north in Mannerie and Calanjardie paddocks where buffel/birdwood, salt water couch and couch grow under scattered paperbarks. Also this useful pasture occurs in pockets around Lake Mandora in the south.

### 2.5.2 Land Use and Management

In recent years it has been noticed that Acacia ligulata (black wattle) has been invading the Anna Land System. It seems that the plant originates from the Mannerie System and spreads out onto the plain.

This phenomena could have been a result of abnormally wet years between 1980 and 1984. If more normal years prevail the wattle may recede to swamps or disappear altogether. If not, control measures such as chemical sprays or burning may be needed.

The thickets formed by paperbarks and in some cases black wattle, make mustering difficult. Cattle 'hide' in the thicket making it very difficult for either horseman or helicopter to muster. A fence built on the plain side of the thickets would prevent cattle from moving into these areas when being mustered.

The Mannerie country in the south eastern corner of the Station is dominated by shrubby Cadjebuts unlike the taller trees growing in the northern part of the Station. Larger trees are found in the area but tend to concentrate along water courses.

Ricegrass and salt couch are useful grasses in this System, being more attractive during the dry season than the adjacent perennials of the Great Sandy System. Consequently, cattle will tend to concentrate on these areas and degradation may occur. Periodic resting of these pastures may be necessary to prevent this occurring.

### 2.5.3 Suggested Carrying Capacity

| | |
|---|---|
| Good | 1 L.S.U. per 45 ha |
| Fair | 1 L.S.U. per 75 ha |
| Poor | 1 L.S.U. per 100 ha |

2.5.4 Feed Status

Desirable plants (small quantity of good feed)

| | |
|---|---|
| Buffel | Native millet |
| Birdwood | Salt water couch |
| Bundle bundle | Couch |

Intermediate plants (medium quantity of average feed)

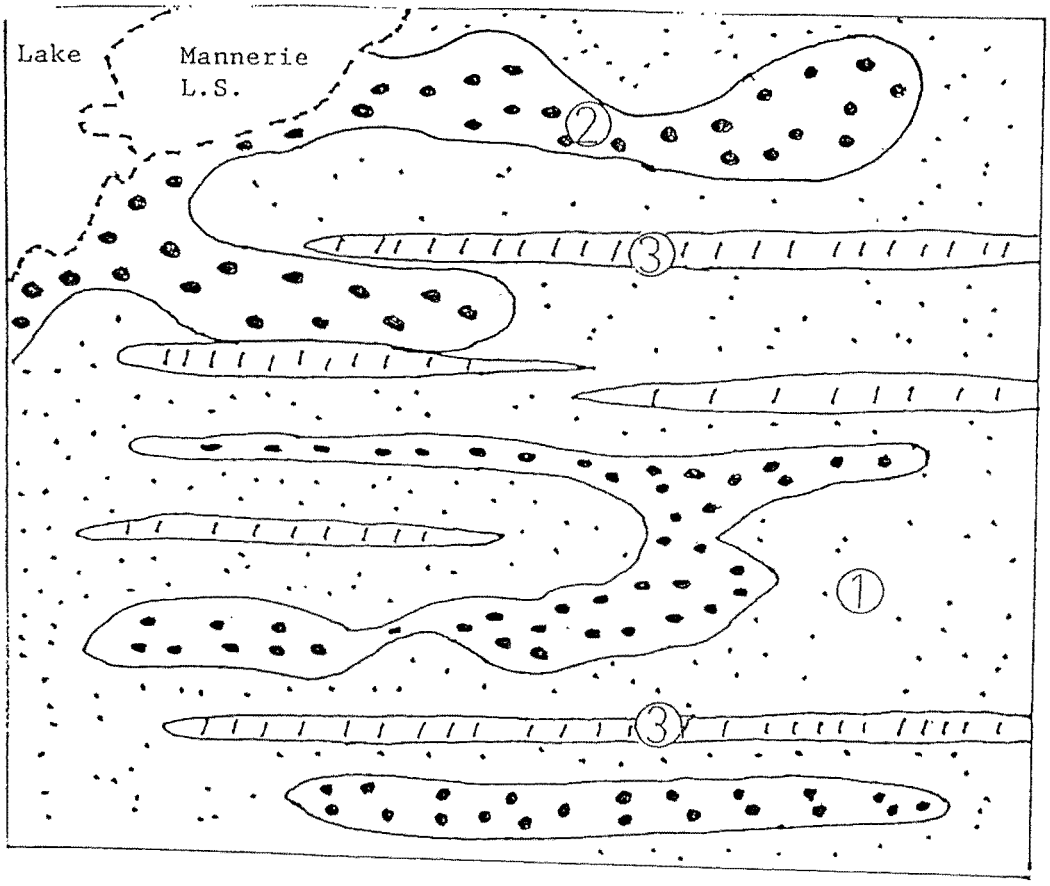
| | |
|---|---|
| Spinifex | Lovegrass |
| Whiteochloa airoides | Frankenia |
| Ricegrass | |

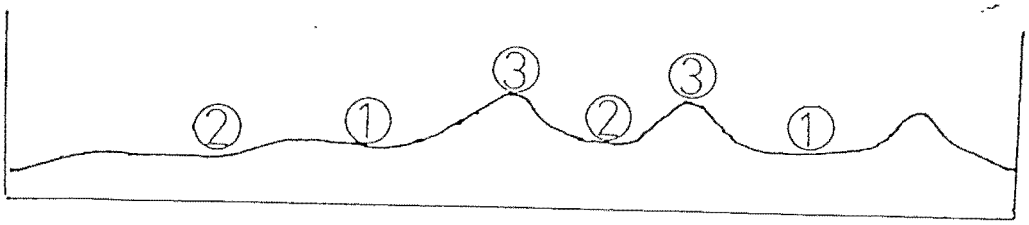
Undesirable plants (large quantity of poor feed)

| | |
|---|---|
| Samphire (I) ? | Black wattle |
| Roly poly | |

.6 Ellel Land System (El) 18,840 ha (5% of total area)

Longitudinal dunes and sand plain interspersed with samphire, paperbark and salt couch. The system is situated in the far south eastern corner of the station, bordering the Mannerie and Lake Mandora Land Systems.



| UNIT | NAME | EXTENT | LAND FORM | SOILS | VEGETATION |
|---|---|---|---|---|---|
| 1 | Swales and sand plain | Large(approx 55%) | Sand dune depressions and slopes | Red earthy sands | Typically pindan or Nita type vegetation. The slopes are colonized by wattles and bauhinia with an understorey of buffel, spinifex, woolybutt and forbs. |
| 2 | Samphire/ paperbark depress-ions | Medium(approx 30%) | Saline plains and depress-ions | Saline silt flats | Dominated by samphire and stunted paperbarks. Less dominant is salt couch and woolybutt. Some wattle on dune margins. |
| 3 | Dunes | Small(approx 15% | Dunes up to 10 m high | Red siliceous sands | The tops of dunes are often bare,some cover of soft spinifex. Trees and shrubs include desert walnut,lemon wood,desert bloodwood and Grevillea spp |

### 2.6.1 Range Condition and Erosion

Only ten range condition and erosion indices were recorded.
Erosion - Nil.
Range condition: insufficient observations were taken to assess range condition.

### 2.6.2 Land Use and Management

Difficult access prevented a thorough survey of the System. The brief observations made revealed a mixed pasture containing saline short grasses and sand plain tussock grasses growing on and around the dunes. The System provides reasonable grazing and would be more suited to dry stock.

The presence of springs and paperbark thickets hinders mustering in this area. By fencing off springs and trapping cattle mustering would be cheaper and more efficient (grazing management similar to Mannerie Land System).

### 2.6.3 Suggested Carrying Capacity

| | |
|---|---|
| Good to excellent | 1 L.S.U. per 30 ha |
| Fair | 1 L.S.U. per 50 ha |
| Poor to very poor | 1 L.S.U. per 80 ha |

### 2.6.4 Feed Status

Desirable plants (medium quantity of good feed).

| | |
|---|---|
| Buffel | Birdwood |
| Salt water couch | Feathertop spinifex |

Intermediate plants (medium quantity of average feed).

| | |
|---|---|
| Woolybutt grass | Lovegrass |
| Eremophila spp | |

Undesirable plants (medium quantity of poor feed).

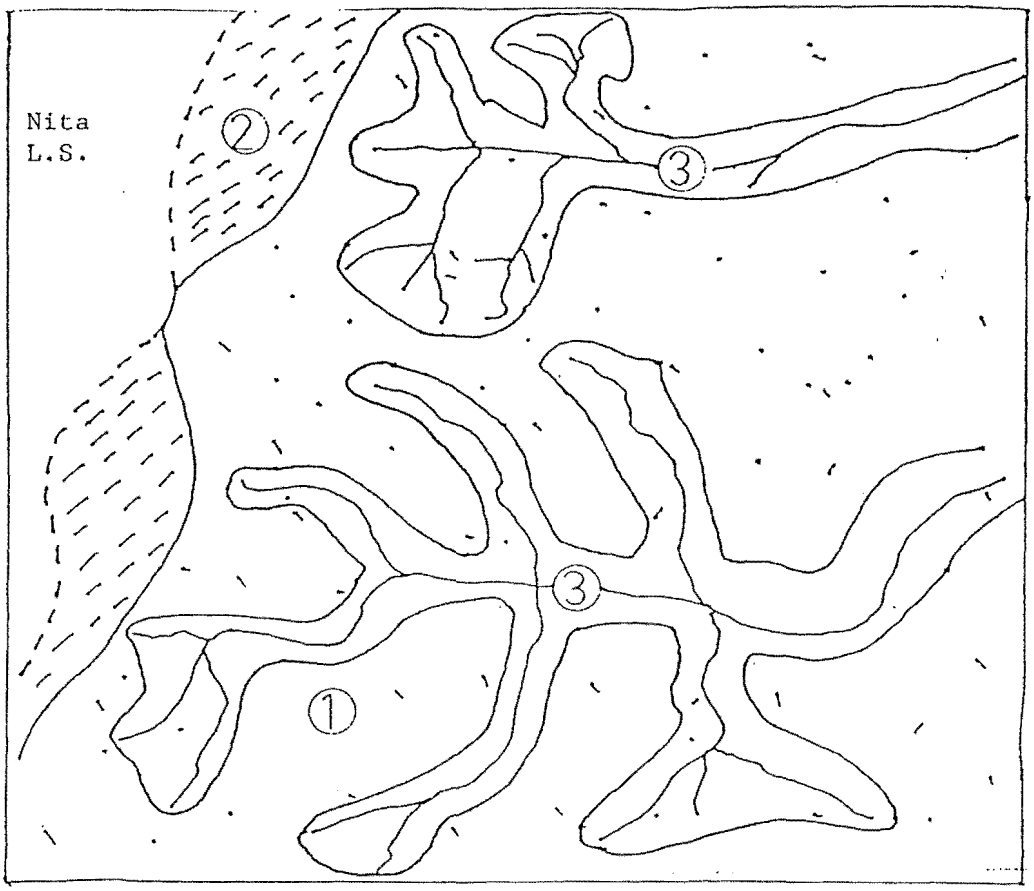
| | |
|---|---|
| Crotolaria spp | Samphire(?) |

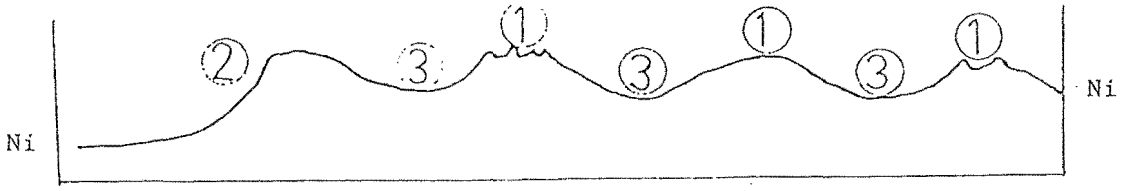
Other

Many forbs, annuals and shrubs (appear after burning) which supply good wet season feed.

2.7 Phire Land System (Ph) 13,075 ha (4% of total area).

Undulating sand plain with numerous lateritic outcrop dominated by soft spinifex. It is situated east of Wild Dog and Bull Head bores.



| UNIT | NAME | EXTENT | LAND FORM | SOILS | VEGETATION |
|---|---|---|---|---|---|
| 1 | Spinifex rises | Large(approx 50%) | Lateritic outcrops and stony rises | Lateritic gravels | Soft spinifex and scattered shrubs(Grevillea,Hakeas and wattles). Some ribbon grass, wire grass and Aristida sp. |
| 2 | Breakaway | Medium(approx 25%) | Breakaway mudstone base | Mudstone origin | ? |
| 3 | Wattle/ spinifex depressions | Medium(approx 25%) | Broad drainage valleys | Red sand overlying laterite gravels | Soft and feathertop spinifex with dense stands along drainage lines. More shrubs present than in 1. (Grevillea, hakeas and wattles). |

### 2.7.1 Range Condition and Erosion

Few range condition and erosion indices were recorded.

### 2.7.2 Land Use and Management

The System has moderate grazing potential but carrying capacity is low. In dry years soft spinifex provide useful feed. During more normal seasons stock graze the few associated grasses and forbs, twenty to thirty percent utilisation of the soft spinifex could be expected.

The Phire Land System is strongly dominated by soft and feathertop spinifex. Without burning, spinifex completely dominates the pasture preventing the growth of more productive annuals. Therefore, occasional burns of spinifex pastures are necessary to improve attractiveness to stock and stimulate growth of associated annual grasses and forbs. Old, closed stands should be burnt prior to the wet season. Burns should not be more frequent than about every four to five years, as they can stimulate undesirables such as corkscrew grass and cockroach bush.

### 2.7.3 Suggested Carrying Capacity

| | |
|---|---|
| Good to excellent | 1 L.S.U. per 50 ha |
| Fair | 1 L.S.U. per 70 ha |
| Poor to very poor | 1 L.S.U. Per 100 ha |

### 2.7.4 Feed Status

Desirable plants (large quantity of average feed).

Soft spinifex
Feathertop spinifex
Ribbon grass

Intermediate plants (small quantity of average feed).

Woolybutt grass
Wire grass
Limestone grass

Undesirable plants (small quantity of poor feed).

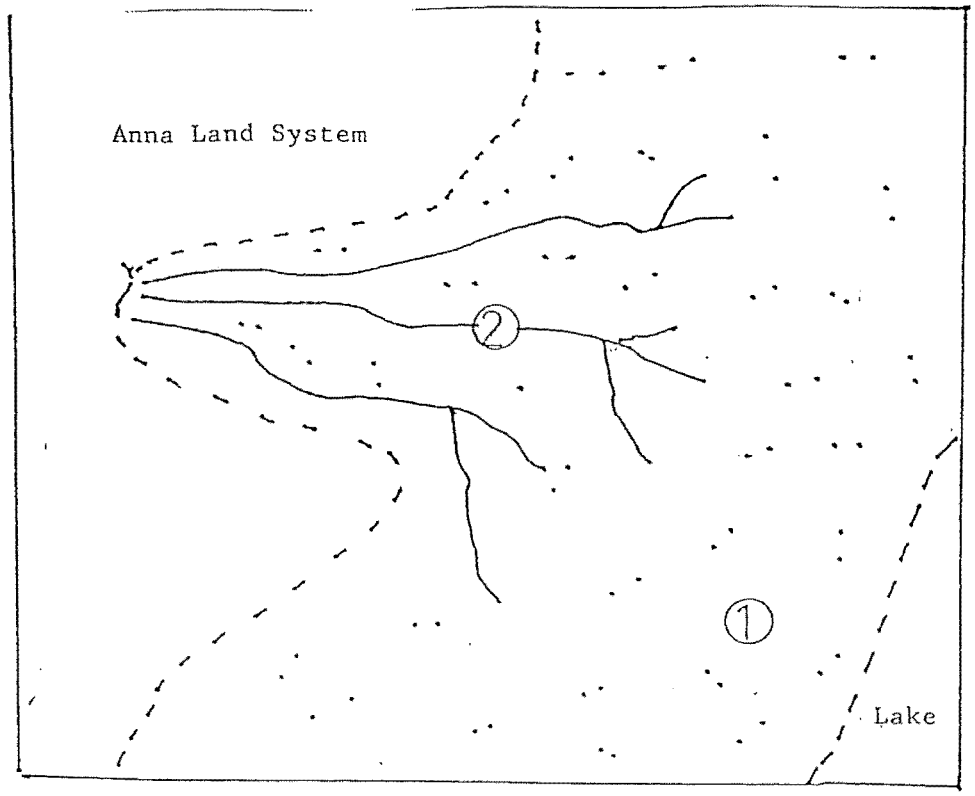
Corkscrew grass
Feathertop threeawn
Cockroach bush

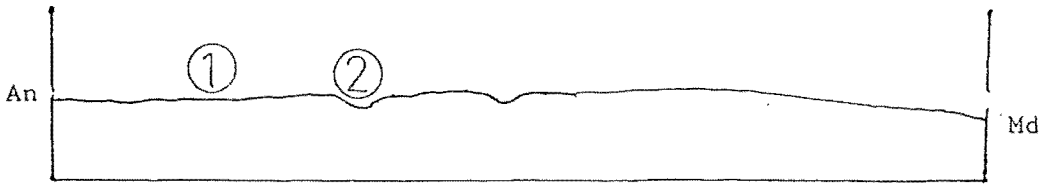
Other

Some annuals and forbs which provide a small quantity of good feed.

3.8 Samphire Land System (Sa) 19,285 ha (5% of total area).

Lake Mandora outwash dominated by samphire.



| UNIT | NAME | EXTENT | LAND FORM | SOILS | VEGETATION |
|---|---|---|---|---|---|
| 1 | Samphire plains | Large(approx 90%) | Saline outwash flats | Silts | Largely samphire,patches of salt water couch and lovegrass along margins. |
| 2 | Watercourse | Small(approx 10%) | Drainage lines | Clays | Samphire and lovegrass between drainage lines. Scattered panic and bundle bundle. Couch within drainage lines. |

2.8.1 Range Condition and Erosion

A total of twenty three range condition and erosion indices were recorded.
Erosion - Nil.
Range condition was fair to good for all of the surveyed area.

The Land System is similar to the saline flats of the Mannerie System in that the majority of the area is covered by samphire. The fringes adjacent to the Anna and Nita Systems are less saline and grow useful perennial grasses.

2.8.2 Land Use and Management

This System is generally poor grazing, with the exception of some areas which provide useful dry season grazing (ie: east of Wotens bore, north west of Coolgardie well and south west of Scotlands point).

2.8.3 Suggested Carrying Capacity

| | |
|---|---|
| Good | 1 L.S.U. per 75 ha |
| Fair | 1 L.S.U. per 90 ha |
| Poor | 1 L.S.U. per 100 ha |

2.8.4 Feed Status

Desirable plants (small quantity of good feed).

| | |
|---|---|
| Salt water couch | Bundle bundle |
| Buffel | Native millet |

Intermediate plants (medium quantity of average feed).

| | |
|---|---|
| Lovegrass | Mulla mulla |

Undesirable plants (large quantity of poor feed).

| | |
|---|---|
| Samphire (1)? | Roly poly |

Other

Some annuals and forbs.

2.9 Mandora Land System (Ma) 9,455 ha (3% of total area).

Comprises the Mandora Lake in the far south east corner of Anna Plains. Bare salt pans that are frequently inundated.

## 3.0 CARRYING CAPACITY

Over the whole Station (including fenced and unfenced areas) the areas of the various Land Systems have been measured and used to calculate safe carrying capacities. The table on the following page summarises carrying capacities and range condition for each Land System. Current L.S.U.'s include allowances for degraded rangeland and insufficient water points. Optimal L.S.U.'s assume all rangeland is in good to excellent condition and 100% watered (waters 10 km apart on the coastal Land Systems and 16 km apart for other Land Systems).

Details of Land Systems and carrying capacities on a paddock/area basis is shown in Table 3.2. (The assumptions for optimal and current carrying capacities used in Table 3.1 also apply to this table).

Taking into account degraded areas throughout the lease, and the proportion of country watered, the current suggested carrying capacity for Anna Plains is around 13,000 L.S.U.'s or 15,350 mixed cattle units. Fully watered and in good to excellent condition the optimal carrying capacity is around 29,000 L.S.U.'s or 34,200 mixed cattle units.

TABLE 3.1 SUMMARY OF CARRYING CAPACITIES AND CONDTION RATINGS FOR EACH LAND SYSTEM.

| | AREA (HA) | % GOOD | % FAIR | % POOR | CARRYING CAPACITY(HA/L.S.U.) GOOD | FAIR | POOR | % WATERED | TOTAL CARRYING CAPACITIES (L.S.U.) CURRENT | OPTIMAL |
|---|---|---|---|---|---|---|---|---|---|---|
| Anna | 69,020 | 50 | 42 | 8 | 4 | 6 | 20 | 50 | 6,867 | 17,255 |
| Eighty Mile | 26,330 | 82 | 18 | - | 4 | 10 | 40 | 41 | 2,418 | 5,115 |
| Nita | | | | | | | | | | |
| Type 1 | 7,185 | 100 | | | 15 | | | 60 | 2,400 | 4,000 |
| Type 2 | 103,945 | 22 | 50 | 28 | 40 | 60 | 80 | | | |
| Type 3 | 52,490 | 100 | | | 40 | | | | | |
| Mannerie | 22,730 | 100 | | | 45 | 70 | 100 | 79 | 400 | 505 |
| Great Sandy | 36,630 | 100 | | | 40 | 50 | 80 | 59 | 540 | 916 |
| Phire | 13,075 | 100 | | | 50 | 70 | 100 | 17 | 45 | 262 |
| Samphire | 19,285 | 100 | | | 75 | 90 | 100 | 80 | 205 | 257 |
| Ellel | 18,840 | 100 | | | 30 | 40 | 80 | 70 | 440 | 630 |
| | | | | | | | | approx | 13,300 | 28,610 |

NB Type 1 of the Nita Land System is the approximate area of the Buffel/Bauhinia unit, Type 2 and 3 are the watered and unwatered areas of the spinifex grassland.

TABLE 3.2 RANGE SYSTEMS INVENTORY AND SUGGESTED CARRYING CAPACITY FOR EACH PADDOCK/AREA

(NB NUMBER OF MIXED CATTLE X 0.85 = L.S.U.)

| | | | | SUGGESTED CARRYING CAPACITY | |
|---|---|---|---|---|---|
| PADDOCK/AREA | LAND SYSTEM | AREA (HA) | AREA WATERED % | CURRENT L.S.U. | OPTIMAL L.S.U. |
| Mannerie | Eighty Mile | 1,000 | | 217 | 250 |
| | Anna | 2,000 | | 398 | 500 |
| | Mannerie | 850 | | 17 | 17 |
| | Nita | 3,800 | | 80 | 111 |
| | | 7,650 | 100 | 712 | 878 |
| Calanjardie | Eighty Mile | 1,990 | | 444 | |
| | Anna | 3,210 | | 638 | |
| | Mannerie | 1,280 | | 26 | |
| | Nita | 2,930 | | 66 | |
| | | 9,410 | | 1,174 | 1,400 |
| | | | 86 | 1,010 | |
| Cardingy | Eighty Mile | 630 | | 140 | 157 |
| | Anna | 1,830 | | 364 | 457 |
| | Mannerie | 640 | | 13 | 13 |
| | Nita | 530 | | 17 | 17 |
| | | 3,630 | | 534 | 654 |
| | | | 58 | 310 | |

TABLE 3.2 (CONT)

| PADDOCK/AREA | LAND SYSTEM | AREA (HA) | AREA WATERED % | SUGGESTED CARRYING CAPACITY CURRENT L.S.U. | SUGGESTED CARRYING CAPACITY OPTIMAL L.S.U. |
|---|---|---|---|---|---|
| Bauhinia (west and east) | Nita | 9,820 | | 234 | 286 |
| | Mannerie | 1,120 | | 27 | 27 |
| | | 11,050 | | 261 | 313 |
| | | | 75 | 200 | |
| Pindan (west and east) | Nita | 10,930 | | 242 | 317 |
| | Mannerie | 60 | | - | - |
| | | 10,990 | | 242 | 317 |
| | | | 100 | 242 | 317 |
| Stud | Eighty Mile | 1,070 | | 240 | 268 |
| | Anna | 2,220 | | 442 | 550 |
| | | 3,290 | | 682 | 818 |
| | | | 52 | 355 | |
| Weaner | Anna | 890 | 79 | 148 | 222 |
| Ram | Anna | 380 | 100 | 77 | 95 |

TABLE 3.2 (CONT)

| PADDOCK/AREA | LAND SYSTEM | AREA (HA) | AREA WATERED % | SUGGESTED CARRYING CAPACITY CURRENT L.S.U. | SUGGESTED CARRYING CAPACITY OPTIMAL L.S.U. |
|---|---|---|---|---|---|
| Talgarno | Nita | 850 | 100 | 60 | 60 |
| Pinchers | Eighty Mile | 750 | | 187 | 187 |
| | Anna | 2,770 | | 650 | 693 |
| | | 3,520 | | 838 | 880 |
| | | | 36 | 302 | 360 |
| Meatworks | Anna | 1,000 | | 148 | 250 |
| | | | | 148 | 250 |
| | | | 74 | 110 | |
| Tank | Eighty Mile | 3,280 | | 820 | 820 |
| | Anna | 4,520 | | 1,021 | 1,130 |
| | | 7,800 | | 1,841 | 1,950 |
| | | | 20 | 368 | |
| Yellow Gap | Anna | 2,710 | | 135 | 678 |
| | Mannerie | 520 | | 10 | 10 |
| | Nita | 1,270 | | 30 | 40 |
| | | 4,500 | | 175 | 728 |
| | | | 100 | 175 | |

TABLE 3.2 (CONT)

| PADDOCK/AREA | LAND SYSTEM | AREA (HA) | AREA WATERED % | SUGGESTED CARRYING CAPACITY CURRENT L.S.U. | SUGGESTED CARRYING CAPACITY OPTIMAL L.S.U. |
|---|---|---|---|---|---|
| Sandy | Anna | 840 | | 42 | 210 |
| | Mannerie | 2,930 | | 60 | 60 |
| | Nita | 2,280 | | 35 | 66 |
| | | 6,050 | | 137 | 336 |
| | | | 100 | 137 | |
| White Gum | Mannerie | 650 | | 15 | 15 |
| | Nita | 15,300 | | 360 | 444 |
| | | 15,950 | | 375 | 459 |
| | | | 100 | 375 | |
| Erinbee | Mannerie | 330 | | 10 | 10 |
| | Anna | 2,445 | | 125 | 610 |
| | Nita | 2,163 | | 50 | 65 |
| | | 4,938 | | 185 | 775 |
| | | | 100 | | 600 |

TABLE 3.2 (CONT)

| PADDOCK/AREA | LAND SYSTEM | AREA (HA) | AREA WATERED % | SUGGESTED CARRYING CAPACITY CURRENT L.S.U. | SUGGESTED CARRYING CAPACITY OPTIMAL L.S.U. |
|---|---|---|---|---|---|
| OUTSIDE FENCED AREA | | | | | |
| East of highway | Mannerie | 10,410 | | 218 | 218 |
| | Nita | 91,770 | | 2,000 | 2,000 |
| | Great Sandy | 35,470 | | 880 | 880 |
| | Ellel | 18,840 | | 620 | 620 |
| | Phire | 13,075 | | 260 | 260 |
| | Samphire | 13,575 | | 160 | 160 |
| | Mandora | 9,455 | | - | - |
| | | 192,595 | | 4,138 | 4,138 |
| | | | 50 | 2,070 | 2,220 |
| West of highway | Eighty Mile | 17,610 | | 2,935 | 2,935 |
| | Anna | 44,110 | | 8,780 | 11,028 |
| | Mannerie | 3,890 | | 100 | 100 |
| | Nita | 21,090 | | 500 | 650 |
| | Great Sandy | 1,160 | | 30 | 30 |
| | Samphire | 5,710 | | 70 | 70 |
| | | 93,570 | | 12,415 | 14,815 |
| | | | 50 | 6,208 | |

NB Current carrying capacity includes allowances for degraded rangeland and the percentage of the area considered to be watered.

Optimal carrying capacity assumes all areas are in good to excellent condition and 100% of the area is watered (waters 10 km apart on coastal Land System and 16 km apart on other Land Systems).

TABLE 3.3 ANNA PLAINS PADDOCK SUMMARY

| PADDOCK | AREA | SUGGESTED CARRYING CAPACITY | | COMMENTS |
|---|---|---|---|---|
| | | CURRENT L.S.U. | OPTIMAL L.S.U. | |
| Mannerie | 7,650 | 712 | 878 | Reasonable condition |
| Calanjardie | 9,410 | 1,010 | 1,400 | Reasonable condition |
| Cardingy | 3,630 | 310 | 654 | Reasonable condition |
| Bauhinia (east & west) | 11,050 | 200 | 313 | Heavy use around Pidgeon |
| Pindan (east & west) | 10,990 | 242 | 317 | Heavy use around Pindan bore |
| Stud | 3,290 | 355 | 818 | Good condition |
| Weaner | 890 | 148 | 222 | Flood affected or heavily used |
| Ram | 380 | 77 | 95 | Good condition |
| Talgarno | 850 | 60 | 60 | Good condition |
| Pinchers | 3,520 | 302 | 880 | Good condition |
| Meatworks | 1,000 | 110 | 250 | Good condition |
| Tank | 7,800 | 368 | 1,950 | Heavy use |
| Yellow Gap | 4,500 | 175 | 728 | Flood affected, or heavily used |
| Sandy | 6,050 | 137 | 336 | Flood affected, or heavily used |
| White Gum | 15,950 | 375 | 459 | Some heavy use around New Gleesons |
| Erinbee | 4,938 | 185 | 775 | Flood affected, or heavily used |
| Homestead and misc | 5,000 | | | |
| OUTSIDE PADDOCK | | | | |
| East of highway | 192,595 | 2,070 | 4,138 | Good condition |
| West of highway | 93,570 | 6,208 | 14,815 | Heavy use around Dallas, Nurdy's and Widjubb |
| | 379,433 | 13,044 LSU<br>15,346 mixed | 29,088 LSU<br>34,221 mixed | |

## 4.0 WATER SUPPLIES

The water supply distribution on Anna Plains is inadequate. Most of the coastal plains country is under-utilised because of unsuitable water supplies. The majority of bores and wells are located either in the Mannerie or Nita Land Systems. Here water supplies are relatively fresh and shallow.

### 4.1 Quality

On the fifty bores working on Anna Plains, twenty eight were sampled for total soluble salts and pH (Table 4.1). All the waters are suitable for cattle however, some bores have medium salt levels and could become unsuitable as salt levels rise over time. These being Cardingy, Rocky's, Mono tank and Scotlands. A regular monitoring of these waters is recommended.

MAXIMUM TOTAL SOLUBLE SALT CONTENT OF WATER FOR OPTIMUM CATTLE PERFORMANCE

| | NON SALT FEED |
|---|---|
| Dry cattle | 10,000 ppm |
| Pregnant or wet cows | 7,000 ppm |

Cattle, like sheep will reduce their intake of salty feed (salt couch, saltbush) and increase their intake of non salty feed (couch, birdwood/buffel) in direct proportion to the salinity of the water. Thus cattle given salty water will not effectively use salty feed.

Paddocks containing a fair proportion of salty feed include Mannerie, Cardingy, Yellow Gap and Sandy. In all cases except Cardingy the water quality is very good. The water supply from Cardingy well is high enough to effect lactating cows and calves, especially if cattle are grazing salty feed. If salinity increases above 6,000-7,000 ppm, stock should be moved to better quality water.

### 4.2 Distribution

Areas insufficiently watered include approximately 50% of the un-paddocked area. Other poorly watered areas include Pinchers and Tank paddocks and to a lesser extent, Calanjardie and Stud paddocks.

The most practical way of supplying suitable stock water to unwatered areas of the plain is by pumping water from bores strategically located in the pindan. The details involved and the economic ramifications of implementing such developments are described in an associated report, "An option for the development of the coastal plain on Anna Plains Station".

The feasibility of developing country east of the highway is dependent on the cost of supplying stock water as opposed to the productivity gained from turnoff in the area. A ten to fifteen thousand dollar investment per water in this area should return a safe carrying capacity of 400-500 head.

LE 4.1 WATER QUALITY - SELECTED WATER SAMPLES

| BORE | PADDOCK | T.S.S. | pH | COMMENTS |
|---|---|---|---|---|
| lgardie well | Premise 7 | 420ppm | 7.87 | OK |
| las | Premise 1 | 640 | 7.34 | OK |
| di gy | Cardingy | 4350 | 7.18 | OK* |
| nbee | Erinbee | 1680 | 7.56 | OK |
| ky | Premise 4 | 4170 | 7.20 | OK* |
| en | Premise 7 | 410 | 7.88 | OK |
| da | Pindan | 380 | 7.58 | OK |
| d + Hmst | Stud | 660 | 7.98 | SUITABLE HOUSEHOLD,GARDEN AND STOCK |
| G eeson | Sandy | 810 | 7.38 | OK |
| an ardie | Calanjardie | 1360 | 7.77 | OK |
| geon | Bauhinia | 520 | 8.89 | OK |
| o ank | Erinbee | 4460 | 7.53 | OK* |
| er | Calanjardie | 2300 | 7.54 | OK |
| hinia | Bauhinia | 360 | 7.20 | OK |
| es an Talgarno | Talgarno | 1980 | 7.38 | OK |
| dy | Premise 1 | 1580 | 7.57 | OK |
| low gap | Yellow gap | 860 | 7.60 | OK |
| phire bore artesian | Premise 1 | 1630 | 7.89 | OK |
| 2 | White gum | 670 | 7.47 | OK |
| as | Mannerie | 1020 | 7.27 | OK |
| dys | Sandy | 870 | 7.57 | OK |
| ju p | Premise 2 | 2320 | 7.60 | OK |
| . cPhees | Mannerie | 570 | 7.65 | OK |
| nsons | Mannerie | 1470 | 7.29 | OK |
| 2 rtesian | Premise 7 | 2320 | 6.93 | OK |
| e rain water(filtered) | | | | |
| dham | Premise 4 | 720 | 7.40 | OK |
| tlands | Premise 4 | 5000 | 7.50 | OK* |
| d pg | Premise 4 | 270 | 7.10 | OK |

Me um salt levels, need to be monitored on a regular basis

## 5.0 RAINFALL

The average annual rainfall (A.A.R.) on Anna Plains is 381 mm. A major proportion of this falls during the summer months. Winter rain, however, often accounts for thirty to forty percent of total rainfall. Southern cold fronts and moist tropical air from Cocos Island bring light showers during winter. Distribution during summer is erratic. Heavy cyclonic storms are intermittent with frequent short and often long dry periods.

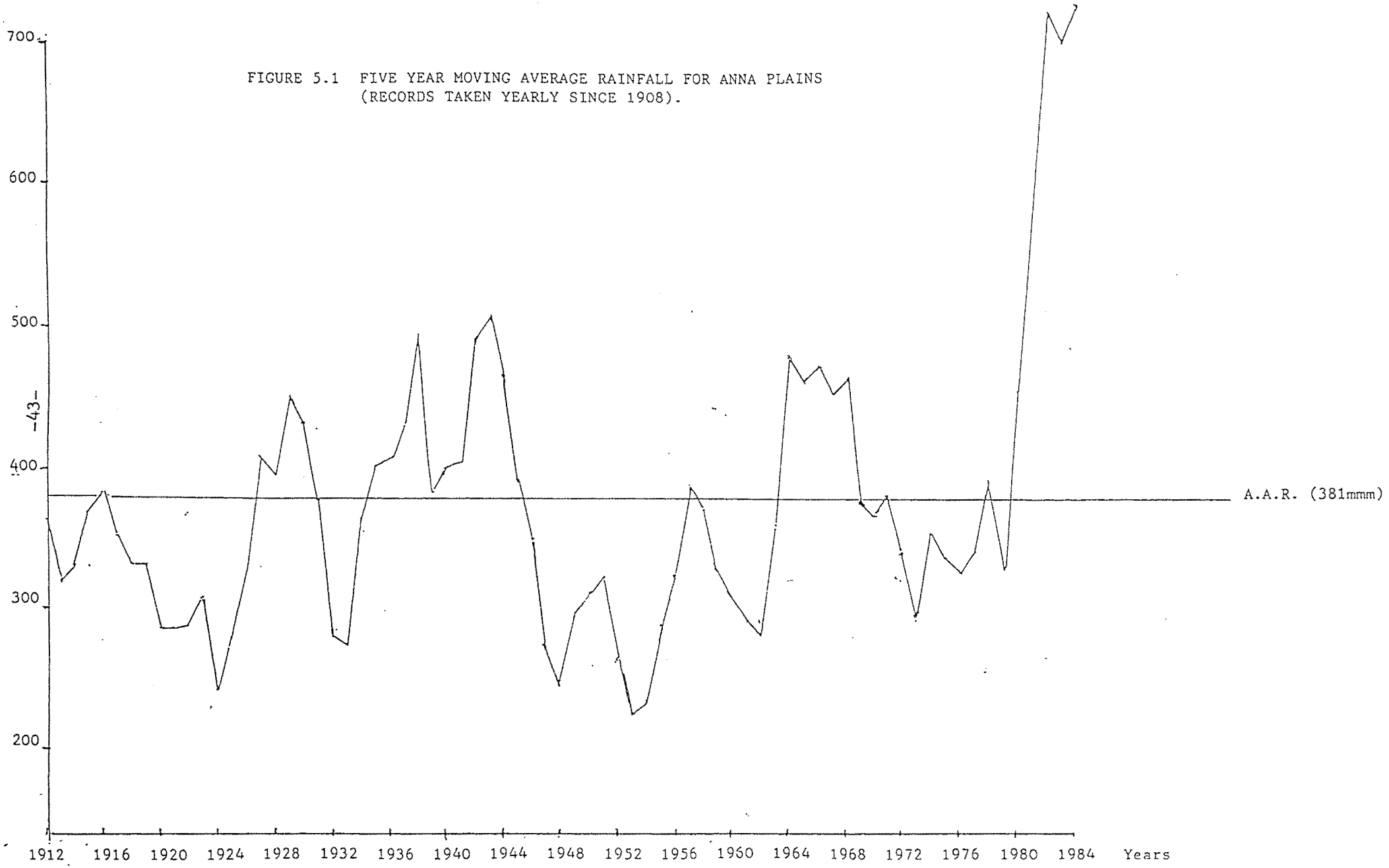
Heavy fogs and dews are a common occurrence during the dry season. At times these produce enough moisture to stimulate 'green pick'. It is especially noticeable in buffel/birdwood growing in sandy soil near McPhees.

A five year moving average has been calculated from annual rainfall records taken since 1908 (the moving average reduces year to year fluctuations and allows trends to develop). Shown below is the proportion of annual rainfall above and below the average annual rainfall between 1908 and 1984.

10% > 480 mm
30% 381–480 mm
50% 280–380 mm
10% < 280 mm

These records show that in a ten year period Anna Plains would expect to have one wet year, three years above average rainfall, five years below average rainfall, and one very dry year.

FIGURE 5.1 FIVE YEAR MOVING AVERAGE RAINFALL FOR ANNA PLAINS
(RECORDS TAKEN YEARLY SINCE 1908).



## 6.0 RANGELAND MONITORING SYSTEM

Stocking rates have been, to a large extent, subjectively established for each land system on the lease. These are given as suggestions only and could be used as convenient starting points from which adjustments upwards or downwards can be made depending on how the condition of the range changes.

To assist in this identification of the change in range condition a series of range monitoring sites have been established throughout the lease. For each site a photograph of the pasture has been taken, as to date, no quantitative measurements have been taken. Once a reliable method is established for measuring changes in grasslands, quantitative recordings will not be made.

The photographs and information on species composition and site condition will be provided in a station monitoring file. The photographs can be used from time to time to check on the effects of grazing in the paddock. Every 2-3 years sites will be re-photographed and plant details recorded by the Department of Agriculture. Details of monitoring sites are shown in Table 6.1 and also in the station monitoring file.

The monitoring system installed on the lease is part of a state wide system presently being developed and installed by the Rangeland Management Branch. This monitoring programme will be used:-

* By pastoralists to assist them in the management of their rangeland.

* By Government Range Management Officers to assist them in attaining a better understanding of the processes affecting range trend.

* To provide evidence for both Government and the community that the state's pastoral land is being used wisely.

TABLE 6.1 ANNA PLAINS PHOTO MONITORING SITES

| PHOTO SITE | LAND SYSTEM | PASTURE TYPE | CLOSEST WATER | PASTURE CONDITION RATING | COMMENTS, OCT 1984 |
|---|---|---|---|---|---|
| AP 01 | Anna Unit 2 | Saline plains | Cardingy 2km | GOOD | Well grazed area, salt couch and samphire with lovegrass. Good ground cover. |
| AP 02 | Anna Unit 2 | Saline plains | Nummery 1.8km | GOOD | Grazed area, mostly salt couch, samphire and lovegrass. Good ground cover. |
| AP 03 | Eighty Mile Unit 1 | Consolidated dunes | McPhees 1.6km | EXCELLENT | Grazed area, mostly buffel and tussock grass (Whiteochloa airoides).Tall ground cover. |
| AP 04 | Anna Unit 2 | Saline plains | McPhees 4km Almas 2.3km | GOOD | Lightly grazed, salt couch and samphire. Fair ground cover. |
| AP 05 | Nita Unit 2 | Spinifex grasslands | Bohemia 1.5km | FAIR | Lightly grazed-burnt previous season. Approx 40% ground cover. Mostly soft spinifex grazing. |
| AP 06 | Eighty Mile Unit 2 | Consolidated dunes | Calanjardie 3km | GOOD | Lightly grazed. Birdwood and bundle bundle. Good ground cover. |
| AP 07 | Anna Unit 2 | Saline plains | Homestead 2km | FAIR | Heavily grazed. Salt couch and lovegrass. Fair ground cover. |
| AP 08 | Nita Unit 2 | Spinifex grasslands | Pindan 3km | FAIR/GOOD | Soft spinifex and ribbon grass. Fair ground cover. Very lightly grazed. |

TABLE 6.1 (CONT)

| PHOTO SITE | LAND SYSTEM | PASTURE TYPE | CLOSEST WATER | PASTURE CONDITION RATING | COMMENTS, OCT 1984 |
|---|---|---|---|---|---|
| AP 09 | Nita Unit 2 | Spinifex grasslands | New Gleeson 1.8km | FAIR/GOOD | Soft spinifex and ribbon grass. Lightly grazed. Fair cover. |
| AP 10 | Nita Unit 1 | Bauhinia/ buffel | Sandy 1.6km | GOOD/FAIR | Buffel and woolybutt grazing. Quite heavily grazed. Fair cover. |
| AP 11 | Anna Unit 2 | Saline plains | Yellow Gap 1.9km | FAIR/GOOD | Salt couch and lovegrass. Lightly grazed. Fair cover. |
| AP 12 | Anna Unit 2 | Saline plains | Homestead 2.8km | POOR/FAIR | Lovegrass and salt couch-some panic. Heavily grazed. Fair ground cover. |
| AP 13 | Anna Unit 1 | Tussock-grass plains | (Mono) Tank 3km | FAIR | Bundle bundle, rice grass pasture. Moderate grazing. Fair cover. |
| AP 14 | Anna Unit 1 | Tussock-grass plains | Tank 3.6km | FAIR | Moderate - heavy grazing pressure. Buffel grass and lovegrass pasture. Good cover. |
| AP 15 | Anna Unit 1 | Tussock-grass plains | Erinbee 1.5km | GOOD | Lovegrass and panic, samphire. Good cover. Moderate grazing. |
| AP 16 | Nita Unit 2 | Spinifex grasslands | Erinbee 3.4km | FAIR | Moderate grazing. Fair cover. Buffel and soft spinifex grasses. |

TABLE 6.1 (CONT)

| PHOTO | LAND SYSTEM | PASTURE TYPE | CLOSEST WATER | PASTURE CONDITION RATING | COMMENTS, OCT 1984 |
|---|---|---|---|---|---|
| AP 17 | Anna Unit 2 | Saline plains | Widjubb 2.4km | GOOD | Salt couch and samphire grazing. Light-moderate use. Good cover. |
| AP 18 | Anna Unit 1 | Tussock-grass plains | Rocky 3.5km | GOOD | Buffel and birdwood, wandarrie grass and salt couch. Moderate grazing pressure. Good cover. |
| AP 19 | Anna Unit 1 | Tussock-grass plains | Scotland 3km | EXCELLENT | Buffel, soft spinifex. Light use. Fair cover. |
| AP 20 | Anna Unit 2 | Saline plains | Wotens 4km | FAIR | Salt couch, wandarrie grasses. Fair cover. Moderate/heavy grazing pressure. |
| AP 21 | Nita Unit 2 | Spinifex grasslands | Wyndham 2.6km | FAIR TO GOOD | Soft spinifex. Light grazing. Fair cover. |

## 7.0 IMPROVED PASTURES

### 7.1 Suitable Species

The widespread colonization of buffel and birdwood on Anna Plains shows the suitability of these species to the area, in particular the calcareous soils of the coastal plains. Both species have also colonized areas of the pindan, especially in association with bauhinia. Furthermore, establishment should also be effective in disturbed and degraded areas around water points.

Recently, the Department of Agriculture has been experimenting with different Stylosanthes species. Suitability of these species to the area will depend on further observations on plant numbers, persistence and spread.

Stylosanthes scabra cv Seca, S. scabra cv Fitzroy, and S. hamata cv Verano, were sown on four sites covering both Nita and Anna Land Systems. Various fertilizer and cultivation treatments were applied to all plots. Observations following the poor wet season in 1984/85 showed some germination of verano and fitzroy on all plots. The best results were obtained from plots in Weaner and Bauhinia paddocks. Further observations after the 1985/86 wet season should reveal the suitability of stylos to the area.

### 7.2 Areas Suitable for Pasture Improvement

If stylos are successful, they could be established around water points in both the pindan and plain (depending on suitability). Stylos are easily established by broadcasting seed into native pasture. Using a 'super spreader' or by hand spreading, strips of stylo could be established around most water points (especially overused ones). Because stylos are not palatable until the mid-dry season, plants are able to grow and persist without destocking water points. Stylos are also highly resistant to grazing, so plants will persist close to water, supply good grazing, and protect the soil from erosion.

Buffel and birdwood can also be sown with stylos, however, cultivation is necessary for plants to establish. The other disadvantage of establishing buffel, is that grazing must be light during the initial period so that the pasture will establish. Although, once established it is resistant to heavy grazing, is very palatable and protects the soil from disturbance.

## 8.0 SUPPLEMENTS

### 8.1 Why Use Them?

Evidence from trials, surveys, soil and vegetation analysis suggest that the coastal plains may be deficient in nitrogen, phosphorus, copper and cobalt. Furthermore, animal and plant studies have also confirmed nitrogen and phosphorus deficiencies in pindan, similar to the Nita Land System on Anna Plains.

In pindan pastures nitrogen levels drop below critical levels early in the dry season following seed set of most native species (April). On the other hand, phosphorus can be deficient during both wet and dry season, (more so during the dry season).

On the plain nitrogen levels drop below critical levels around May/June. Phosphorus levels have not been measured in the pasture but soil analyses suggest that plants could be low especially late in the dry season (Appendix 9.3). Furthermore, trace elements (especially copper and cobalt) are deficient on the plains and would need to be supplemented.

Supplementing cattle deficient in nutrients, nitrogen in particular, will reduce liveweight loss and improve liveweight gains.

### 8.2 When To Use Them

Response to protein supplements are likely to occur when pastures are mature and fully seeded. The best overall results are likely to be obtained by commencing feeding as soon as responses can be obtained. On plains country this would most likely be from July/August, and on pindan from May/June until new pasture growth during the wet season.

Phosphorus and trace elements can be fed with nitrogen during the dry season and without nitrogen during the wet season. (Phosphorus would be more important in the pindan). Feeding should commence before the green flush and finish when the pasture dries off.

### 8.3 How to Supply Them

For dry season supplementation, all nutrients can be supplied through the drinking water using a liquid dispensing unit mounted beside water troughs. Nitrogen is supplied in the form of urea, phosphorus as mono ammonium phosphate (M.A.P.) or phosphoric acid, copper and cobalt as salts. This method is labour saving and effective. All stock need to drink and in doing so obtain nutrients.

An alternative method of feeding supplements is through roller drums using a mixture of urea, molasses, phosphorus (as phosphoric acid) and trace elements. This method is very effective but more expensive because of the high cost of molasses and the additional labour involved in 'feeding out'.

There are other forms of supplements available, however, most of these are salt based and possibly unpalatable to cattle on coastal country.

Supplementing phosphorus, copper and cobalt during the wet season could be a problem, especially when supplements are supplied through the drinking water. Areas that have natural water supplies for long periods during the wet season are unsuitable for water supplementation. In this situation mineral blocks may be more suitable. Strategic placement of blocks should give cattle access to them, even though cattle spread out during this period.

Survival feeding using fortified molasses and urea feed in open troughs, may be necessary during droughts and poor seasons when feed is short. It is an expensive method, however, it is cheap if large numbers of cattle are saved.

## 8.4 What Stock Do You Feed?

The most benefit will come from feeding breeders and weaners, in the form of reduced mortalities, improved conception rates and post weaning growth rates. Dry cattle do respond to supplements during the dry season. However, compensatory gain during the wet season can eliminate a substantial component of this, therefore, it would be more economical to supplementary feed breeders and weaners.

## 8.5 How Much Does It Cost?

Below is a list of costs for the four types of supplements mentioned above. The cost has been calculated using ingredients landed in Derby, excluding labour and capital costs. All supplements excluding the fortified molasses supply 30 g of nitrogen and 8-10 g of phosphorus (wet season mineral block) per head per day.

| | Approx. cost $/hd/180 d. |
|---|---|
| Drinking water(mainly dry season) | 7-8 |
| Roller drums(dry season) | 12-13 |
| Dry salt basal licks(dry season) | 10-12 |
| Mineral blocks(wet season) | 3-4 |
| Fortified molasses(droughts) | 50-60 |

## 9.0 APPENDICES

### 9.1 Stocking Rates

Stocking rates are measured in Large Stock Units (L.S.U.), where a Large Stock Unit is a bullock or dry cow. This is equivalent to one mixed cattle unit multiplied by 0.85.

### 9.2 Range Assessment

For each 1.0 km traversed range condition and erosion was assessed according to the following scale. These values are shown on the map as a two number group eg: 0,2 which summarise the rating for erosion (0) and range condition (2) as assessed over the kilometre distance.

Scales are summarised below:

Erosion:
- 0 - Nil
- 1 - Minor - slight hummocking or stripping.
  - thin sheeting.
- 2 - Moderate - large discontinuous scalds.
  - gullies or sheeting on lower slopes.
- 3 - Severe - major scalds and wind piling.
  - extensive gullies.

Range condition:

1. Excellent - a predominance of palatable nutritious grass species in a healthy stand with many young plants.
2. Good - a less healthy stand of palatable nutritious grasses with older individuals becoming more evident. Some increase in bare areas and the beginnings of a shift in species composition towards less desirable individuals may be evident.
3. Fair - less palatable species are beginning to dominate, bare areas are larger, however, soil stability is not yet seriously affected.
4. Poor - few if any palatable species are present, annual species are more evident and in the late dry season large areas of the soil surface are bare.
5. Very poor - total dominance of unpalatable species, many annuals and large unproductive bare areas may be evident. Landscape stability is seriously at risk and production from these areas is very low.

## 9.3 Soil Characteristics

Soil samples were taken at various locations over the Anna and Eighty Mile Land Systems. Samples were analysed for texture, colour, pH, salinity, nitrogen and phosphorus. Details of the analysis are shown below in table 9.3.

The results from the analysis show the following:

* The soil from the Anna Land System is characterised by a light-medium, grey-dark grey, alkaline-strongly alkaline clay.

* Soil taken from the Eighty Mile System is an alkaline dusky red sand low in salt and nitrogen.

* The less salt tolerant plants buffel, birdwood and couch, are associated with light soils with low salt levels. Therefore, areas to be reseeded with these species should have soil similar to the above.

* Surface nitrogen levels are within the expected range (0.02-0.50%) for most areas of the upper end of the expected range for arid soils (0.02-0.12%). These levels are good as many pertain to the high productive nature of the Anna Land System.

* The coastal plain soil shows an adequate supply of phosphorus and in all cases levels are well above the critical level of 10 ppm. However, because the pH of these soils is so high, the availability of some nutrients (phosphorus, copper, cobalt and zinc) become low, to the point the grazing animals may be deficient in these minerals.

TABLE 9.3 ANNA PLAINS SOIL SAMPLES 19/11/84

| SITE | LOCATION | PASTURE TYPE | DEPTH CM | DESCRIPTION | |
|---|---|---|---|---|---|
| | | | | TEXTURE | COLOUR |
| AP 01 | 2km N of Cardingy mill 100m E of track | Couch | 0-10 | Sandy clay | Very dark grey |
| AP 01 | | | 10-40 | Sandy clay | Grey |
| AP 03 | 1.6km N of McPhees 100m left of track | Buffel | 0-10 | Sand | Dusky red |
| AP 03 | | | 10-40 | Sand | Dusky red |
| AP 04 | 2.3km WNW of Almas 100m left of track | Salt water couch | 0-10 | Medium clay | Very dark grey |
| AP 04 | | | 10-40 | Medium clay | Very dark grey |
| AP 06 | 3km W of Calanjardie 100m S of track | Birdwood/ buffel | 0-10 | Sandy clay | Dark grey |
| AP 06 | | | 10-40 | Light clay | Grey |
| AP 13 | 3km NE of tank 2.1km S of Weaner/ Meatworks gate, 100m in from dogleg | Bundle bundle | 0-10 | Light/medium clay | Very dark grey |
| AP 13 | | | 10-40 | Light clay | Grey |

TABLE 9.3 ANNA PLAINS SOIL SAMPLES 19/11/84

| SITE | pH $H_2O$ | | SALINITY mS/m (1+5) | | | | NITROGEN % | | PHOSPHORUS ppm | |
|---|---|---|---|---|---|---|---|---|---|---|
| AP 01 | 9.5 | Strongly alkaline | 41 | | 0.004 | OK | 0.090 | Med | 23 | OK |
| AP 01 | 9.4 | as above | 47 | | 0.027 | OK | 0.040 | Low | 14 | OK |
| AP 03 | 8.8 | Alkaline | 10 | | 0.001 | OK | 0.036 | Low | 25 | OK |
| AP 03 | 8.8 | as above | 8 | | 0.001 | OK | 0.027 | Low | 16 | OK |
| AP 04 | 8.4 | Alkaline | 69 | | 0.058 | OK | 0.254 | Med | 67 | OK |
| AP 04 | 8.9 | as above | 62 | | 0.045 | OK | 0.133 | Med | 30 | OK |
| AP 06 | 8.6 | Alkaline | 20 | | 0.006 | OK | 0.152 | Med | 80 | OK |
| AP 06 | 9.0 | as above | 43 | | 0.034 | OK | 0.076 | Low | 21 | OK |
| AP 13 | 8.7 | Alkaline | 21 | | 0.003 | OK | 0.126 | Med | 34 | OK |
| AP 13 | 8.7 | as above | 49 | | 0.057 | OK | 0.054 | Low | 16 | OK |

TABLE 9.3 (CONT)

| SITE | LOCATION | PASTURE TYPE | DEPTH CM | DESCRIPTION | |
|---|---|---|---|---|---|
| | | | | TEXTURE | COLOUR |
| AP 17 | 2.4km SSW from Widjubb 230m W of road | Salt water couch | 0-10 | Light clay | Very dark grey |
| AP 17 | | | 10-40 | Light clay | Very dark grey |
| AP 18 | 3.5km due S to Rocky, 100m S of track | Buffel/ birdwood | 0-10 | Light clay | Dark grey |
| AP 18 | | | 10-40 | Light/medium clay | Very dark grey |

TABLE 9.3 ANNA PLAINS SOIL SAMPLES 19/11/85

| SITE | pH $H_2O$ | | SALINITY mS/m (1+5) | | | | NITROGEN % | | PHOSPHORUS ppm | |
|---|---|---|---|---|---|---|---|---|---|---|
| AP 17 | 8.9 | Alkaline | 130 | HIGH | 0.128 | HIGH | 0.092 | Med | 47 | OK |
| AP 17 | 8.7 | as above | 210 | HIGH | 0.280 | HIGH | 0.046 | Low | 17 | OK |
| AP 18 | 8.6 | Alkaline | 23 | | 0.002 | OK | 0.094 | Med | 42 | OK |
| AP 18 | 8.6 | as above | 16 | | 0.003 | OK | 0.096 | Med | 21 | OK |

## 9.4 VEGETATION

TABLE 9.4 LIST OF MAJOR PERENNIAL PLANTS FOUND ON ANNA PLAINS

| BOTANICAL NAME | COMMON NAME | FEED VALUE* | INDICATOR OF RANGE CONDITION |
|---|---|---|---|
| **Trees and Shrubs** | | | |
| Acacia bivenosa | Dune wattle | N | N |
| A. coriacea | Dogwood | N | N |
| A. drepnocarpa | | N | N |
| A. eriopoda | Broome pindan wattle | L | N |
| A. grasbyi | Minni richi | L | N |
| A. holosericea | Candelbra wattle | N | N |
| A. impressa | | N | N |
| A. ligulata | Black wattle | N | L(-) |
| A. pachycarpa | Pindan wattle | L | N |
| A. translucens | | N | M(-) |
| Alichandrone heterophylla | Lemonwood | M | N |
| Eucalyptus zygophylla | Broome bloodwood | N | N |
| E. dichromophloia | Variable-bared bloodwood | N | N |
| Grevillea pyramidalis | Caustic bush | N | N |
| G. striata | Beefwood | N | N |
| Hakea sp | Hakea | N | N |
| Melaleuca lasiandra | Paperbark | N | N |
| M leucadendron | Cadjebut | N | N |
| M. translucens | Paperbark | N | N |
| T. acacioides | Cadjebut | | |
| **Perennial Grasses** | | | |
| Aristida inaequiglumis | Wire grass | L | H(-) |
| Cenchrus ciliaris | Buffel grass | H | M |
| C. setiger | Birdwood grass | H | M |
| Chrysopogon fallax | Ribbon grass | M | H |
| Cynodon dactylan | Couch | H | M |
| Dichanthium fecundum | Bundle bundle | H | H |
| Eothriochloa ewartiana | Desert bluegrass | H | H |
| Enneapogon planifolius | Nineawn | L | L |
| Eriachne obtusa | Northern wandarrie grass | L | M |
| E. pulchella | Pretty wandarrie | L | M |
| Eragrostis dielsii | Mallee lovegrass | L | M |
| E. eriopoda | Woolybutt grass | L | M |
| E. falcata | Sickle lovegrass | L | M |
| Panicum decompositum | Native millet | H | H |
| Plectrachne schinzii | Feathertop spinifex | ? | ? |

TABLE 9.4 (CONT)

| BOTANICAL NAME | COMMON NAME | FEED VALUE* | INDICATOR OF RANGE CONDITION |
|---|---|---|---|
| Sporobolus virginicus | Salt water couch | H | M |
| Triodia pungens | Soft spinifex | L | M |
| Whiteochloa airoides | | L | N |
| Xerochloa barbata | Rice grass | L | M |
| Other | | | |
| Averna javanica | Kapok bush | H | H |
| Distichostemon hispidulus | | N | N |
| Frankenia pauciflora | Frankenia | N–L | N |
| Halosarcia sp | Samphire | N | M(-) |
| Indigofera trita | | M | M |
| Neobassia astrocarpa | | M | M |
| Ptilotus astrolasius | Mulla mulla | M | M |
| Rhynchosia minima | | L | L |
| Salsola kali | Roly poly | N | L(-) |
| Scaervola spinescens | Currant bush | H | H |
| Sclerolaena sp | Copper burr | | |
| Sida fibulifera | Sida | N | M(-) |
| Solanum esuria | | N | M(-) |
| S. lasiophyllum | Flannel bush | L–M | L |
| Annual and Biennial Grasses | | | |
| Aristida browniana | | | |
| Dactyloctenium radulans | | | |
| Sporobolus australasicus | | | |

* N - none
L - low
M - moderate
H - high
(-) - undesirable