A REVIEW OF THE OPERATION OF THE BRUCELLOSIS AND TUBERCULOSIS CAMPAIGN IN PASTORAL AREAS OF SOUTH AUSTRALIA

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1. INTRODUCTION

This review was prepared as a response to concern that the Brucellosis and Tuberculosis Eradication Campaign, (BTEC) in the Northern Region of South Australia, had resulted in severe financial hardship for many owners. It was also felt that wide acceptance by pastoralists of a policy of destocking potentially infected cattle meant that some properties would have difficulty in locating suitable replacement stock and recovering their former productive capacity.

The conduct of the campaign in the period between 1977 and 1983 is examined including the administrative, property management, technical and financial aspects that have affected its operation. It is believed that wider availability of this information will lead to a greater acceptance of the need for the procedures adopted.

At the beginning of 1977 procedures for the control of tuberculosis in pastoral areas of South Australia had been underway for almost 10 years. Producers and departmental officers recognised the futility of attempting to eradicate disease from heavily infected properties using current procedures and with the available funding, staffing and expertise. Cattle grazing in the area to the north of the dog fence were regarded as the most heavily infected with tuberculosis and brucellosis of any pastoral area in Australia and because of the extensive nature of the country, the unpredictable and arid climate and the lack of cattle control, eradication of disease was considered impossible.

The review examines a number of significant areas where there is potential for criticism to be directed at the operation of the campaign in pastoral areas. This examination shows that the procedures adopted were the result of an effective team approach, where ideas from many individuals and sources were progressively welded into an effective method of combatting a disease situation not previously experienced.

2. SUMMARY

Any disease control campaign that affects an industry to the extent that the BTEC has affected the S.A. pastoral beef industry, is bound to raise questions regarding the validity of the methods used. The fact that some previous critics are now most avid and vocal supporters of the continuation of the campaign, is a tribute to the abilities and perseverence of field officers, who spent many hours of their own time in attempting to change ingrained attitudes. Their dedication and attention to detail has ensured that all owners have had the opportunity to become fully conversant with the campaign and been assisted to adopt procedures effective in controlling disease, improving management, and ensuring a better future for the pastoral cattle industry.

This review shows that the conduct of the Brucellosis and Tuberculosis Campaign in pastoral South Australia, has not been carried out in isolation from the rest of Australia. Policies and procedures have been adopted that are likely to be most effective in eradicating disease while preserving the financial base of pastoral beef producers. In all the aspects discussed here, the officers concerned have demonstrated their concern for the livelihood of producers and shown sensitivity and commonsense in their dealings.

The following summarises the major points made within this discussion.

* A significant reduction in the prevalence of tuberculosis and brucellosis has been achieved between 1977 and 1983.

  + The number of quarantines for tuberculosis has been reduced from a high of 42 in 1978/79 to 33 in 1982/83 and an estimated 10 in 1983/84, while brucellosis quarantines from 44 in 1981/82 to 31 in 1982/83 and an estimated 12 in 1983/84.

  + The prevalence of tuberculosis in 1976/77 was estimated from testing results at 0.88% while in 1982/83 a reduction to 0.27% has occurred and recent testing information indicates the prevalence at about 0.12%. A reduction has also occurred in the annual prevalence of brucellosis from a high of 2.8% in 1979/80 to 0.77% in 1982/83 and down to 0.46% based on recent test results.

  + The most recent testing information shows that tuberculosis infected animals were only found in 4 herds at the last test, while only 5 herds had brucellosis reactors.

  + The remainder of South Australia's pastoral areas will be declared Provisionally Free during 1984.

* The transfer of responsibility from Adelaide to Port Augusta, and the development of appropriate systems of management and administration was a significant step.

  + Close contact and briefing of senior management in headquarters enabled rapid implementation of effective procedures.

  + The ability to maintain animal health staff numbers, (at present 5 veterinarians and 8 stock inspectors) has had a significant effect upon progress.

+ Careful documentation and maintenance of records enabled the implementation of the most effective procedures and simplified reviews of progress and procedures.

* Although most of the visible progress occurred during the period 1980/83, the three years prior to 1980 were crucial in creating the infrastructure, obtaining experience and developing the liaison with producers necessary for effective eradication plans to be implemented.

  + The investment appraisal study carried out by the late John Edey, provided useful information on the area of study and the methods of eradication and aspects of financial and property management which were previously only partially understood. It also stimulated the investigation of procedures least damaging to property viability.

* The arid nature of the far north of South Australia made the application of disease control procedures particularly difficult.

  + Concern was expressed during the 1977 drought that disease control procedures could result in the loss of many livestock.

  + The potential for conflict between the Department, Pastoral Board and property owners and managers during future droughts was recognised when the format for Approved Property Programs was drawn up.

  + In the period between 1978 and 1983 the department maintained a policy of preventing store movements from infected properties in the far north, however, these have been permitted from individual disease free mobs where there was no risk of disease transfer.

  + Future movements off pastoral properties during times of drought will be facilitated when the whole of South Australia is declared Provisionally Free.

  + Most owners acknowledge that without the incentive to destock, the present drought would have caught them with large numbers of unsaleable stock.

* A significant change in producer attitude has been achieved by the use of extension methods including the publication of a regular newsletter called the Northern Cattlemans News and annual meetings of producers at Marree and Oodnadatta where eradication procedures and progress and the concerns of cattlemen have been discussed in a public forum.

  + Change in attitude has also occurred as a result of the close relationship developed between owners and the veterinary officers and stock inspectors with responsibility for the conduct of individual property programs.

  + Many new concepts have been introduced to producers with varying effects depending upon individual circumstances, however financial, management, educational and social effects can be identified.

  + A dramatic reduction in cattle and feral animal numbers, construction of extensive improvements, changes to management methods, and a reassessment of the social and financial aims of pastoralists has occurred.

+ Most pastoralists are now firmly behind the continued conduct of the campaign although the perceived adverse effects on stock numbers and property capitalisation will remain topics of conversation for some years.

* Close contact has been maintained with other States and officers responsible for the conduct of similar programs. Conferences with interstate officers have been attended during the period of this report at Broken Hill, Mildura, Charleville, Alice Springs and Birdsville while workshops on aspects of the campaign have been attended at Katherine, Alice Springs and Toowoomba.

* The Remote Area Working Party of BTBSC has played an important role in facilitating the exchange of ideas between States and developing uniform criteria for eradication programs. The Working Party is expected to continue to assess progress in pastoral areas throughout the north of Australia and to stimulate research.

* The use of aircraft has become an integral part of northern region operations.

  + Since 1979 officers have assisted 17 properties to check for straggler cattle involving 83 hours of aircraft charter.

  + Successful destocking operations using aircraft and a helicopter have been carried out on 6 areas in the far north and more are planned. These have been carried out in areas where ground mustering to clear all cattle has proved impractical.

* Decisions on the most financially advantageous eradication strategies were made as a result of discussions between departmental officers, producers and in some cases, their accountants.

  + The BTBEP beef model developed in South Australia, examines herd structures and finances over a sequence of years and has proved a useful tool in assisting managers to determine alternative management strategies.

* Income tax concessions introduced in the 1980 budget have been crucial in facilitating destocking and the construction of property improvements essential for cattle control.

  + Over $6 million has been invested by pastoralists in the 3 years since 1980.

* Departmental officers have maintained a close and continuous contact with aboriginal communities assisting wherever possible to direct the disease control activity of each property.

  + During 1980 a stock inspector was stationed at Ernabella to improve liaison with the communities and since 1981 a stock inspector has been permanently located at Chandler Siding, primarily for the same purpose.

* The control of cattle involved in disease eradication was recognised as essential.

+ Progressive restrictions on cattle movements have been introduced to ensure that disease is not spread from infected properties nor introduced to those which have destocked.

+ The control of cattle on a property was recognised as being essential for testing programs to be effective.

* Technical changes and innovations have been promptly investigated and implemented when appropriate.

  + The inability of the tuberculin test to detect some chronically infected animals was recognised and to assist in control, culling for age was introduced in 1979.

  + The use of improved vaccination procedures was used as they became available, including a dose of 1/400 Strain 19 in several heavily infected herds. This was found to be effective in reducing the incidence of brucellosis.

  + The progressive introduction of improved brucellosis diagnostic tests has ensured that a high rate of identification of infected animals is maintained.

* The system of Approved Property Programs which document conditions on each property and the negotiated proposals for effective eradication has had a significant effect upon campaign progress.

* Concern at the risks associated with destocking programs resulted in special conditions applying.

  + Destocking programs were designed to remove disease quickly, leaving producers financially viable because of the large increase in cash flow. Where this has been successfully managed, producers have been able to make use of the taxation concessions introduced in 1980 to safeguard themselves financially, while restocking or breeding up their herds.

  + The original estimate of cattle due to be destocked was 181,000 however destocking and normal turnoff has disposed of almost 200,000.

  + Restocking programs shows that about 24,000 cattle have already been introduced to properties while estimates obtained from owners and managers show that about 46,000 head are still required, indicating that 34% of the cattle required for restocking have already been obtained.

  + There will be a net loss of about 130,000 head of cattle from the region by the end of 1983.

* Implementation of the concept of destocking infected cattle as an alternative to test and slaughter resulted in concern that introduced cattle would be subject to disease risk and become infected and that it would be too difficult to ensure introduced cattle were disease free.

  + It was recognised during 1982 that because of the continuing drought and escalating store cattle prices many owners would have great difficulty in restocking.

+ A set of conditions to facilitate the introduction of disease free stock was drawn up in May 1983.

+ Purchase of clean cattle prior to the completion of destocking was allowed on 13 properties in the period between 1980 and 1983 providing risks were minimal.

* Plans for the future conduct of the eradication campaign in the northern region have been drawn up.

  + Following the completion of destocking, isolation of test mobs and completion of testing, major activities will involve the supervision of restocking, monitoring of test mobs and restocking cattle; ensuring producers remain alert to the risk of disease and assisting them to regain former productivity as rapidly as possible.

  + During 1983/84 destocking operations will be completed and only cattle under test or introduced clean stock will be present on properties.

  + Strenuous efforts will be made to ensure that disease breakdowns are minimised and that effective procedures for dealing with them are available.

  + Regular sampling of cattle will be carried out wherever abattoir monitoring appears inadequate. Such testing will be carried out to coincide with management practices.

  + The development of smaller yet more productive herds with a higher degree of supervision and control than was previously possible is the ultimate objective of these plans.

3. BACKGROUND TO THE PASTORAL AREA CAMPAIGN

Prior to 1978, disease control efforts in the far north of South Australia concentrated upon the control of TB and definition of the prevalence and geographical distribution of brucellosis. Efforts to implement an effective tuberculosis eradication campaign were hampered by a lack of resources and difficulties involved in directing and operating the campaign from Adelaide.

In 1975, the then Chief Veterinary Officer, Dr. P.R. Harvey, implemented a review of the Animal Health Branch and recommended the adoption of the regional system of animal health administration. In June 1976, Dr. Harvey undertook an extensive survey of properties in the western half of the area north of the dog fence. Discussions with owners and managers concerning the campaign resulted in a number of observations on factors limiting its effectiveness, including the following.

1. Public relations were poor because of the frustration of attempting to achieve meaningful progress with eradication.

2. Staff numbers were inadequate and resulted in an inability to provide consistent officers to operate on particular properties.

3. There was a lack of appreciation of control of tuberculosis and brucellosis in pastoral areas.

4. The animal health service was not able to provide assistance in aspects of animal health apart from brucellosis and tuberculosis control.

5. The requirement to test large mobs of cattle resulted in inconvenience to owners.

6. There was a need to pay more attention to management techniques in the control of TB especially weaner segregation, concentrated culling of bulls and aged cows, accelerated turnoff of older cows, subdivisional fencing and provision of additional waters.

7. The poor standard of yards available for testing and the lack of use of portable yards was noted.

8. Interim targets were required in the conduct of the eradication campaign.

9. A vaccination program for brucellosis should be commenced as soon as possible.

10. There was a need to carry out further brucella surveys to identify infected properties and to estimate the prevalence and distribution of the disease.

11. Stock inspectors should be trained in tuberculin testing techniques.

As a result of the review of the Animal Health Branch and these observations, animal health officers involved in pastoral area eradication were progressively transferred from Adelaide to Pt. Augusta during 1976 and 1977. Additional veterinary officers were recruited and four experienced stock

inspectors from the Northern Territory transferred to the Department. In June 1977, Dr. G.B. Neumann was appointed District Veterinary Officer in charge of the Pt. Augusta office and by October that year when Dr. D.A. Tabrett was appointed Regional Veterinary Officer, the Pt. Augusta office had two veterinary officers and four stock inspectors concentrating upon pastoral eradication activities.

The appointment of a Regional Veterinary Officer allowed a number of significant changes to be made in the method of operation and laid the base for the future campaign in the Northern Region. In 1977/78 the far north experienced a severe drought and there was little eradication activity. This provided an opportunity for the stock inspectors and veterinary officers to make contact with owners and managers and lay the foundation for the activity which would follow the drought.

During 1977, the foundations of the Approved Program system were laid down in an agreement between Dr. Tabrett and the owners of one large lease. This involved the complete destocking of the lease commencing in 1978, followed by 60 days spelling before restocking with clean cattle. Provision to extend the program in future years to include other leases controlled by the same company was included.

This Company approached the Deputy Commissioner of Taxation concerning possible application of the provisions of Sections 36AAA and AA of the Income Tax Assessment Act to the proposed complete disposal of cattle from the lease. Although the Commissioner indicated that he would not be bound in advance by any opinion, it appeared that Section 36AA would apply, providing the necessary elections referred to in sub sections (1) and (6) of the section were made. This reply was significant in the future conduct of the campaign. It initiated Australia wide action to promote the use of 36AA as widely as possible to assist the campaign. The proposed use of Section 36AAA (which would allow the setting aside of income for a period of 5 years following the forced sale of cattle) was also encouraged. This already applied to fire, drought or flood, but was not considered at that time appropriate to the circumstances of disease control.

Although the drought broke in 1978, little progress was immediately possible in the pastoral area because of the poor condition of cattle and low prices. However testing programs were continued wherever possible, and properties where there was suspicion of either tuberculosis or brucellosis were placed under quarantine, while discussions on disease eradication proposals continued. There were only 19 herds under quarantine for TB in the pastoral area south of the dog fence at that time, reflecting the level of activity possible in sheep grazing country where stock control was possible. Also during 1978 the lack of definitive information on properties under eradication procedures and their potential effect on station viability was recognised. Discussions were held between officers of the Department of Agriculture and the late Mr. John Edey, a private pastoral consultant during August 1978, concerning a proposed investment appraisal study. Formal approval to carry it out was given in October 1978. During the next 12 months, Mr. Edey, in conjunction with departmental officers and 6 property owners from the far north of the state, investigated the conduct of the campaign and its effects upon station viability.

His report provided useful information, not only on the area of the study and the case study properties, but also on the methods of eradication and aspects of financial and property management which were previously only

partially understood. The recommendations however were disappointing, as they reflected the current activity and attitude of officers located in Pt. Augusta rather than clear recommendations on future actions which should be taken to ensure long term financial viability for pastoral beef cattle producers. By the time the report was published most of the recommendations had been implemented or were in the process of being implemented, and therefore the impact of the study was to some extent subdued. It was also affected by the resignation of Dr. Tabrett as Regional Veterinary Officer in October 1978.

The following are the major recommendations from Mr. Edey's study and reflect the type of activity Pt. Augusta animal health staff were involved in.

1. The extension effort in pastoral areas should be increased to promote a better understanding among managers and owners of the rationale for eradication. Regular meetings should be held at locations accessible to pastoralists, and officers from other States, experienced in eradication procedures and management aspects relating to the BTEC, should be invited to participate in such meetings.

2. The BTEC program should be expanded to include the area north of the dog fence, to ensure that the 1984 goal of Provisional Freedom is achieved.

3. Advantage should be taken of good seasonal conditions and high prices.

4. SAGRIC and pastoralists should actively seek special taxation concessions for the fencing and yards required for eradication.

5. SAGRIC staff at Pt. Augusta should be increased for field activity, monitoring movements and extension purposes.

6. Greater use of aircraft should be made for transporting personnel and for mustering.

7. A radio base should be established at Pt. Augusta as a matter of priority.

8. All mustered and tested cattle should be identified.

9. Compensation should only be paid for reactor cattle originating from properties that effectively participate in an approved eradication program.

10. SAGRIC should ensure prompt feedback of testing data both from property tests and abattoirs.

11. A movement permit system should be introduced to increase the effectiveness of monitoring movements from infected properties.

12. SAGRIC should carry out Crown musters at the owner's expense wherever property owners refuse, or are unable to cooperate, and where such properties are likely to be a risk to neighbours.

13. In the event of drought, provision may have to be made for establishing fattening or agistment depots inside the dog fence.

14. SAGRIC should continue the economic review of the 6 stations included in the study.

During 1978 and 1979 discussions were held on a number of occasions with several large companies whose pastoral holdings had high levels of disease but were unable to institute effective eradication programs. Although destocking of one lease had commenced, the company involved had not made definite plans for their other leases and discussions centred around the most effective and economic proposals. Discussions between departmental officers and the Australian Bureau of Animal Health resulted in the company employing a private veterinary surgeon experienced in pastoral matters, as a consultant, and this assisted the company's' operations, especially in Queensland. Discussions were also held with another S.A. Pastoral Company and plans initiated to institute effective testing or destocking programs wherever possible. A decision was made to partially destock two stations and restock them with disease free stock. The results of such negotiations had significant effects on the future conduct of the program as they resulted in visible activity thus providing an additional incentive for other pastoral beef producers.

Although none of these early programs proceeded exactly as expected, most were ultimately successful or are in the process of achieving a final clearance of infected stock. A major problem has been the delay in removing infected stock, either because of drought conditions or mustering problems resulting from the difficult country which occurs on all properties. In some cases there were changes in approach during destocking, resulting in the retention of young cattle for testing, which often diverted resources from destocking and thus significantly delayed eradication.

A major factor limiting the progress of the Campaign was the attitude of those producers who were not prepared to accept the need for a Campaign or that restrictions on sale would eventuate. As a first step in a continuing public awareness campaign, producer meetings were organised during February 1980 at Marree and Oodnadatta. At these meetings the case for eradication was plainly put before the producers present and had a significant effect in initiating an increase in activity. Meetings of all producers have been held each year since then, and in August each year a smaller group of producer representatives has met with the Chief Veterinary Officer and Regional Veterinary Officer to examine aspects of the Campaign causing concern to producers.

During 1978 the Australian Bureau of Animal Health produced a review paper, "Disease Eradication on Extensive Beef Cattle Properties in Central and Northern Australia". This paper assisted in putting the South Australian campaign into perspective, and identified many of the problems that are common to each State involved with the extensive beef cattle industry. The Brucellosis and Tuberculosis Sub-Committee, at a meeting in February 1980 recommended that a Working Party on BTEC in remote areas be formed. The proposed group held an informal Workshop on remote area disease eradication at Katherine (N.T.) during March 1980. Four officers from the Northern Region presented papers on aspects of South Australian experience.

The Working Party on the BTEC in Remote Areas became official later that year and held its first meeting in September in Alice Springs. It has since had a significant effect upon the conduct of disease eradication programs on pastoral holdings, especially in South Australia where optimum staffing levels allowed new procedures to be promptly implemented. South Australia also had a significant effect upon the direction of discussions because of the substantial progress made in introducing the concept of Approved Property Programs. The

Working Party produced a report which defined for the first time criteria for effective property programs in remote areas. It was also useful in assisting State, Commonwealth and Producer efforts to secure improved taxation concessions for properties involved in remote area eradication. Following the changes to the Income Tax Assessment Act announced in the 1980 Commonwealth budget, the way became clear for the Approved Program concept to be used on all properties.

The Working Party also recognised the potential for severe disruption of the pastoral cattle industry and that individual properties could suffer severe financial hardship if insufficient care was taken in the planning and implementation of property programs. During 1979/80 the first attempts were made at carrying out financial analyses of properties involved in eradication programs and a paper on this subject was presented to the Katherine Workshop. An economist from the Bureau of Agricultural Economics assisted ABAH officers in producing a computer program to perform the complex calculations required. The program was first demonstrated to the Remote Area Working Party meeting in May 1981 in Darwin and was subsequently made available to those States which wished to use it. Although South Australia was very keen to implement the program it was not until the latter part of 1981 that a microcomputer became available. This delay had the advantage of allowing sufficient time for Northern Region officers to assist in improving the computer model, and the program has been used widely since then, and has undoubtedly assisted interested producers to understand the financial effects of alternative management strategies.

The changes to the Income Tax Assessment Act which occurred in 1980 will contribute substantially to the ultimate success of the eradication campaign in the remote areas of South Australia. Prior to 1980 a number of properties had commenced eradication, and some had erected the fencing and yards required. It had become obvious that many properties would be unable to invest sufficient funds to allow the erection of subdivisional fencing essential for cattle to be effectively controlled for testing. The insertion of Section 75c was most significant as it allowed the erection of property improvements which would otherwise never have been available and placed many properties in a position where improved management and control over stock was possible. In the three years since the introduction of this concession over $6 million has been invested by S.A. pastoralists in improvements required to facilitate disease eradication. The other change to the Income Tax Assessment Act was Section 36AAA which allowed an owner to exclude from assessable income for 5 years the profits from forced sale of livestock, giving producers the opportunity to use income produced for restocking purposes before paying tax. It was recognised by many producers that these 2 changes provided an opportunity to review the capitalisation of their properties and to restock with disease free animals of possibly higher genetic merit than were previously held.

The Remote Area Working Party produced uniform criteria for Approved Programs to ensure that these taxation concessions were only used where an owner was fully acquainted with the requirements of eradication and committed to the eradication of disease from his property. In South Australia the use of fully documented and signed Programs was found to be an effective way of ensuring owners understood their obligations. The documenting of decisions and the requirements for either testing or destocking allowed adequate time for the implications of these actions to be assessed by both owners and departmental veterinary officers and stock inspectors. In a number of cases these deliberations resulted in changes to a program as problems associated with the implementation of a first draft were found.

In 1979, problems associated with operating all activities from the Pt. Augusta base were recognised and eventually resulted in stock inspectors being located at Chandler siding in the North west, Coober Pedy and Marree. This move provided a significant boost to liaison with producers including the aboriginals in the north west, and stimulated property owners to implement more effective eradication programs. Their availability for discussions or testing activity at short notice gave them the opportunity to build a close and effective working relationship. These stock inspectors have been extensively involved in administering the permit system introduced in 1980 which applies to stock movements from all properties north of the dog fence.

Steady progress has been made with all aspects of the operation of the Campaign in the Northern Region. Drought has had a severe effect on many properties, especially those in the Marree area and up the Birdsville track and on properties to the west of Lake Eyre. The drought has assisted on properties which elected to destock, however on some it has had the unfortunate effect of resulting in the death of many stock, including some to be retained as a herd nucleus. In addition, many properties which destocked several years ago have unfortunately remained bare due to the inability to support cattle. In the meantime the price of disease free stock suitable for restocking has increased substantially, and thus severely affected the financial advantage that could have resulted from a rapid changeover of stock.

4. NORTHERN REGION PROGRESS

Prior to 1977, estimates of the prevalence of diseases were made from information obtained from meatworks at the time of slaughter. This data was supplemented by limited field testing of some herds. Estimates on many properties were thus doubtful especially as animals sent for slaughter do not represent a cross section of a herd. The figures in Table I underestimate the 1979 prevalence, as when the data was compiled some properties had not sold cattle for several years. However, the table shows the significant reduction in the number of properties with a high prevalence of either disease. A further reduction is imminent when all properties have completed destocking.

Table I Estimated Prevalence of Tuberculosis and Brucellosis on SA Northern Pastoral Properties. (after Edey 1979)

Prevalence	Number of Stations			
	Tuberculosis		Brucellosis	
	1979	1983	1979	1983
nil	14	32	6	29
less than 0.1%	8	7	1	10
0.1% to 1%	13	7	6	1
1% to 2%	2	2	1	1
2% to 4%	3	-	5	2
4% to 6%	-	1	4	2
6% to 8%	-	-	5	-
8% to 10%	-	-	3	2
More than 10%	-	-	9	2
	40	49*	40	49*

* Definition of the term "station" has changed as a result of additional tail tags being issued to parts of several properties.

It is not intended that this review should dwell upon progress in the northern region. There is no doubt that much has been achieved as Table II illustrates. A reduction in the number of quarantines for both diseases is apparent and more clearly seen on maps 1.1 to 1.6.

In Table II the prevalence for tuberculosis in 1976/77 was defined from testing results as 0.88% while in 1982/83 a significant reduction to 0.27%

prevalence (from testing results) occurred. This is considered an overestimate as testing of heavily infected mobs and the identification of large numbers of reactors often led to complete mob disposal. The "Most Recent Test" results (Table III), obtained by combining the results from the last test on each mob on a property, allow easy visualisation of current status, but take no account of known infected mobs that are to be destocked or of mobs yet to be tested (minimal). This most recent testing information shows the present prevalence from test results as 0.12%. This table also shows the progressive reduction in the annual prevalence of brucellosis from a high of 2.84% in 1979/80 to 0.77% in 1982/83 and to 0.46% on the most recent test results. This percentage is inflated from the results of testing on two properties where an average of 6% reactors have recently been removed. Both these herds have since been vaccinated. Recent experience with the use of the dose of 1/400 Strain 19 which was used, indicates that this will be effective in containing infection and assisting eradication.

Table II Results of Tests and Number of Quarantines Maintained for Tuberculosis and Brucellosis North of the Dog Fence

YEAR	TUBERCULOSIS				BRUCELLOSIS			
	TEST			Quarantines Imposed	TEST			Quarantines Imposed
	No.	Pos.	%		No.	Pos.	%	
1975/76	24409	56	0.23	37	Survey Testing			3
1976/77	30775	272	0.88	40	Survey Testing			3
1977/78	10446	14	0.13	39	Survey Testing			4
1978/79	21871	70	0.32	42	3210	19	0.59	23
1979/80	46416	150	0.32	40	22978	652	2.84	26
1980/81	48601	122	0.25	40	31047	526	1.69	34
1981/82	66781	135	0.20	37	42525	442	1.04	44
1982/83	83635	227	0.27	33	36756	282	0.77	31
1983/84 (Estimated)	50000	50	0.10	10	25000	50	0.20	12

The measurement of progress by the number of tests conducted does not provide a very accurate picture. Properties to the north of the dog fence are extremely large and vary in size from 950 km^2 to 30 000 km^2, with ten stations occupying areas greater than 7 500 km^2. If each of these large properties is considered as a group of smaller grazing areas, then the complexities and difficulties of the problems involved in eradication can be more effectively visualised. Detailed figures are available for each property and show that there are many properties which will be released from quarantine in the near future, either because they are free of cattle or have undergone the required testing and are free of disease.

The number of herds with active infection can also be estimated from the most recent testing results up to September 1983. The figures in Table III have

been summarised for each group of properties and a concentration of infection in the NW is apparent. The reactors indicated have, however, been derived from only 4 herds for tuberculosis and 5 for brucellosis (not necessarily the same) and although reactors could be anticipated from other herds this emphasises the low level of infection which remains in the area.

The number of quarantines imposed for either disease is an indication of the seriousness of disease in the area. Almost without exception every property north of the dog fence has been under quarantine for both diseases. In South Australia quarantines apply to the whole of a property and thus may not reflect the improvement in disease status as individual mobs on a property become free. For example, although a property may have only one out of six mobs of cattle infected, it remains under a blanket quarantine restriction until all mobs are free. Release of a quarantine requires the completion of two clean tests of each mob at a minimum of 180 days (six months) apart. The rate at which quarantines can be released is thus severely constrained by these procedures and the reduction anticipated in the next 12 months reflects the remarkable reduction in infected cattle and mobs. It is not possible to estimate the rate of breakdowns from free status to infected that may occur in the future. Past experience shows that breakdowns must be anticipated and the plans to counter the disease and financial implications are discussed in the section of this report on future plans.

Table III Approved Program Test Summary

(NB There may be significant discrepancies between the planned testing and the test results due to forced sale or disposal because of drought).

PROPERTY	Number Cattle Tested				Most Recent Test Results					
	Planned	Actual	Forth coming	Total Test Herd	Tuberculosis			Brucellosis		
					Tested	Pos	%	Tested	Pos	%
1) Aboriginal	2400	1895	400	2295	1981	-	-	1552	-	-
2) North West	24500	20783	2900	23683	25032	58	0.2	17083	139	.81
3) Oodnadatta	18250	13728	0	13728	14203	-	-	10769	50	.46
4) Marree	7325	2839	0	2839	8433	-	-	5521	4	.07
5) Birdsville	10650	1152	0	1152	1736	-	-	1272	-	-
6) Strzelecki	7500	6773	0	6773	7668	-	-	5482	-	-
TOTAL	70535	47170	3300	50470	49053	58	.12	41679	193	.46

It should be noted that information from abattoir monitoring has not been included in any table because the figures for both tuberculosis and brucellosis are biased because of the total destocking of heavily infected herds.

5. SIGNIFICANT ASPECTS OF CAMPAIGN MANAGEMENT

5.1 Administration

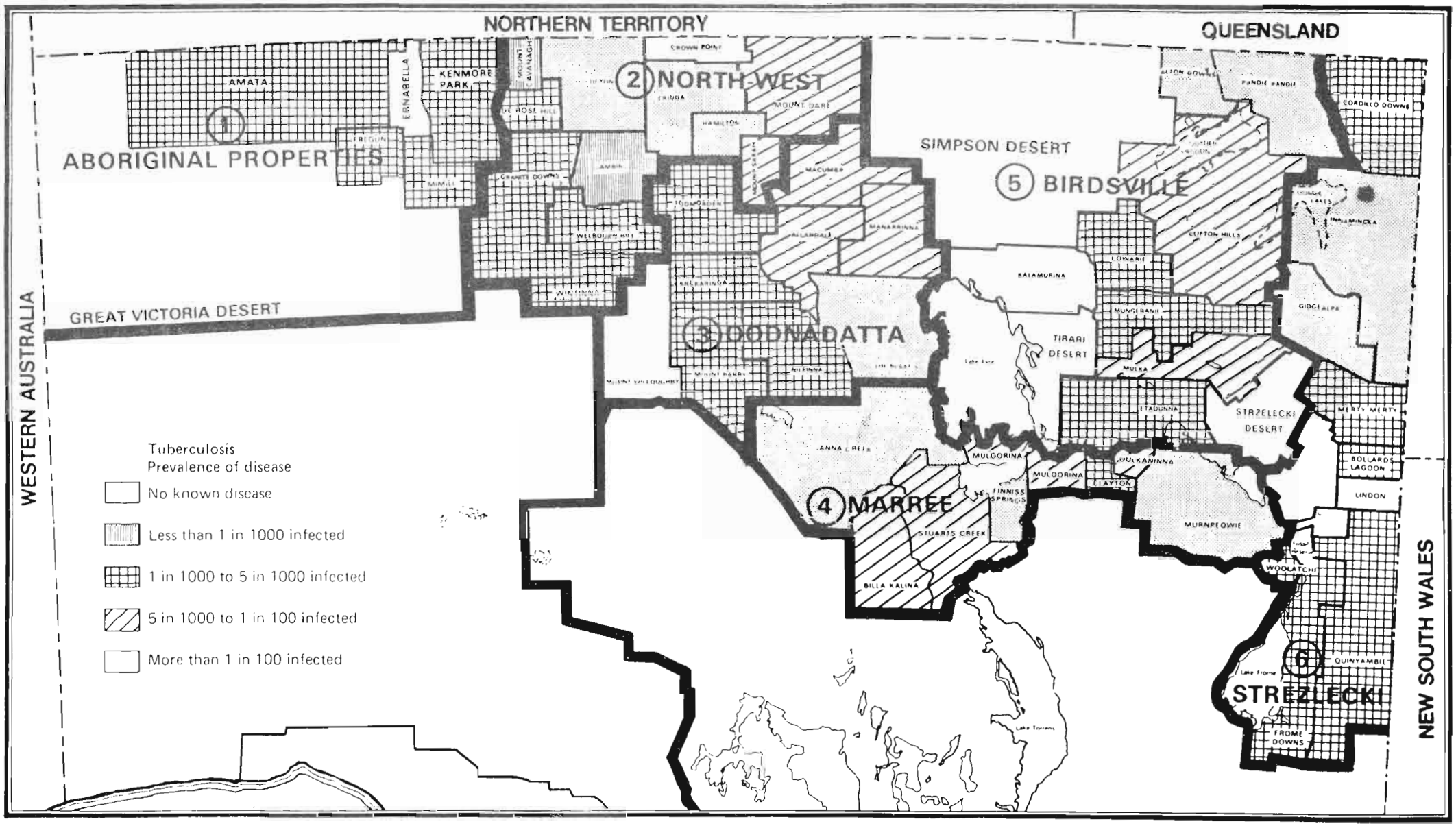
The development of a system of administration and management that allowed most decisions to be made from Pt. Augusta, was an extremely important development. Prior to 1977 management of the campaign in the northern region was the responsibility of the Principal Veterinary Officer (BTB). This was found to be unsatisfactory as it did not allow sufficient attention to be given to local details, nor for an understanding and expertise in pastoral area eradication to be gained. In June 1977, following the appointment of a District Veterinary Officer, a start was made in transfering responsibility for functions related to the conduct of the campaign from Adelaide. This process was continued following the appointment of a Regional Veterinary Officer in October of that year, however it took several years for a management system to develop that could effectively handle most of the administrative functions required by the campaign. The acquisition of appropriate vehicles and equipment and the implementation of effective administration, encountered many problems as traditional functions moved from Head Office.

Prior to 1977 only records of testing results were maintained and there was no information available on individual properties, their management facilities or local conditions. The accumulation of appropriate information was the first job for newly appointed stock inspectors who spent considerable time visiting owners in the north of the State. A system of property inspection reports was instituted and files created for each property so a continuous record would be available. This information proved invaluable in later years when Approved Programs were being documented.

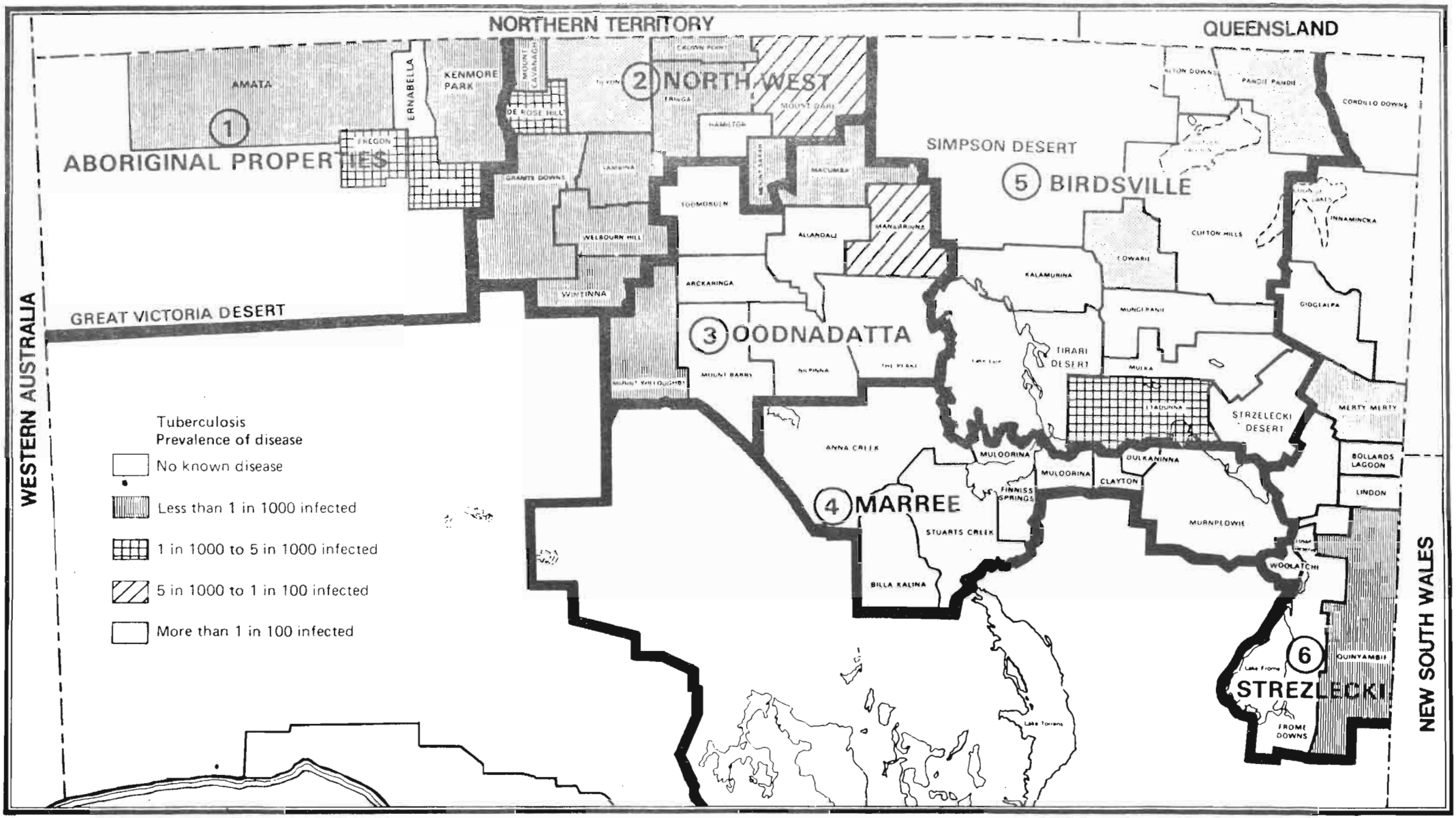
The Pt. Augusta office has been progressively upgraded over the years and during 1979/80, a number of significant developments occurred including the installation of telex and a high frequency radio base. Plans for relocation to new office accommodation were implemented during this period. At the beginning of 1980, plans were also made to purchase a microcomputer for the storage of local records and information. Although this computer did not eventuate until the end of 1981, its potential uses were expanded to include the BTBEP model, while it has been used extensively for word processing. A larger microcomputer is soon to be installed which will allow the storage of property information, movement records, and testing results on individual mobs of cattle.

The success of the northern region in obtaining the equipment, supplies and facilities needed to carry out an effective Campaign, has been due in part to the close contact which has been maintained with headquarters officers, especially senior management and members of the Executive. Their involvement in regional staff meetings, pastoralists meetings in the far north and in head office discussions, ensured their familiarity with the often unusual requests which the Campaign stimulated. The ability to maintain staff numbers has been due to this close relationship and it is significant that South Australia has a ratio of stock inspectors and veterinary officers to each property, higher than any other State involved in remote area eradication. At present 5 veterinary officers and 8 stock inspectors are employed (see Appendix 1).

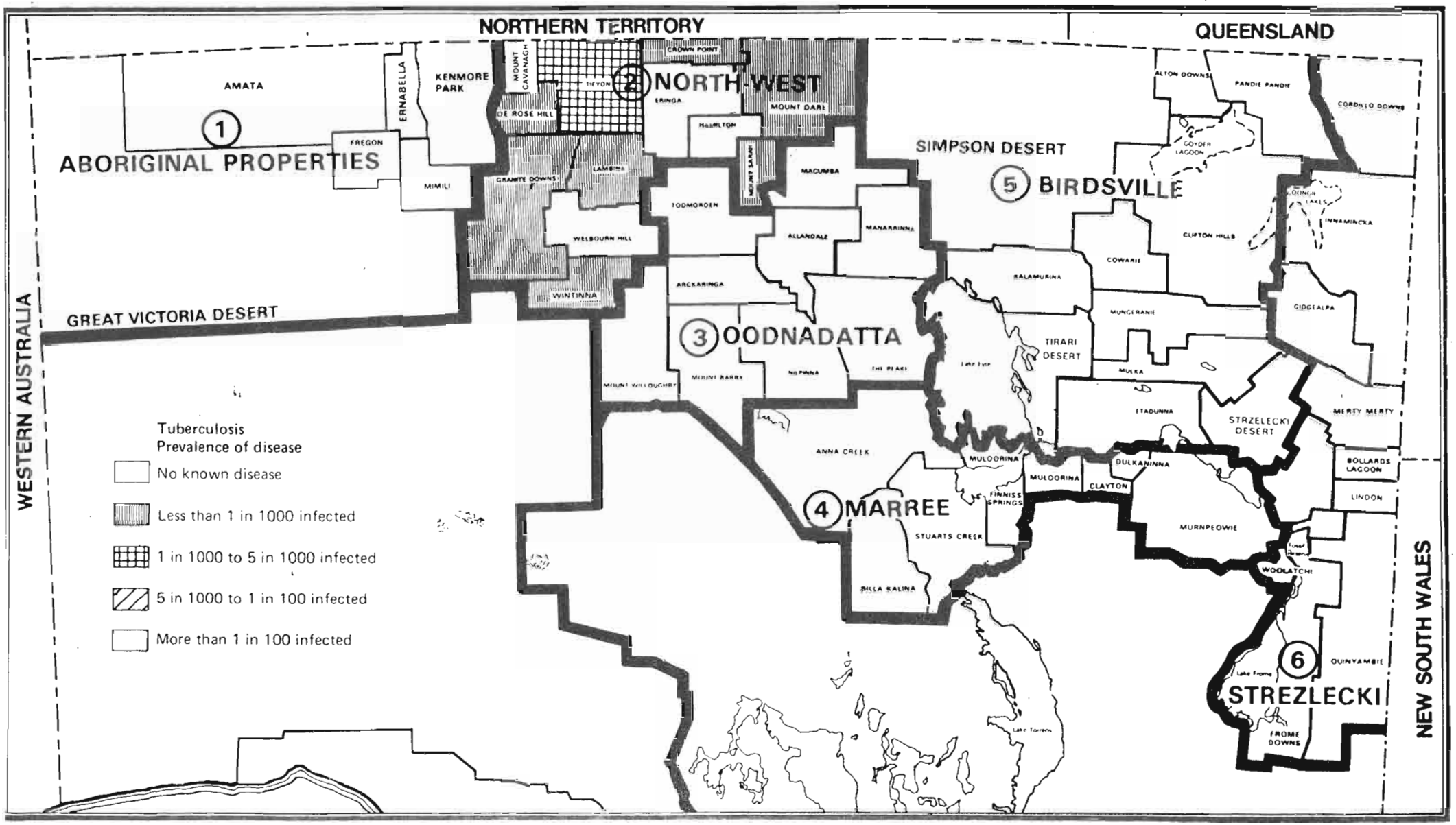
Tuberculosis – July 1980



Tuberculosis.—31 August 1983

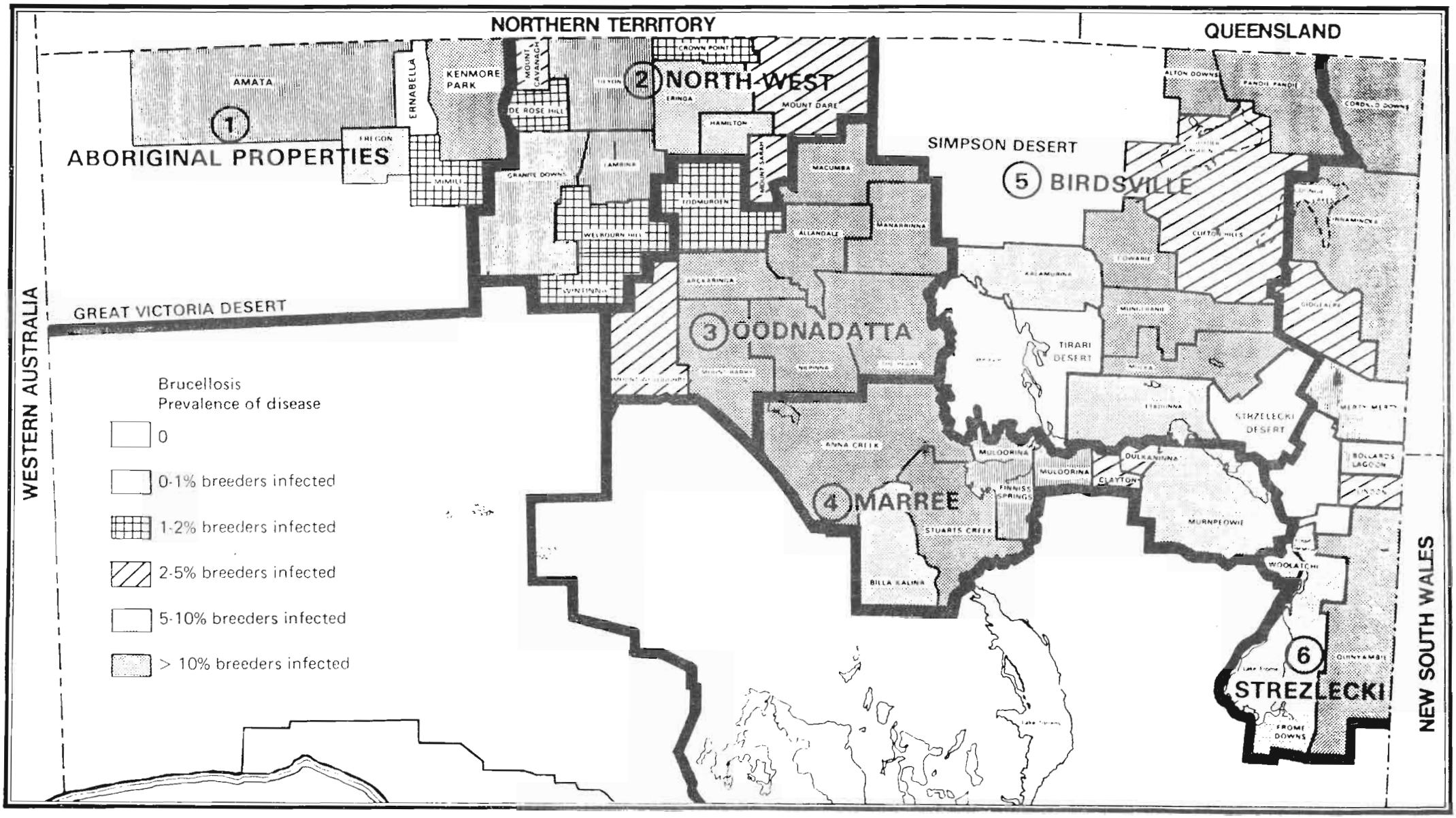


Tuberculosis — expected levels February 1984

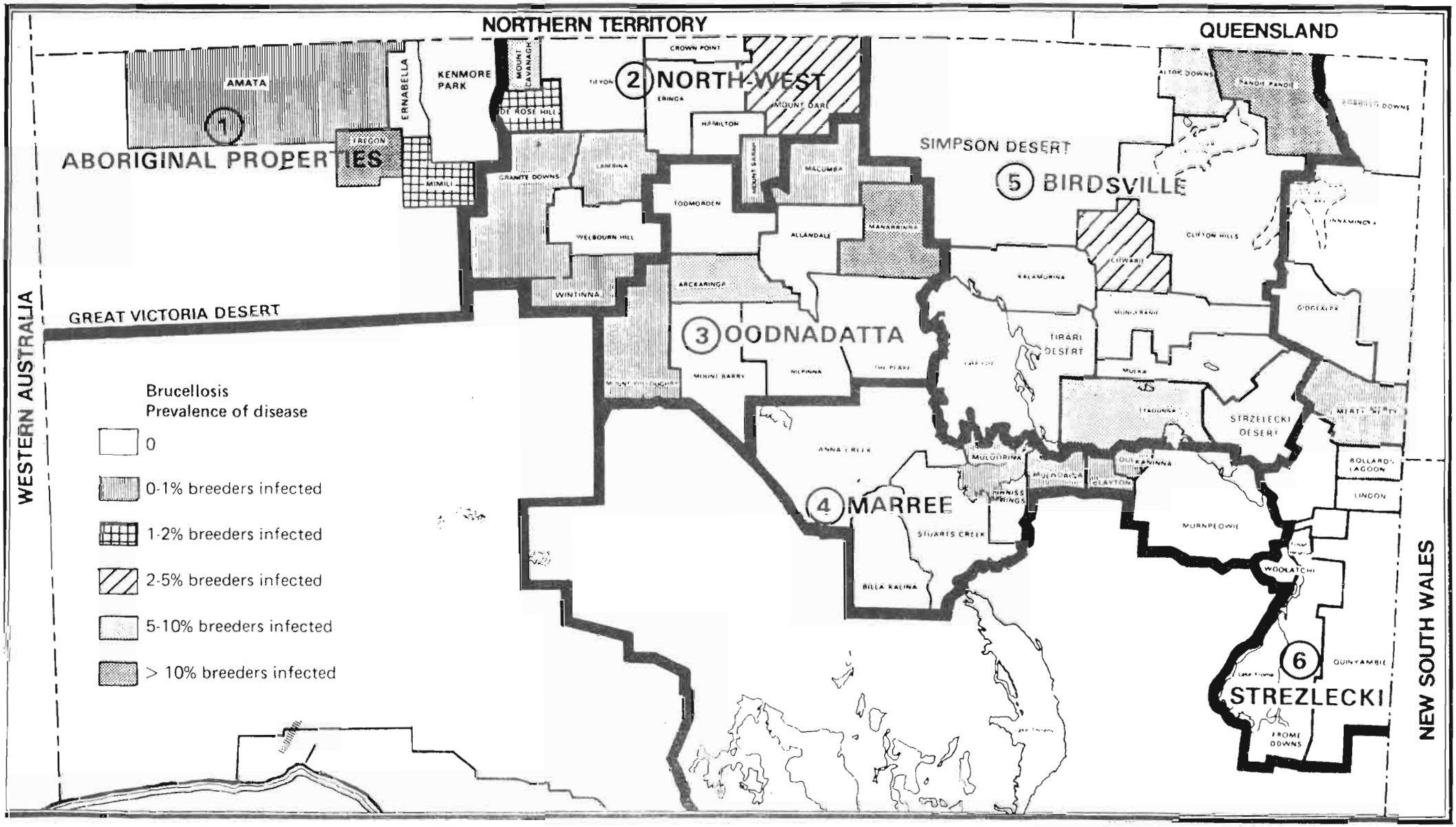


Brucellosis — July 1980

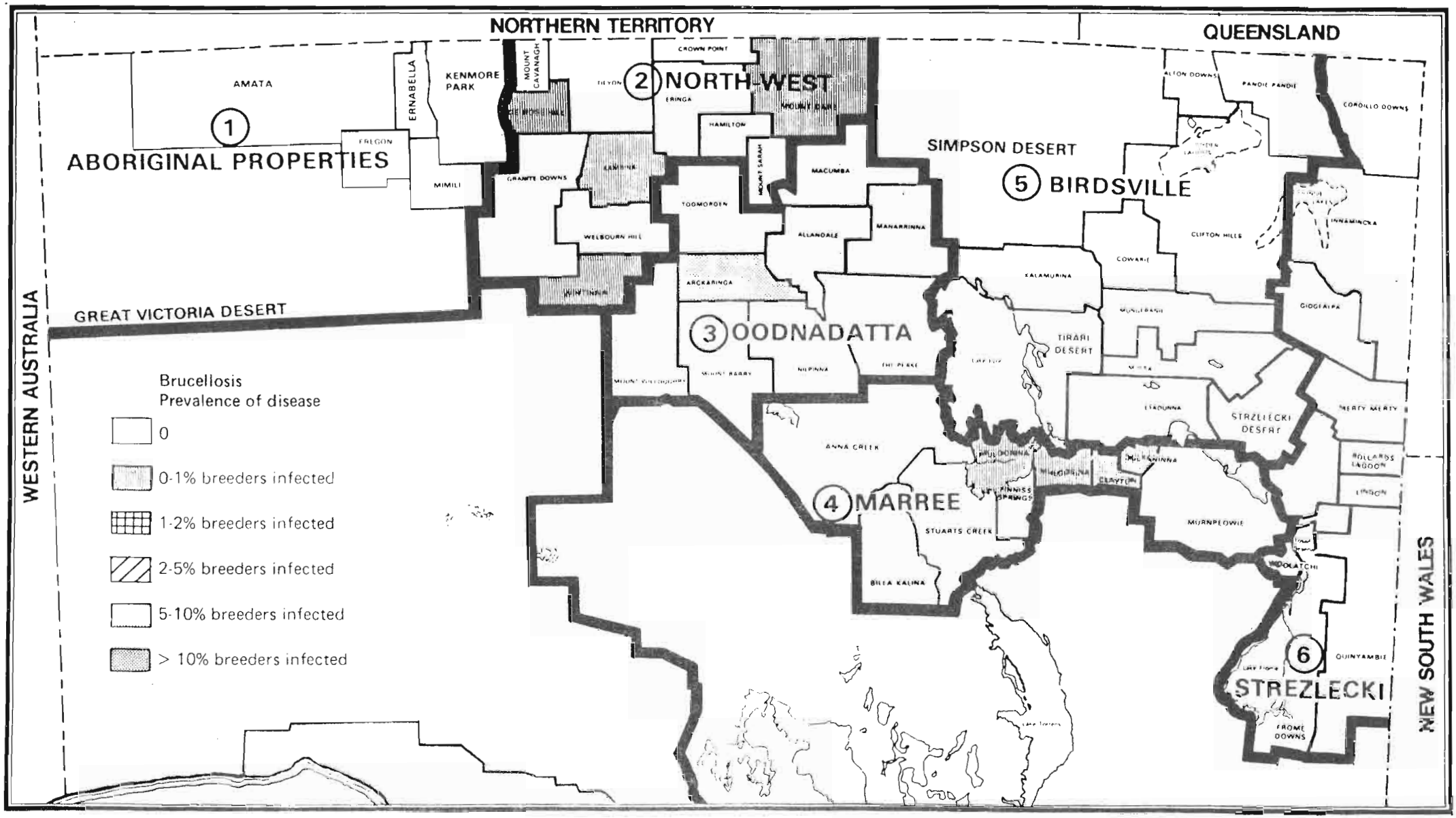
MAP 1.4



Brucellosis —31 August 1983



Brucellosis—expected levels February 1984



Since 1979 the use of aircraft has been significant. Table IV shows the increased use of aircraft and especially helicopters used for destocking operations. The figures include ferrying either aircraft or helicopters to the area of an operation.

TABLE IV Aircraft Hire and Charter in the Northern Region

		78/79	79/80	80/81	81/82	82/83
Aircraft	Hire Hrs.	0	74	81	17	
	Charter Hrs.	0	168	205	243	426
Helicopter						
	Charter Hrs.	0	3	0	35	300

5.2 The Effect of Drought

The arid nature of the far north of South Australia, where average annual rainfall is between 125-200 mm and where droughts occur on average one year out of three, makes the application of disease control procedures particularly difficult. Cattle numbers must be carefully managed if the optimum number are to survive and reproduce and it is these management practices which made the maintenance of testing programs impractical during the 1970s. During that period the tuberculosis control campaign concentrated on dairy and beef herds located in agricultural areas. As the Campaign progressed, there was mounting concern that cattle originating from heavily infected pastoral properties in the north of the State could be a source of further outbreaks of TB. In 1975 a proclamation under the Stock Diseases Act restricted the movement of cattle from the area north of the dog fence and directed future consignments of stock for slaughter only. This effectively ended a drought relieving option pastoralists had used where store animals were supplied to more favoured areas.

In 1977, when most of the north experienced a drought, there was sufficient concern at these restrictions on store movements for some pastoralists to initiate discussions with the Department of Agriculture with a view to temporarily relaxing them. Following an inspection of drought areas by Pastoral Board members in 1977, a report to the Department of Agriculture, concluded that the requirements of herd control to effectively eradicate tuberculosis on open range land could not be practically implemented or economically justified. The Board believed that alternate strategies should be developed, including methods of transporting infected cattle into temporary quarantine areas in the south, where appropriate testing could be carried out. A meeting in March 1977, resulted in the discussion of alternative procedures for relieving the situation and a further meeting in April tried to resolve the problems of moving cattle from the overstocked pastoral areas, particularly from properties under high drought stress, and quarantine restrictions. A list of affected properties was supplied by the Pastoral Board and as a result short and long term policies to relieve that situation were formulated. Proposals for a long term policy were:

"* The need for field extension on tuberculosis particularly by group meetings and individual contact.

* Testing into isolation areas with provision of finance to assist stock owners to erect necessary fencing.

* Rural Industry Assistance finance to provide the necessary facilities to enable the breeding of disease free stock.

* Quarantine properties to be available in the Provisionally Free area as holding areas for cattle undergoing tests prior to sale.

* Technician tuberculin testing for demand TB testing."

The proposals for a short term policy were:

* Planned slaughter of forward store cattle from the worst affected properties.

* A submission to the Minister for the short term disposal of cattle from high stress areas.

Subsequently a meeting of departmental officers was held in June 1977 to discuss intermediate and long term conditions for movement of cattle from the area north of the dog fence. This meeting felt that overstocking was not caused by departmental movement restrictions imposed for TB eradication purposes but rather by the failure of the Pastoral Board to use its powers to prevent owners of pastoral leases from carrying excessive numbers of cattle. It also disagreed with the Board's opinion that TB eradication was not feasible. The meeting resolved that the Pastoral Board should apply more control over pastoral leases and that wherever disease eradication was concerned, the Department of Agriculture should assist as much as possible to formulate policies to allow steady progress to be made. To assist in the movement of drought affected stock, properties were classified into four categories and conditions for movement from each category determined. In August 1977 meetings were held with stock owners at both Oodnadatta and Marree. Members of the Pastoral Board and the Department of Agriculture addressed stock owners on the conditions under which movements could be made.

The potential for conflict between the Department, the Pastoral Board and property owners and managers during a future drought was recognised when the format for Approved Property Programs was drawn up. Under a general heading of contingencies, the officers drawing up the program were required to discuss with the owner the likely effects of drought, floods, fire, market depressions and disease breakdowns in order to formulate with the owner, plans to minimize the effects of each of these upon the Approved Program. Such plans may have included a reduction in stock numbers or construction of additional paddocks and waters, for example.

In the period between 1978 and 1983 the Department has maintained its policy of not permitting store movements from infected properties in the far north. This has resulted in some opposition from owners who have been excluded from an often lucrative store market. Exceptions to the embargo have always been possible where there was no disease risk from store cattle. Since the latter half of 1981, movements have been allowed off properties from north of the dog fence where the property has been released

from quarantine, or where individual mobs have achieved disease free status and been severely affected by drought conditions. In each case such movements have been carefully supervised and included disease testing where necessary. The relaxation of movement conditions under such circumstances has greatly assisted individual producers and enhanced the reputation of the Department.

In early 1983 the existing Provisionally Free area, covering all the agricultural part of the State was extended to enclose another 15 properties thus allowing unrestricted movement from 10 more properties that were not under quarantine. During the period until the remainder of the north is declared Provisionally Free, individual movements will continue under a strict set of conditions, including movement testing where necessary. After the declaration of Provisional Freedom the movement of store cattle will be possible from all properties that have been released from quarantine.

5.3 Extension Programs

It was recognised in 1976 that one of the reasons for the failure of properties to implement effective tuberculosis eradication programs, was the inability of many owners to understand the importance of eradication. Owners were confused as to their obligations, and consequently it was felt that communication between the department and pastoral producers should be improved as rapidly as possible. As a first step the Animal Health Adviser at Pt. Augusta, Mr. Bill Giles, commenced a newsletter called the "Northern Cattlemens News" which was distributed to all beef cattle producers in the far north. As well as providing information on relevant aspects of the eradication campaign it provided comment on issues relevant to the beef industry. Since then, 17 issues of the newsletter have been produced by the staff of the Pt. Augusta office covering a range of subjects including:-

* Argentina, threat to Australian Beef Exports?
* Income Equalization Deposits
* Brand Heaters
* Bluetongue
* Subsidies for Destroying Drought Affected Cattle
* Cattle Yards and Fences
* Further Restrictions on Stock Movements
* New Locations for Stock Inspectors
* Gepps Cross Market Restrictions
* Taxation Effects of Destocking
* Permit System and Segregated Cattle Markets
* Stock Transport Accidents
* T.B. Conference at Alice Springs
* Status of Railway Yards
* Poisoning Related to Fungal Contamination of Feed
* Staff Changes and Movements
* Drought Relief
* Future of Segregated Markets
* Restocking Programs
* Stock Movements to the Northern Territory
* Leg Soundness in Bulls
* Can Cattle Marketing be Improved?
* B.T.B. Industry Liaison Committee

In the absence of effective radio, television and newspaper coverage as vehicles for extension information, the Northern Cattlemens News has proved a useful means of distributing information to owners.

Another major group extension activity has been the conduct of producer meetings at two centres in the far north. The first meetings were organised for February 1980 at Marree and Oodnadatta. They were intended to impress upon producers the urgency for initiating discussions, and commencing eradication activity for both tuberculosis and brucellosis. The first meetings were chaired by the Chief Veterinary Officer, Dr. J. Holmden and included addresses by four speakers. Dr. M. Reid, the Principal Veterinary Officer in charge of the Brucellosis and Tuberculosis Eradication Campaign, discussed various aspects of the campaign including the reasons for eradication, nature of the diseases, methods of diagnosis, vaccination, property and area statuses and the progress in both South Australia and Nationally. Dr. Leith Andrews, the Principal Veterinary Officer (TB) from the ABAH, discussed problems of T.B. and brucellosis control in Central and Northern Australia, based upon his extensive experience in those areas. Mr. John Edey, the agricultural consultant employed to carry out the Investment Appraisal Study (page 3), discussed the economic impact of disease eradication on arid pastoral stations, while Mr. Bill Prior from Hamilton Station near Alice Springs, discussed experiences encountered in the eradication of disease from his property. The attendance at these meetings demonstrated the interest and concern expressed by pastoral beef producers, although it was disappointing that many of the most avid critics of the campaign were not present. This unfortunately has been a consistent feature of the annual meetings. Since the first meeting in 1980, producer meetings have become an annual feature, and each year guest speakers have been invited from within the Executive of the Department, the Animal Health Division and where possible from interstate. This ensures that not only do owners receive up to date and relevant information but that their views and attitudes are effectively canvassed in a public forum.

At the initial meeting it was agreed to continue liaison between producers and the department by forming a small committee of elected representatives who would meet between annual meetings with senior departmental officers. Meetings have been held each year in an informal manner to facilitate exchange of information between producers and those responsible for the conduct of the campaign, especially the Chief Veterinary Officer and the Regional Veterinary Officer. New developments in research or eradication procedures have been presented while progress in southern areas and potential repercussions on the pastoral cattle industry have been discussed. Apart from these methods involving producer meetings or publication of the regular newsletter, other group extension activity has been directed more to informing southern producers of the activity in the northern areas by radio talks, newspaper articles and occasional television interviews.

There is no doubt that the most effective means of promoting the adoption of rational eradication procedures has been discussions on a one to one basis, between owners and stock inspectors or veterinary officers. These have relied heavily upon the ability of these officers to be fully conversant with all aspects of the campaign and especially the procedures applying to pastoral area eradication. The conduct of regular staff meetings has allowed all officers to have the opportunity to maintain their knowledge, to query aspects with which they disagree and to raise the

problems that their producers face. The degree of cooperation received from producers in the north is a result of the close contact that has been maintained with field officers.

5.4 Effects upon Producers

The effects of the campaign upon producers and the pastoral beef cattle industry have been dramatic. Prior to 1976 few property owners or managers made a serious attempt to reduce the prevalence of tuberculosis or brucellosis, let alone attempt eradication. Almost 10 years of experience with control procedures since the first attempts at tuberculin testing in pastoral areas resulted in both producers and departmental officers becoming disillusioned with the campaign. The futility of random testing programs and the high costs associated with testing, ensured that owners entered the period described in this report in an uncooperative and even hostile mood.

The changes effected since the transfer of responsibility to the Port Augusta office are discussed at some length during this report. In this section some of the more obvious effects of the operation of the campaign upon producers and the pastoral beef industry are examined to illustrate the profound and long lasting changes that have occurred. Prior to this campaign no government body had shown much interest in the pastoral beef industry apart from the Pastoral Board, and producers lived an isolated and independent existence.

Since 1977 producers' attitudes have been progressively altered as close and continuous contact with departmental officers introduced many new concepts. These had varying effects upon producers depending upon individual circumstances, however, the financial, management, educational and social effects are readily identifiable. The following are some aspects where producers' knowledge has substantially altered:-

* The meaning of disease and the effects of different diseases on beef cattle.
* Disease as a cause of financial loss.
* Disease control programs as a means of reducing economic loss.
* The cost of disease control programs.
* Alternative management approaches in pastoral areas.
* The use of efficient fencing and yards, holding paddocks, pregnancy testing, examination of calving and death rates to examine the productivity of a herd.
* An increased awareness of grazing pressure from confined stock and the ability of vegetation to sustain cattle through a range of seasonal conditions.
* The use of cashflow analysis as an aid to business management.
* An awareness of alternate uses for cash reserves.

* The use of controlled destocking as a management technique to reduce adverse environmental effects while improving cashflow and reserves.

* The advantages to be obtained from cross breeding using *Bos indicus* blood.

* An awareness that high quality musters are attainable and assist in stock and country management.

* That aeroplanes and helicopters can be valuable aids to management.

It is obvious that all producers have not become aware of all these concepts, or that the list includes all conceptual changes, however the list illustrates some changes that have occurred.

During the period prior to 1980, most producers were convinced that the proposed eradication of tuberculosis and brucellosis would proceed but were also aware that the adoption of procedures to provide effective cattle control could be ruinous. The taxation concessions provided in the 1980 budget allowed the campaign to proceed with reduced, but not insignificant effects. As a result of the policies and procedures discussed elsewhere in this report, the following are the most significant changes affecting producers and their industry.

* A dramatic reduction in stock numbers resulting in:-

  - the spelling of some areas of country for the first time since settlement.

  - producers depending upon interest from capital or capital gain rather than stock sales for survival.

  - an improved financial state for some.

* A reduction in feral horses, donkeys and camels which will allow a reappraisal of the adverse effects these animals have had on vegetation and ultimately on beef produced.

* Construction of extensive improvements leading to improved stock handling and a reduction in the requirement for labour which has been difficult to find and retain.

* Changes to management methods and a reduction in staff numbers over the last twenty years has led to future managers needing a range of "new" skills involving for example, range evaluation and stock control.

* A realisation that improved production per head may be achieved if stock of higher genetic merit are retained producing more offspring capable of surviving to a marketable age. This may in turn result in opportunities for pasture spelling and regeneration and reserves of feed.

* The sale of store cattle which has been impossible for 15 years for most properties offers an option that many will capitalise upon.

* Some pastoralists have reassessed their social and financial aims as alternative attitudes and investment options become apparent.

The change in attitude of producers from hostile resentment at the imposition of control and eradication procedures to one of active participation and cooperation with departmental officers has been particularly noticeable. This change was slow at first as many pastoralists were reluctant to take the first step towards eradication which they saw as radically altering their way of life. At the opening of the Northern Region Headquarters in 1982, Mr. Keith Greenfield from Billa Kalina Station summed up these problems in his address,

> *"It (the campaign) has dragged us, for the most part very unwillingly from a low investment in terms of labour and capital equipment into a high input situation. The cost has been enormous not only financially, but emotionally. Years of isolation had bred in us an independence not used to accepting direction from bureaucrats. Let alone those pursuing a goal we believed impossible."*

The reasons for the change were felt by Mr. Greenfield to be related to the establishment of the Port Augusta office:-

> *"Since its inception in 1977, a marked improvement in constancy of policy by the department has been apparent.*
> *Managers have got to know their veterinary officers and stock inspectors much better with a consequent improvement in consideration."*

Most pastoralists are now firmly behind the continued conduct of the campaign although the perceived adverse effects upon stock numbers and property capitalisation will remain topics of conversation for some years. The change in attitude is well illustrated by the recent Simpson Desert Task Force meeting at Birdsville, where the grazier component passed the following motions.

"1. *That all owners of properties bordering the Simpson Desert be required to destock all cattle not under an approved testing program or clean, by December 1983.*

2. *That all cattle under test on properties bordering the desert be provisionally clean by the 31st December 1984. Cattle which do not meet this criterium should be destocked.*

3. *The producers of this task force have imposed a condition on themselves to enable eradication in the area, that they be provisionally clear by December 1984. As they do not wish to have their efforts prejudiced by other infected properties, they would like a similar target date placed on neighbouring properties in their respective areas."*

5.5 Interstate Discussions and Conferences

The conduct of so called "Border Conferences" occurred for some years, especially between Queensland, South Australia, Western Australia and the Northern Territory. Their purpose was to discuss matters of mutual interest, particularly the requirements for movement of livestock. The first such conference that had great relevance to the BTEC, was held in Alice Springs in March 1978, and attended by Drs. Tabrett and Neumann and Mr. Coverdale representing South Australian interests. Of particular interest was the recent discovery of a Bluetongue like virus which was causing concern especially to the Northern Territory and Queensland. In November 1978 a Border Conference was held between Victoria, New South Wales and South Australia in Mildura. This also assisted the development of greater rapport between regional and divisional personnel from each State. Health requirements for interstate movements were discussed and progress and problems with the BTEC program in each state outlined. In April 1979 Dr. G.B. Neumann, the Regional Veterinary Officer, travelled to Charleville in Queensland and held discussions on various aspects of the BTEC in Queensland, particularly on the status of properties bordering the South Australian pastoral areas.

In March 1980 a Workshop was held over 3 days at Katherine in the N.T. Over 30 people attended including a number of leading graziers and representatives from the N.T. Parks and Wildlife, Department of Lands, Aboriginal Affairs, State and Commonwealth Animal Health Authorities and Buffalo and Cattle Industry Associations. The aim of the Workshop was to highlight problems peculiar to remote areas that could jeopardise a successful outcome to the National Brucellosis and Tuberculosis Eradication Campaign. Most people attending gave papers (including Drs. Neumann, Tolson, Stevens, and Mr. Paige from S.A.), covering broad subjects including reviewing the campaign progress in remote areas, defining the problems and identifying the resources and activities required for success. Conference delegates agreed that eradication in remote areas depended largely on the segregation of tested livestock and strategic depopulation. Eradication would be impossible unless problems of finance, feral animals and management styles in remote areas could be resolved. It was agreed that both government and the cattle industry must be more fully acquainted with the problems. The last half day was devoted to formulating recommendations to government as follows:-

* To support amendments to taxation which would assist the issues discussed.

* Promote research, development and extension on fencing materials and techniques necessary to control feral buffalo and cattle and effectively segregate herds under test.

* Promote research on the processing and marketing of feral animals.

* Promote research to develop techniques of game management that would be most effective for a disease eradication program applied to poorly controlled livestock.

* Review legislation relating to land covenants, living areas and administration and where necessary reinforce and redraft legislation to take into account present and possible future disease eradication requirements.

* Enforce animal disease eradication responsibilities on government authorities responsible for controlling land.

The Workshop was a valuable experience for those who attended, and provided an opportunity to gain experience and discuss the problems of other States and Territories. It appeared at that time that South Australia's remote area programs were proceeding well compared to other States. In July 1981 a Border conference was held at Broken Hill between N.S.W., Queensland and South Australia and a representative from the Bureau of Animal Health. This meeting again allowed each State to discuss its progress and problems and to create an awareness between States of progress along border areas.

The role of the Remote Area Working Party in facilitating the exchange of ideas and in the development of uniform criteria for eradication programs, has been mentioned previously (page 10). When the Working Party was first formed, it consisted of representatives from South Australia (Dr. G.B. Neumann), Queensland, the Northern Territory, Western Australia and the ABAH. Now that problems of the BTEC are tending to concentrate in the remote areas, membership of the Working Party has been expanded to include representatives of the CSIRO and producers. The Working Party is expected to continue to play an important role in the assessment of progress in pastoral areas throughout the north of Australia and in stimulating the research required to ensure that eradication procedures applied to pastoral properties are optimally effective.

In May 1981 the Working Party recommended that a special task force be created to examine the eradication of tuberculosis and brucellosis from the Simpson Desert which has common areas in the Northern Territory, South Australia and Queensland. There was concern that there could be significant numbers of cattle living in the desert and surviving around a small number of permanent and semi-permanent springs and upon the herbage species, parakeelya, which can support cattle for long periods of time without water. Properties surrounding the Simpson Desert were either T.B. or brucellosis infected and most were not fenced. In good seasons cattle were known to go far out into the desert where they could live for long periods of time, while there was evidence that cattle had walked from the northern fringe of the desert to South Australian properties. The first meeting was held in October 1981 with further meetings in April and July 1983. Destocking of the desert was planned for the end of 1983 with each State to ensure that all cattle are removed from the desert fringes over the summer period. The major South Australian part of this operation will be concentrated on the western fringe of the desert in the Mt. Dare and Macumba areas where a detailed plan has been drawn up for a helicopter shootout.

During March 1982 the Remote Area Working Party also sponsored a workshop in Alice Springs with the following objectives:-

* To define as accurately as possible the extent of the eradication problem in hectares of country which carries infected livestock which will need to be destocked or shot.

* Develop options to solve this problem and list the resources required and their availability.

* To identify legal, institutional and political barriers and the approach necessary to counter them.

* To formulate recommendations that will allow the BTEC to proceed in remote areas.

This workshop was attended by Drs. Vandegraaff, Curran and Reid from South Australia who presented papers. The most important papers presented have been published and include the following topics:-

* The epidemiology of brucellosis and tuberculosis under extensive range conditions and the effects of management and landscape types.

* Financial factors affecting the capability to undertake disease eradication on extensive properties.

* The effects of land form, vegetation and waters on mustering.

* Eradication tools and their performance under extensive conditions and extra regulatory needs.

* Case studies of programs depicting strategies and costs involved in representative areas and the special approaches required to counter them.

* Extension inputs necessary to generate manager and owner motivation and commitment to BTEC.

* Evaluation of tests and testing strategies in the field and in laboratories.

* Tuberculosis eradication - A summary of recommended property plans and operating procedures in northern areas.

In April 1983 a BTEC Property Assessment Workshop was sponsored by the Working Party in Toowoomba, Queensland and attended by Dr. Curran from the Northern Region and Mr. G. Trengove from the Economics Division. This workshop had objectives of examining different eradication strategies and their application, the role of cash flow analysis within the technical constraints of T.B. eradication, and of identifying appropriate cash and credit management strategies. It was also planned to examine the feasibility of establishing uniformity in the application of computerised economic assessment techniques. This would allow regional eradication funding to be better monitored especially with respect to cost effectiveness. This Workshop determined that the final phase of the campaign was likely to be very expensive, and consequently all expenditure should be accountable and used in technically feasible programs with a high likelihood of success. Expenditure should be planned to allow disease eradication to be carried out at least cost to both the BTEC and the producer. Additional assistance measures were also recognised as necessary to ensure disease eradication in the north of Australia. The Approved Program concept was accepted as a basis for the administration of BTEC in northern Australia, and was expanded to include details of expected BTEC expenditure and on-property effects based on cash flow analysis. It was recognised that the BTEC must stay within a budget and be capable of accounting for its actions and expenditure to producer groups and Government. It was decided that cash flow budgeting should be the basis of financial assessment of properties needing possible assistance. The

Cattle Council of Australia felt that the BTEC in the north should be planned to have as little effect on the industry as possible, and that it was essential that disease be eradicated, to justify the expenditure. Both the Bureau of Animal Health and the CCA looked for ways of assessing the technical correctness and the appropriateness of expenditure. A range of beef herd cash flow computer programs were made available. The South Australian BIBEP program was adopted as the basis for herd dynamics and cash flow analysis. Further development was planned to be carried out in Queensland to allow adoption for use on a number of different microcomputers.

This information on Border conferences, Working Party meetings and Workshops has been included to demonstrate the involvement of Northern Region staff in contributing to the Australia-wide control of disease in pastoral areas, and to outline their involvement in discussions on a wide range of associated subjects. There is no doubt that ability to attend such meetings has been a major factor in stimulating the application of new procedures and concepts to the eradication of disease in pastoral areas of South Australia.

5.6 Involvement in Property Inspections and Cattle Destruction

Property Inspections

The introduction of property programs involving either partial or total destocking of cattle, resulted in requests from pastoralists for assistance to confirm that areas or whole properties were free of cattle. There was scepticism expressed by owners and managers that the complete removal of cattle would be possible. It was thus agreed that property inspections operated by the department would become a part of the destocking program. Since 1979 officers have been involved in assisting on 17 properties involving 83 hours of aircraft time. In addition, stock inspectors have spent considerable time inspecting fences and waters for evidence of straggler cattle, and where necessary reporting their presence to managers.

Although this has involved the campaign in considerable expense, it has also ensured that destocking operations have been successful and created an awareness in owners and managers that anything less than complete destocking is unacceptable. A period of 60 days freedom from cattle was enforced from the beginning of destocking programs in 1978. This was later strengthened by carrying out inspections only after the 60 days had elapsed. Where stock were found, further inspections were delayed for another 60 days and where necessary owners were required to pay associated expenses.

Destocking Operations Involving Cattle Destruction

In 1979, when the brucellosis campaign was proceeding through the agricultural areas to the east of Pt. Augusta, it was recognised that there were areas of country around Mt. Remarkable where feral cattle existed which would be impossible to muster. The use of a helicopter gunship to facilitate removal or destruction of approximately 30 head was considered, however did not eventuate because the cattle were eventually tracked and destroyed by local residents. This scenario stimulated interest in the use of helicopters as it was realized that as the campaign progressed into the far north there were many areas

where it would be impractical or impossible to carry out effective ground mustering. During 1980 the first destocking operation involving a helicopter was conducted on a station where a small number of cattle were running in thick scrub country and the owner was unable to muster them for testing. It was agreed that the department would assist to muster. This resulted in the successful yarding of 10 and destruction of 3 head. There was sufficient return on the cattle to cover the expenses involved in the exercise.

Similar operations were anticipated for other areas in 1981 but it was not until mid 1982 that they eventuated with the first use of a helicopter gunship on Goyders Lagoon. Since then successful operations have been carried out on several properties and this type of exercise has become a routine part of the present phase of the Northern Region eradication campaign. More operations are being planned for the Simpson Desert and for the area of country occupied by aboriginal communities surrounding the eastern Musgrave Ranges. Future plans include the eastern fringe of the Great Victoria Desert, the central part of the Musgrave Ranges and possibly the lower end of Cooper Creek. The cost of these operations has been charged to the BTEC, as each involved the removal of cattle considered by both owners and the department as unmusterable, and hence of no value. No compensation is paid for animals destroyed under these circumstances.

There are several phases in successful destocking by shooting. Experience has shown that the total removal of cattle involves at least 2 helicopter/plane shootouts in each area combined with considerable ground based assistance. To carry out destocking economically, it has been found necessary to choose a combination of methods. Each method has a cost/effectiveness related to cattle distribution and abundance and to the ability of officers to locate them in different environments.

Destocking of the northern part of the Cooper Creek illustrates most aspects of this approach. About 30 000 head of cattle were originally in this area and traditional mustering methods (horses, bikes and occasionally planes) removed all but 1 000 head. This took about 2 years. In the summer of 1981/82, the northern part of the Cooper was flooded and a survey in late 1982 showed that this had implications for the proposed destocking operations. The northern part of the Cooper contained about 900 head close to waters while the southern half had a few cattle watering at a few brumby soaks and walking out considerable distances to feed. Each area was handled separately to minimize costs. The southern sector was first mustered by property owners, followed by a helicopter muster for about half a day around the only significant water. Departmental officers and station management then removed any remaining cattle using vehicles and bikes over a period of several weeks. The northern sector had plenty of water in channels and lakes with reasonable feed close by. Destocking was carried out during November 1982, when the weather was warm and the cattle close to waters. A plane was used to locate cattle and to direct a helicopter to where they were concentrated. In the first 8 days of this operation over 800 head were destroyed. In January 1983 a plane and helicopter were used again for 5 days and resulted in the destruction of a further 23 head. In the months following this operation a few stray cattle were reported to remain and consequently in July an aircraft was again used to spot cattle with ground based

teams to track and destroy them. Three head were destroyed in the lakes area while to the west a further 14 head were found. It is unlikely that further cattle remain in this area, however ground survey teams will continue surveillance until this is confirmed.

In planning these expensive operations, it was necessary to know the distribution and numbers of cattle and how they varied with changes in feed, water and temperature. The cost of locating and destroying cattle by each method and how this varies with their density must also be known with some accuracy. In planning for the Cooper operation, information was gathered by:-

* Holding a meeting of producers to compile available local knowledge and discuss problems with the tentative plans.

* Locating other information sources such as the pilots and staff of SANTOS, the Pastoral Board and dingo shooters. A recent Landsat photograph and a collection of aerial photographic mosaics and topographical and property maps were also acquired.

* A general survey of the area was carried out to familiarize officers with the nature of the country and to locate areas likely to hold cattle. Such areas were then flown in a close grid to define the sub-populations.

The plan was then altered through this reassessment and a final plan documented and sent to all producers in the area.

When a property gives permission to remove residual cattle, the management is advised that future decisions concerning residual cattle will be made by the department. This approach was adopted as a result of experience gained in destocking Goyders Lagoon, to avoid disputes over the value of cattle and because of the cost of operating aircraft and keeping men in the field.

The mounting of such operations by the Department of Agriculture was a new and at times frustrating experience. There was no precedence for this activity and little experience in the planning required. Since the first efforts they have become an extremely efficient and effective means of removing residual cattle. Although expensive, they are a necessary part of the Campaign because difficult areas of country make it unreasonable or impossible to expect property management to remove all cattle. Recognising the existence of these areas, defining their extent and mounting the operations, has had a significant effect upon the progress of the Campaign in the Northern Region. It has also allayed the fears of some individuals associated with the pastoral cattle industry who believed that inability to control and remove cattle from all areas would result in the ultimate failure of the eradication campaign.

5.7 Financial Aspects

In January 1981 it was recognised that while the BTEC was progressing satisfactorily in the closely settled parts of Australia, there was little progress in much of the pastoral areas of north and central Australia. The inability of many extensive properties to upgrade cattle control and management to a level that would permit effective disease eradication was the major constraint.

To assist in the examination of alternative eradication strategies, the ABAH developed a computer model to assist animal health authorities and producers to jointly prepare appropriate eradication and property development plans. The program was based on a demographic model of a cattle herd with property running costs and receipts detailed and was designed to be used interactively on a microcomputer. To use it to examine cash flow, information was required from the producer and his advisers on the existing cattle operations, together with judgements on likely future performance under various management options. Output was in the form of projected herd numbers, receipts, costs and accumulated surpluses or deficits during a period of up to ten years. Different proposals could be tested by re-running the model, making appropriate changes and comparing the results. It was felt that planning by cash flow analysis could prove beneficial to producers who were uncertain of the future viability of their properties. It could also provide them with tangible plans for discussions with advisers, credit houses and other authorities that might need to be involved with both property development and the achievement of disease eradication objectives.

Prior to its introduction, decisions on the most financially advantageous eradication strategies were made as a result of discussions between departmental officers, producers and in some cases their accountants. Owners were encouraged to involve accountants, as it was considered essential that financial advisers have a sound understanding of available taxation concessions relevant to the BTEC. A number of properties did this, however there were a significant proportion of producers who made decisions on the disposal of their cattle and invested in new fences and yards without assistance. Most owners made extensive use of the destocking and income protection measures which were available to minimise taxation. The department does not have information available on individual properties as this is considered privileged information between producers and their accountants. It appears, however, that financial and property mismanagement can seriously affect the success of a destocking program and lead to financial difficulties.

The BTBEP pastoral beef production model was developed in South Australia and examines herd structure and finances over a sequence of years as for the ABAH model. The model requires annual data on four aspects of a pastoral beef operation, the herd structure, sales, purchases of stock and finances. Estimates of cattle in each age group are entered at the start of the year and a number of events such as deaths, sales and purchases are applied to each age group and type of cattle. The number remaining at the end of the year are then moved to the beginning of the following year. The breeding section calculates the branding percent expected from cows of particular ages while data from cattle sales and purchases are distributed into appropriate

categories. Both sales and purchase tables require an average purchase or sale price per head and an average freight price per head. A statement of the cost and income of the operation is rounded into a balance for the year (Appendix 2).

This model's major strength is its simplicity. The format and method of data input allow pastoralists to readily understand what the results mean. The model has also been useful in demonstrating to departmental staff how cattle numbers and herd structures relate to the finances of properties and how they are affected by the BTEC. Producers have gained an insight into their likely future financial position by considering their herd structure and cash flow problems and this has been helpful in assessing alternatives. A major use has been in planning restocking programs and demonstrating how the BTEC has affected normal cattle operations. Analyses have also been carried out to demonstrate how the BTEC has affected groups of properties and the whole of the northern cattle industry.

This model was developed as a cooperative effort between Northern Region officers, the Mathematical and Computing Services section of the department and the Economics Division. Dr. G. Curran, the Senior Veterinary Officer (BTB) at Pt. Augusta has had most experience in using the model and has assisted a number of owners and their accountants by demonstrating the matters discussed above. The model is available for demonstration to any producer who is interested.

In general it appears that the Approved Programs have worked well where there has been sound financial and stock management. Drought has affected accumulated reserves on some properties but in view of its severity most producers admit they would have lost heavily if the drought had arrived at a time when they were fully stocked. Unfortunately some producers appear to have had difficulties in organising the large income from destocking to their best advantage.

5.8 Aboriginal Properties

The first serious involvement of the department with aboriginal communities operating cattle enterprises was in October 1976, when an abattoir traceback for tuberculosis resulted in the quarantine of one station. In the early part of 1977 a program for tuberculosis and brucellosis testing of properties in the north west of the State was arranged for the period from July to September. The proposal was to test cattle on three Community owned stations over a 2 month period, however the organisation of the testing took insufficient account of the management capabilities of the operators, the number of cattle to be mustered and the facilities available to hold cattle and perform testing. This plan was not a success and only small numbers of cattle were tested on each station out of the many thousands that were mustered. There was no consistency between the numbers presented for testing and reading with many cattle escaping from yards during the testing procedure. This was a frustrating experience for the officers involved and did little to enhance the department's reputation or that of the property owners. After this experience it was agreed that there should be no further testing of aboriginal properties until cattle were effectively controlled, their numbers reduced and a clearer definition of the problem obtained. It was fortunate that the disease prevalence was low and therefore the urgency to commence and maintain a regular testing program was low.

During February 1979 the Regional Veterinary Officer, Dr. G.B. Neumann participated in a survey of the aboriginal cattle projects arranged by the Department of Aboriginal Affairs. The intention was to complete an aerial and ground survey of each property. The survey party consisted of Mr. S. Miles, Project Officer, and Mr. R. Styles, District Adviser, both with the Department of Aboriginal Affairs, Mr. Bill Prior, manager of Hamilton Downs Station and Mr. J. Taylor from Elders G.M. in Alice Springs. The survey identified major problems involved with conduct of disease eradication programs. It was obvious that the level of knowledge of the diseases, and the requirements of disease control, was minimal and that considerable work was required to upgrade the extension effort to the communities. The condition of stock waters, fences and yards was very depressing and it appeared that there would be several years of work necessary to upgrade facilities sufficiently to commence and maintain effective testing programs. Following this inspection, quarantines were imposed on each property and comprehensive instructions outlining the conditions of the quarantine and explaining disease control requirements, were provided to each community.

Since then progress on the aboriginal properties has been disappointingly slow. Departmental officers have maintained close and continuous contact with each of the communities and have assisted wherever possible to direct the disease control activities on each property. There have been a number of proposals prepared for disease eradication on each property, however without exception, there were many changes made as the inability to control cattle and to present them for testing became apparent. During 1980 a stock inspector was stationed at Ernabella to improve liaison with the communities and since 1981 a stock inspector has been permanently located at Chandler Siding primarily for the same purpose.

During this involvement with aboriginal communities, close liaison has been maintained with both the Department of Aboriginal Affairs and the Institute for Aboriginal Development in Alice Springs. Both organisations have been helpful in assisting to improve the management of stock and implement effective disease control programs. Since 1980 the Institute of Aboriginal Development has been especially helpful in preparing extension material for the aboriginal communities and offering effective advice and assistance in handling the many problems which have occurred. It has also carried out research required to assist the properties to eradicate disease in the most financially advantageous manner. This advice has not always been followed and several communities appear to have squandered the very large amounts of money earnt from destocking. All the properties decided to include a substantial component of destocking in their Approved Programs, however, only three properties eventually retained any stock or introduced clean stock. Although the north west area has had a run of good seasons, it has not been possible to capitalise on them because of the inability to remove straggler cattle. This has meant a long delay in returning the properties to their full productive capacity. During August 1983 the first helicopter shoot out of unmusterable cattle was conducted, and similar operations will follow to cover all of the country where aboriginal communities run cattle.

6. METHODS OF CONTROL AND ERADICATION

In 1976 it was believed futile to continue to attempt to eradicate disease without appropriate tools and that procedures appropriate to pastoral area disease eradication were poorly defined. Northern Region officers have since made significant progress in defining procedures involving cattle control, tuberculin testing, brucellosis vaccines and serological tests and in developing special examinations to accurately define the disease status of individual animals.

6.1 Cattle Control

The need for effective control of cattle movements during an eradication campaign has been recognised for many years and overseas experience demonstrates the futility of attempting eradication without it. Discussion on stock movements into the northern pastoral areas is included elsewhere in this review. The introduction of the segregated marketing system in 1981 was an important step in ensuring that cattle being removed from properties did not have contact with disease free stock. From July 1983, additional restrictions have been applied to cattle which originate from quarantine properties north of the dog fence or interstate and move through the S.A. pastoral areas by road. Restrictions are as follows:

* The owner or manager of the cattle must notify the appropriate Inspector of Stock at least 3 days before the movement of stock is to occur.

* A wide yellow paint stripe down the back must be applied to all cattle leaving quarantined properties by road. The paint used must persist under all weather conditions for the duration of transport.

* The carrier of stock must be advised by the owner/manager of stock to contact the stock inspector supervising the movement and:

  (a) provide an expected time of arrival at either Lyndhurst, Quorn or Port Augusta, AND

  (b) advise on arrival at Lyndhurst, Quorn or Port Augusta.

* Should a vehicle not arrive around the appointed time, the inspector awaiting the arrival of the carrier will set out to locate it.

* If a stock transport should overturn, the Inspector of Stock supervising the movement is notified by the carrier, the police, the owner of the stock or his agent. The inspector will set out to locate the vehicle, assess the situation and assist in control and/or destruction of the stock.

The control of cattle on a property basis was recognised as being essential if testing programs were to become effective. In order to effectively apply the available diagnostic test, a minimum of two musters was required per year and in most cases three or four were needed to make adequate progress. The necessity for 100% musters was explained to all owners, but it was recognised there were difficulties in obtaining this quality of muster on every occasion. The need to maintain the isolation of mobs under test was immpressed upon owners and in 1981 a system of recording each individual animal commenced. Early in the campaign animals

were identified by the use of backtags (a numbered piece of material attached to the back of the animal by special glue). These proved unsuccessful and from 1979 all animals tested for brucellosis were identified with serially numbered and coloured eartags. Introduced cattle must likewise be identified allowing:-

* Easy recognition of stranger cattle from neighbouring properties so that prompt action can be taken for their removal.

* Easy recognition of residual cattle intended for destocking.

* Ready identification of any cattle straying from one paddock to another.

* Identification of imported cattle where further check testing is required after introduction.

These individual identification numbers have been recorded in "Mob Books", which are maintained by the stock inspector responsible for each property. They list the eartag number of each animal and its presence or absence at each test is noted and advised to the owner. This ensures that there is absolute control over every animal, that the ability of biological tests to detect infected animals is maximised, and that account can be taken of the spread of disease betwen tests from previously unmustered animals.

Stock inspectors have also been involved for several years in advising management on the types of fencing most effective in segregating cattle and on cattle yard materials and construction. They have also been active in examining areas of fencing which are under stress or where disease free stock may be under risk from adjacent infected animals. Wherever fences are found to be inadequate owners have been advised that repair or maintenance is required.

6.2 Tuberculosis Testing

When tuberculosis testing commenced in the far north, the tuberculin used was referred to as HCSM. A new tuberculin, Purified Protein Derivitive (PPD) became available in 1977 and in S.A. was first used in pastoral areas. It proved to be more sensitive in identifying infected animals and thus has advantages in the pastoral environment where mustering is expensive. A new tuberculin (Rotterdam) has also been investigated for use in pastoral areas, while work is progressing on a serological test.

In addition to utilizing these improvements in tuberculin, the sub-optimal sensitivity of the test was recognised and as mentioned above, testing was not carried out unless a minimum of two tests per year and high percentage musters could be achieved. The inability of tuberculin to detect some chronically infected animals was recognised and strict culling for age was introduced in 1979. Since the introduction of guidelines for Approved Programs, this has become a standard practice in tuberculosis control.

6.3 Brucellosis Vaccines

During the early 1970s some vaccination was conducted using Strain 19 in heifer calves. Although this vaccination program was sporadic and only a small proportion of the available calves were vaccinated, the presence of this vaccine in some herds appears to have had an effect in reducing the incidence of brucellosis. In 1977, it was decided to commence a vaccination program involving all breeding cattle using the killed brucella vaccine, Strain 45/20. This vaccine was used wherever possible in the following three years, however it was found that the requirement for 2 doses made its application impracticable under the arid conditions of the far north of South Australia. Once again, however the vaccine had a noticeable effect on the incidence of brucellosis in herds where it was used.

During 1980 the first vaccinations were carried out using a reduced dose of Strain 19 vaccine. Research in the U.S.A. showed that a low dose of Strain 19 in adult animals was effective in preventing abortions, and thus transfer of *Brucella abortus* between animals. The first use in South Australia involved a 1/10 dose and later a 1/20 dose. However in 1981, further research showed that a dose as low as 1/400 was sufficient to invoke an effective immune response in adult cattle. That dose has since been used in a number of heavily infected herds and found to be extremely effective in reducing the incidence of brucellosis. Future vaccine use will be restricted to control severe outbreaks of the disease where the alternative of destocking is impossible because of management or financial constraints.

6.4 Brucellosis Serological Tests

When the brucellosis testing campaign commenced in the northern region, the Rose Bengal Test (RBT) was used as a screening test for all blood samples and the Complement Fixation Test (CFT), a more specific test, was used to retest positive samples. Although this proved satisfactory early in the campaign when there was high infection on some properties, it was felt that as the campaign progressed such testing may not prove adequate to remove all infected animals. In addition there was concern that because of the use of Strains 19 and 45/20 vaccines in the far north, these blood tests may cause confusing results. In 1979 the Indirect Haemaglutination Test (IHLT) was introduced to assist decisions on whether a CFT reaction was due to infection or Strain 19 vaccine. There was still concern, however that the tests may not be adequate for use in an environment where the regular monthly testing used in settled areas was impossible. During 1980 the use of the Complement Fixation Test as a whole herd test was introduced for the pastoral areas and provided added confidence in results. A new test, the Enzyme Linked Immuno Assay (ELISA), also became available and after some preliminary testing was adopted for use on samples from herds where vaccine had not been used. It was found to be very effective at identifying animals which were infected but unreactive to the Complement Fixation Test. The development and use of new advances in serological techniques has been a feature of the campaign in the northern region and has without doubt increased the rate with which the disease has been removed from many herds. During 1981 Dr. G. Curran assisted research officers from the CSIRO in research both into the use of reduced dose (1/400) Strain 19 and the ELISA test.

6.5 Additional Testing

It is relevant to this review to make mention of a system that has been used to retest animals where a reaction is thought to be incorrect, or where it is desirable to confirm the presence of the causative bacteria. In 1979 an area of land, consisting of a series of 8 fenced paddocks, was leased from Australian National. The central area was double fenced to form a quarantine paddock for the isolation of animals reacting to either test with suspicious results. A small yard was erected within the central paddock and many reactors have since been processed. Its availability has given Northern Region officers the opportunity to examine in detail animals which react to disease tests. Post mortems can be conducted at a slower pace, allowing a detailed examination and collection of appropriate specimens. In some cases animals have been held in the quarantine facility while additional testing has been carried out. Where animals have been examined under these ideal conditions and found to be free of any indication of infection, they have been declared non-reactors and appropriate changes made to the disease status of the herd. This has saved pastoralists unnecessary mustering of mobs for retesting and unwarranted delays in the release of quarantines.

7. APPROVED PROPERTY PROGRAMS

The system of Approved Property Programs (Appendix 3), which document conditions on each property and the negotiated proposals for effective eradication, has been discussed previously. The emphasis has always been to eradicate tuberculosis and brucellosis, but it is the logistics of testing heavily infected uncontrolled stock that has, more than any other single factor, resulted in the need for a reduction in stock numbers and the isolation and testing of young animals. This approach was accepted by most pastoralists because of the high disease prevalence and the management and financial difficulties resulting from repeated mustering for testing. Other important considerations have been the prevailing market conditions and the reduced incidence of disease in young stock resulting in faster eradication from individual mobs. The provision of taxation concessions in 1980 had a significant effect in promoting the sale of stock and allowing the construction of the internal fencing and yards essential to the campaign success.

Notes on the preparation of property programs were produced for Northern Region staff in September 1980 and detailed the type and quality of information that was required to ensure that each program considered all relevant information. The following were the major guidelines.

* Review of the history of BTEC on the property

  A concise and accurate statement providing a summary of testing and traceback history and comments on identifiable reasons for the failure or abandonment of any previous plans for testing.

* Description of the property

  A brief discussion of the relevant topographical, vegetative and water resources that may affect or limit the effectiveness of BTEC on a particular property and including the preparation of appropriate maps.

* Statement of development of the program

  To provide some background material for the Chief Veterinary Officer, detailing when decisions concerning the program were made, by whom, and an indication of the attitude of property management.

* The program

  This section supplied details of the reason for selection of a particular type of program, including a consideration of alternatives. It offered comment on the commencement date, the procedures involved and the staff allocated to a particular property. Any recognised constraints on success were mentioned and plans for drought or other contingencies were included.

* Details of factors affecting the BTEC

  A detailed analysis of all factors that helped determine the program on a property and that may have affected its chance of success. Special care was taken to include comments on management and socio-economic factors unique to arid areas.

  The following are the specific headings used to assist staff in preparing the Approved Program:-

+ Property - including location, size, fencing and paddocks.

+ Management - the method of operation, abilities, personalities and labour requirements.

+ Financial aspects including current viability of the property and information on accountants and advisers.

+ Stock, plant and equipment - comments on the carrying capacity, the number of feral animals, problems with waters, yards and mustering.

+ Disease - the estimated prevalence of each disease, particularly in individual mobs if this was available.

* Contingencies

Each of the following had to be examined and discussed with owners. Suggestions were required as to the procedure to be followed if they occurred.

+ Drought

+ Fire

+ Flood

+ Market Depression

+ Disease Breakdown

* The Agreement

Each owner involved in an Approved Program was required to sign an agreement to carry out the planned proposals. This was in the following form:

> "I agree with (*S.I. or V.O.*) that this document is an accurate statement of the proposed program on (*station name*) and that I will assist to the best of my ability to ensure that brucellosis and tuberculosis are successfully eradicated."

This ensured that owners read the document and recognised its implications for the future management of their station.

The taxation concessions under Sections 75C and 36AA and 36AAA were not processed until this committment had been made.

An Annual Progress Report is required on each Approved Program. A proforma (Appendix 4) is completed by the veterinary officer responsible for the property. Based on this assessment, a report is written to the Chief Veterinary Officer outlining progress within the previous calendar year. A copy of that report is also sent to the stockowner for his information and records.

At the first meeting of the Remote Area Working Party in September 1980, the criteria for Approved Programs on properties, herds or part herds, were more carefully defined and submitted to BTBSC for inclusion in the Standard

Definitions and Rules of the National Campaign. These criteria built upon South Australian experience and adapted and expanded the previously mentioned requirements into a set of conditions acceptable to all States involved in remote area eradication.

Specific additions to the previous guidelines were applied immediately after the Working Party meeting as follows:-

* The disease prevalence as defined in the Standard Definitions and Rules had to be known.

* All cattle had to be capable of being mustered at least twice per year.

* Cattle had to be secure from reinfection by individual identification, physical examination of the environment and knowledge of the disease prevalence in surrounding areas.

* Areas of mustering difficulty had to be defined including land categories of "extremely difficult", and "impossible to muster" which would be excluded from testing programs and fenced off if necessary.

* The frequency of mustering should be at least twice per year, or once if determined by the D.V.O. after consideration of the program, disease prevalence and epidemiology of disease in the area. The ability to muster at short notice was desirable in the event of possible traceback information or the presence of suspect or stranger cattle.

* All cattle being TB tested had to be initially subjected to culling for age by removing all females over 6 years and bulls over 5 years.

* Administration and documentation of an Approved Program was detailed and followed closely the South Australian model.

8. DESTOCKING AS AN APPROVED PROGRAM

Concern with both the financial and disease risks associated with destocking programs resulted in special conditions applying to the use of destocking as an Approved Program. Reinfection was a major concern and it was important to ensure that property conditions were such that infection would be detected, isolated and eradicated before it became established. Officers were advised that the use of Section 75c concessions was as important for destocking as for a testing program, as areas for isolating introduced stock would be required and control over all stock essential if a disease outbreak occurred.

The general format for the Approved Property Program was followed but included additional comments on the following.

1. Reasons for total or partial destocking being used as the Approved Program e.g. if the management was not capable of testing or adequate stock facilities were not available. In some cases the disease prevalence was too high to permit rapid progress and it was considered that destocking would be financially advantageous to both the property and the BTEC.

2. The following factors had to be known and specifically included in the program:

    * The disease prevalence in adjoining herds.

    * Factors affecting the commencement data such as season, prices and the availability of transport.

    * The time period for the total process of destocking and an indication of the timetable for both restocking and the other procedures planned.

    * Defined areas had to be destocked within 6 months.

    * All destocked cattle were required to go for immediate slaughter.

3. The following safeguards had to be available and fully documented.

    * Movements off the property to be recorded with the ability to detect losses and escapes and advise early where these occurred.

    * Supervision of the sale and slaughter of stock (handled by the Central Region market inspectors).

    * Defined areas had to remain vacant for a minimum of 60 days following the removal of the last animal and an aerial and/or ground check had to be made by a departmental officer after the 60 days.

    * Proposed movements onto the property had to be documented by confirming the origin of stock from a property confirmed free of disease and by scrutinizing the status and/or testing records if necessary. Isolation and security while in transit from the property of origin and on arrival on the destocked property, had to be maintained. Identification of the herd with an approved eartag and requirements for further testing were the perogative of the District Veterinary Officer.

4. As part of these programs, the officer was required to produce a summary of the proposed destocking program in the form of a draft instruction from the Chief Veterinary Officer to an owner, confirming the agreement for destocking. This also provided evidence that the destocking was a disease eradication requirement (Appendix 5).

Destocking programs were designed to remove disease quickly, leaving producers financially viable as a result of the large increase in cashflow. Where this has been successfully managed, producers have been able to make use of the 1980 taxation concessions to safeguard their finances while restocking or breeding up their herds.

When programs were first prepared, the estimate of cattle to be destocked was 181 000. Owners expected to test a further 70 000, so about 250 000 were thought to be on properties in 1980. Since then, destocking and normal turnoff has removed about 190 000 head, with a further 8 000 still to be removed. The increase over the original estimate reflects underestimates of the number of cattle, a decrease in the number retained for testing and natural increase. Owners planned to test about 70 000 head, however, this has since reduced to about 50 000 under test or to be tested.

Restocking programs have shown that 24 000 cattle have been introduced to properties under Approved Programs. Estimates obtained from owners and managers put the number of cattle still required at about 46 000 head including 26 700 breeders. Thus 34% of the cattle required for restocking have already been obtained and with the number of cattle involved in testing, about 74 000 head are in the area at present. When added to the 46 000 head required by owners to restock, about 120 000 head are expected in the far north after completion of the Approved Programs. If this is compared with the estimate of 250 000 head on properties at the commencement of the program, it appears there will be a short term net loss of 130 000 head from the region. Table V provides figures in more detail for the six subdivisions of the far north shown on Map 1.

The "Trucked Under Permit" figures represent a significant underestimate of cattle actually removed as they have been summarised from Movement Permits received or signed. In addition many cattle were removed under destocking programs but prior to the commencement of the permit system and an accurate record of their numbers is not available. It is known that some permits have not been returned so a further 15 000 - 25 000 head could have been trucked. There are cattle still to be destocked, however 76% of these are scheduled to be removed by October 1983. The remaining 3 500 will be turned off with rain or in the course of departmental destocking operations.

Nearly all the cattle still to be tested are on one property which should have set up its test herd by the end of the year. The remainder will be either tested or destocked depending on the seasons. There has been a reduction of about 20 000 head in the number of cattle originally expected to be tested due to owners rethinking the amount of fencing to be erected, or realising they were attempting to test more cattle than could be retained in available paddocks.

TABLE V Summary of Approved Programs involving destocking

PROPERTY	Destocking			Restocking			Summarised Totals		
	Original Estimate	Trucked under Permit	Yet to Destock	Intros. to date	Still reqd.	Total Intros Reqd.	Original Herd Number	Total Destock under Permit	Expected Herd Numbers
1. Aboriginal	15000	10298	2650	1794	1103	2897	17400	12948	5192
2. North West	39200	41069	3360	2954	6050	9004	63700	44429	32187
3. Oodnadatta	43900	54391	120	9101	9795	18896	62150	54511	32624
4. Marree	32600	29571	0	3369	9000	12369	39835	29571	15208
5. Birdsville	23500	26573	2620	2782	12290	15082	34150	29193	16234
6. Strzelecki	26950	28328	0	4324	8120	12454	34450	28328	19227
TOTAL	181,150	190,230	8,750	24,324	46,358	70,702	251,685	198,980	120,672

Where destocking has been due only to the effects of drought, restocking estimates have been set at zero. This has occurred on two properties in the Marree area. Drought may increase the level of restocking over these estimates on the Birdsville Track, Marree, and Strzelecki districts. This could increase estimates by up to a third if the drought continues in the Marree and Birdsville Track areas, but should only marginally effect the Strzelecki Track estimates.

9. RESTOCKING PROGRAMS

Implementation of the concept of destocking infected cattle as an alternative to test and slaughter resulted in concern that introduced cattle would be subject to disease pressure and may themselves become infected. Another fear was that it would be too difficult to ensure that introduced cattle were disease free. These problems were recognised in planning for the eradication of tuberculosis in 1977 when the first program detailed:-

* Regular inspection and repair of the boundary fence at least weekly to ensure the lease is, and remains free of cattle.

* Restocking of the lease with tuberculosis free cattle and the maintenance of the free herd. Cattle purchased to be certified free of tuberculosis by the Chief Veterinary Officer of the State or Territory where purchased and may require a single mob test before movement. Cattle should preferably be purchased from brucellosis free herds and all non-vaccinated cattle will be vaccinated free of cost against brucellosis with 45/20 vaccine. The second injection of 45/20 will be given not less than 6 weeks or more than 6 months after the first injection.

* The herd will be certified as a tuberculosis free herd by departmental officers provided they are convinced that every effort is made to maintain the herd as free, by constant repair and regular inspections of fences, prompt removal of any stranger cattle and continuing evidence that tuberculosis is not present.

These conditions were progressively modified with experience in the planning and conduct of Approved Programs. Further ones included in all Approved Programs were:-

* Prior permission must be obtained for introduction of any stock to the property. Any cattle which are introduced must be tuberculosis and brucellosis free as certified by the Chief Veterinary Officer of the state or territory from which they originated and may require a free mob test before movement. Following introduction, such cattle are to be held in isolation.

* Any strangers found shall be removed as soon as practical after detection and regular searches will be made for such animals. The detection of strangers will be reported to the R.V.O. Pt. Augusta so that their presence can be accounted for in preparing disease eradication programs.

The inclusion of such conditions illustrated the mounting concern expressed by the industry and departmental officers that the maintenance of disease free status of introduced cattle would become a major problem unless adequate controls were implemented and maintained. Between 1980 and 1982 it became obvious that most owners had opted to destock all or part of their herd rather than become involved in a long, tedious and expensive testing program. It was felt that the restocking of properties was developing into a major issue and one which would occupy a considerable proportion of officers' time. As a result the conditions for movement into the pastoral area of South Australia were progressively strengthened.

This was formalized in May 1982 by a circular from the Chief Veterinary Officer to stock agents, owners and departmental officers in both South Australia and other States outlining new conditions for the introduction of stock as follows:-

* Prior approval to be obtained from the R.V.O., Northern, at least 7 days prior to the proposed purchase (not proposed delivery date). All applications for approval to be in writing (telex acceptable).

* The applications for approval to include:-

  - details of properties from which cattle are to be purchased,
  - the number and class of stock,
  - the intended date of movement onto the property.

Under such conditions the purchase of clean cattle prior to the completion of destocking was allowed on 13 properties in the period between 1980 and 1983. Each was judged on its merits and approval given if the risks were minimal and the alternatives unacceptable for various reasons. Disease breakdowns occurred on three due to poor segregation and/or poor control of the restocking procedure. Such problems are part of the reasons for recent changes to the restocking requirements. The ability to restock while removing infected cattle is important to many owners in ensuring that a property remains viable, both from financial and management viewpoints, especially in generating sufficient activity to permit continued employment of station workers.

It was also recognised during 1982 that because of the continuing drought and escalating store cattle prices that many owners would have difficulty in restocking. Until that time the policy had been to use animals with minimal risk of infection, however, this involved considerable testing and time spent seeking background information on cattle and their property of origin. It was suggested that because of these problems, cattle should be retested on the property after arrival. It was recognised that there would have to be close supervision, especially with respect to tuberculin testing as it was known that cattle in poor condition may not show an effective response to this test. A special restocking form (Appendix 6), was provided to staff in December 1982 with a request for the required information to be provided by the end of the following March. An examination of these forms shows the detailed information required to enable an effective appraisal of each individual property, the areas considered secure and the conditions under which cattle could be introduced.

A formal individualised approach to the restocking process was necessary for the northern eradication area because of the difficulties in implementing a single set of guidelines appropriate to all introductions of cattle to destocked properties. It was recognised that isolation facilities, feed and water availability, disease status of adjacent herds and mobs and testing facilities varied between properties and thus the conditions for reintroduction of clean cattle should also vary. In order to plan for the future, it became necessary to discuss in detail the present expectations of pastoralists and to provide guidelines on restocking strategies that could optimise cash flow and a return to financial viability. The most effective way to formulate policies and guidelines for restocking was to proceed on an individual property basis involving the preparation of a mutually acceptable restocking program for each station. This was done in the form of the documented restocking program previously mentioned. The steps involved in implementing this procedure were as follows:

1. A property visit and interview with the owner/manager by the stock inspector and the responsible veterinary officer, designed to assess:-

   * The manager's estimates of the number and types of cattle required.

   * The expected duration of the restocking period, allowing for seasonal variation.

   * The security of isolation areas identified as suitable for introductions.

   * The level of disease risk from adjacent herds and mobs.

   * The likely longevity of feed and water and thus availability of suitable secure restocking areas.

   * Availability of holding yards and testing facilities in restocking paddocks.

   * The minimum surveillance testing strategy for each mob of introduced cattle.

   * Contingency plans for movement, testing and/or destocking cattle in the event of a disease breakdown.

   * The minimum acceptable herd status and movement testing requirements for the properties of origin.

2. In some cases it was recognised that properties were operating under severe financial stress and that it would be necessary to conduct investigations using the BTBEP computer model and knowledge of the number, type and price of introduced stock, their rate of introduction and subsequent management to provide effective advice. This could minimise the financial impact of restocking as well as improving the potential for long term improved profits. The preparation of specific restocking programs was the first step in implementing a more rigid and detailed assessment of the problems associated with restocking. Various degrees of movement and surveillence testing, supervision of offloading and eartagging and security checks by stock inspectors will be used to monitor progress.

3. After the restocking programs were returned by stock inspectors in early 1983, the numbers and requirements for cattle were more accurately known and it became apparent that available controls over restocking could still be inadequate. Conditions for movement of stock onto northern pastoral properties did not take adequate account of a number of problems including the following:-

   * In the case of tuberculosis, current herd and movement testing requirements did not sufficiently recognise the threat from infected but non-visible lesioned reactors. Also the herd and movement testing requirements in other areas of Australia did not appear to sufficiently recognise the threat of inapparent tuberculosis in store cattle including the effects of poor body condition on the tuberculin test.

* The interpretation of brucellosis serological tests appeared to vary between States and regions, particularly in vaccinated herds, leading to uncertainty about the true level of disease and risk of infection. It was recognised that considerable numbers of heifers would be purchased for restocking and that they may not react to the Complement Fixation Test until after calving.

* It appeared that some States and regions had different concepts of the herd status classifications laid down by the Standard Definitions and Rules. There was particular concern that in some States abattoir traceback information appeared to be disregarded and thus the basis for herd status classification was often inadequate.

* Conventional movement restrictions were thought to be inadequate to prevent the reintroduction of disease during restocking and appropriate movement controls were needed to give producers the best opportunity to safely restock.

* The movement testing of stock prior to entry into South Australia was recognised as necessary if introduced stock were to be placed in areas where regular and adequate mustering was impossible.

* The difficulty of assessing disease histories on properties of origin had been recognised for some time. There was a need to obtain more information than just the property status and to achieve this, communications between the Northern Region and other States would need to improve. More accurate property information could help to reduce doubts about information supplied and reduce the amount of testing before cattle were released into open areas.

This reassessment concluded that pastoralists needed better understanding of the options available to them when purchasing cattle for restocking. Owners had to be aware that if doubt existed about the risk of infection, then additional testing could be required, preferably prior to entry. Problems could occur if owners purchased from markets with short notice and it would be best to purchase direct from a property. Failure to devise a better system of controlling movement requirements could have resulted in severe restrictions on the types of herds eligible to supply cattle to South Australia and thrown doubt on whether cattle should be purchased from markets at all. This would have limited the options of cattlemen even further and forced up the costs of restocking.

Following this reassessment a meeting between senior Northern Region staff and BTEC management officers drew up a set of movement conditions that would involve Northern Region officers in the minimum amount of herd of origin assessments, yet ensure that there is little risk of disease introduction. The conditions were worded to place the responsibility for assessing the disease free status of a property of origin on the officer certifying the eligibility for entry into northern pastoral areas. The area of South Australia covered by these instructions was north of the dog proof fence and introductions to properties within that area are only permitted under the following conditions from the 9th May, 1983:-

* Prior notice to the Regional Veterinary Officer, Pt. Augusta, or his delegate (Information recorded as per Appendix 7).

* Cattle to originate from a herd or herds where no disease has been detected or suspected for 3 years prior to movement. In accordance with this condition appropriate Health Certificates (Form 1) fully endorsed must be provided for each consignment and signed by a veterinary officer or inspector with the endorsement:

  "After due investigation I am satisfied that no disease has been detected or suspected in the herd(s) of origin during the three years prior to movement" ..... *(V.O. or S.I.)*

* Cattle must be tested within 30 days prior to movement with no reaction to:

  (a) Tuberculin test read no sooner than 72 hours following injection of tuberculin.

  (b) Compliment Fixation Test (CFT) for brucellosis.

* Cattle must be individually identified by eartagging in the manner specified by the R.V.O., Pt. Augusta, or his delegate.

Cattle moving to this area from within South Australia are also required to meet the above conditions except that the Health Certificate is replaced by a written instruction signed by a V.O. or Inspector of Stock giving the information required as well as the current status of herd(s) of origin in respect of TB and brucellosis.

These instructions were issued as a circular to stock agents, northern pastoralists and managers, Regional Veterinary Officers and interstate agencies, and provided for the first time a concise, readily understandable, and effective set of conditions to protect destocked areas from possible disease. It was recognised that it would be necessary to give interstate authorities sufficient time to examine their records to enable the certification with respect to the property of origin. There was some concern within the industry that the condition for no evidence of disease for 3 years was far too severe, however, this was found to be less strict than that imposed in other States for similar purposes.

In this context it should be noted that at the meeting of the Simpson Desert Task Force held at Birdsville on the 26th July 1983, the government officers and 10 pastoralists representing South Australia, Queensland and the Northern Territory passed the following motion.

"That the various State departments maintain stringent movement requirements on cattle for restocking previously destocked properties".

10. FUTURE PLANS FOR THE NORTHERN REGION ERADICATION CAMPAIGN

The Brucellosis and Tuberculosis Eradication Campaign in the Northern Region will in future include the following activities:-

* Completion of destocking involving specific actions by property owners or managers and by departmental officers.

* Completion of the isolation of test mobs.

* Completion of testing programs.

* Supervision of restocking.

* Monitoring of test mobs and restocking cattle to ensure that no disease remains in herds or, if present, does not spread.

* Ensuring producers remain alert to the risks of disease either being introduced or lying dormant in their cattle, and that they understand that early detection of disease provides the greatest range of options to deal with disease outbreaks.

* Assisting producers to regain former productivity as rapidly as possible.

During 1983/84, destocking operations will be completed and only cattle in test groups or introduced clean stock will be on properties. Owners have been advised that no new test mobs could be set up from untested cattle after 31/6/83 without prior arrangement. All cattle under test should complete one round of testing by the end of 1983. By July 1984 disease in test mobs should be at a very low level, with most mobs achieving at least C1 status. It is anticipated that all test cattle will reach C1 status by December 1984 and could achieve C2 status by the end of 1985, barring disease breakdowns or delays caused by drought.

Restocking has already reinforced the need for close supervision. Work involved will include close monitoring of conditions on parts of properties, fence and paddock inspections and continuing discussions with property owners and managers on the optimum management of cattle introduced to parts of each property. Considerable emphasis will be placed on introducing the concept of "premises" as the basis for disease control and associated property management. A premise in this context is defined as an area of country which carries a relatively constant and defined population of cattle. This concept was developed as an eradication tool for the northern areas of Australia. In South Australia it will be used for monitoring purposes and should minimise efforts by property managers to comply with the disease surveillance procedures planned to limit the spread of any disease outbreak.

Following the elimination of all obvious infection, the Campaign will move into a phase of detecting infection not readily apparent for one reason or another. This work began with the use of improved tests such as the ELISA test, the testing of young animals for TB and brucellosis, use of age culling and testing after calving. These procedures have already helped to detect infection not found by conventional disease eradication techniques. In addition, regular sampling of cattle will continue wherever abattoir monitoring appears inadequate so ensuring any outbreak of disease is detected quickly. This will allow owners the opportunity to use testing methods rather than be forced to destock newly

infected mobs of cattle. Such testing will be carried out in good seasons and will be arranged to coincide with normal management practices such as mustering to brand or truck sale cattle.

Strenuous efforts will be made to ensure that disease breakdowns do not occur. It must be accepted that no biological system can be under perfect control and that breakdowns could occur. A computer data base is to be constructed using a new microcomputer and appropriate software. This will allow rapid access to all records of a property or premise relevant to a disease breakdown, including test results and cattle movements. Owners will continue to be made aware of the risks. Regular contact during surveillance testing will help keep the problem in front of producers. Other extension methods will be employed to keep producers alert to the dangers including the continued use of the extension methods previously employed, especially regular publication of the Northern Cattlemans News and the conduct of producer meetings.

A program to assist owners to regain productive capacity will be developed in full as the testing phase declines. The use of the BTBEP model to examine alternative management strategies has already been discussed. The aim of the continuing extension program is to identify management areas that may allow alternatives to traditional management to be implemented with minimum disruption during the reconstruction phase of the campaign. This will be done by demonstration wherever possible, including the use of practices such as cross breeding and weaner segregation, which have not been seriously tried in this part of South Australia. The awareness and adoption of these plans by producers will be assisted by improving the range of skills available within the region by appointing other staff as the requirements for veterinary officers and stock inspectors declines and by instituting training programs to improve the ability of the remaining stock inspectors to provide advice outside their present area of expertise. The development of smaller yet more productive herds, with better supervision and control than was previously possible is the ultimate objective of these plans.

11. CONCLUSION

The adoption in 1975 by the cattle industry and government of proposals to commence the eradication of brucellosis and accelerate the tuberculosis eradication campaign led to a reappraisal of the management of the campaign in South Australia's pastoral areas. The transfer of responsibility for the pastoral area campaign to Port Augusta resulted in the progressive development of the administrative and technical procedures necessary to effect eradication.

Although little visible progress was made prior to 1980, the management structure developed and the experience gained, allowed rapid implementation of the Approved Program system of administration following the substantial taxation concessions provided in the 1980 budget. A determined effort by the team of officers located in Port Augusta resulted in the development of a rapport with producers resulting in the changes in cattle management required to allow sophisticated disease control procedures to be applied.

Northern Region officers have assisted property managers to develop programs for eradication best suited to individual needs. An awareness of the adverse effects eradication could have on property viability led to a range of procedures to aid owners and protect their investment in the campaign. Because of high disease prevalences owners generally preferred to reduce the size of their herds by destocking rather than by entering into long and expensive testing programs with no guarantee of success. Procedures to facilitate this option were developed, especially to protect introduced cattle following destocking. Although concern was expressed that cattle for restocking would be unavailable, owners persisted in the destocking approach using taxation concessions to provide a cash flow until restocking was possible. A severe drought caused some owners to totally destock rather than attempt to retain a herd nucleus, thus assisting the eradication of disease.

The interim aim of the campaign was to achieve Provisional Freedom for both diseases by 1984. This aim will be achieved in South Australia even though the area under consideration commenced the eradication phase with the highest prevalences for both diseases of any pastoral area in Australia. Although criticism has been directed at the procedures adopted, there is good evidence to show that the success of this campaign has resulted from the close cooperation of pastoralists and departmental officers and the application of economically and technically sound principles of disease eradication.

12. ACKNOWLEDGEMENT

This review would not have been possible in the available time without the assistance of Mr. Butler, the Senior Clerk (BTB) who collated most of the statistics, the typists in the Port Augusta Office who typed the early drafts and the operators of the word processing facility in Adelaide.

The encouragement and assistance of the Chief Veterinary Officer, Dr Holmden, and Acting/Principal Veterinary Officer, Dr Wilson, was appreciated.

NORTHERN REGION STAFFING

The following officers have operated from the Port Augusta office during the period from 1976 and been associated with the campaign for eradication of tuberculosis and brucellosis. The numbers indicate the percentage of time spent in the region while the classifications and titled are those which applied for the major portion of time. Asterisks indicate current staff.

Name	Class	Title	1976	1977	1978	1979	1980	1981	1982	1983
Giles W.G.	AA2	AHA	100	100	50	-	-	-	-	-
Barry G.J.D.	AT1	SI	100	100	100	100	100	100	100	100*
Taylor C.J.	VO2	VO	100	100	100	100	-	-	-	-
Matthews D.J.	AT1	SI	100	100	100	100	100	100	100	100*
Curtis D.J.	CO1	CO	-	75	100	100	100	100	100	100*
Coverdale D.	AT1	SI	-	100	100	100	100	100	100	100*
Neumann G.B.	VO4	RVO	-	50	100	100	100	100	S/L	100*
Paige G.J.	AT1	SI	-	50	100	100	100	100	100	100*
Tabrett D.A.	VO4	RVO	-	25	75	-	-	-	-	-
Stevens G.	VO1	VO	-	-	75	100	100	50	-	-
McDonald D.	CO2	SC	-	25	100	100	100	100	100	100*
Fidler P.J.	CO1	CO	-	-	25	50	-	75	100	100*
Hack W.R.	AA3	RAHA	-	-	-	50	100	100	100	25
Curran G.C.	VO2	SVO	-	-	-	50	100	100	100	100*
Tolson J.W.	VO2	SVO	-	-	-	25	100	-	-	-
Stanley M.J.	AT1	SI	-	-	-	100	100	-	-	-
Hughes G.J.	AT1	SI	-	-	-	-	100	100	-	-
Heron J.M.	AT1	SI	-	-	-	-	100	100	100	100*
Trengove C.T.	VO1	VO	-	-	-	-	100	100	-	-
Coffey R.L.	AT1	SI	-	-	-	-	50	100	25	-
Fabian G.R.	AT1	SI	-	-	-	-	50	100	100	100*
Thomas N.R.	VO1	VO	-	-	-	-	-	50	100	100*
Anderson M.L.	VO1	VO	-	-	-	-	-	50	100	100*
Vandegraaff R.	VO4	RVO	-	-	-	-	-	-	100	-
Cock T.C.	AT1	SI	-	-	-	-	-	-	50	100*
Joseland T.M.	AT1	SI	-	-	-	-	-	-	25	100*
Van Wijk J.	VO1	VO	-	-	-	-	-	-	25	100*

BTB ERADICATION PROGRAM

Northern Region : BTBEP Model Example

	NUMBER	%DIED	SOLD	PURCHASED	RETAINED	%BRANDED
CALVES	675	3	147	0	506	
HEIFERS	100	7	50	0	43	60
COWS	3550	6	547	0	2803	69
BULLS	73	4	8	10	72	
STEERS	1550	3	349	0	1155	
HERD	5948	5	1100	10	4579	69

YEAR 0 SALES

	NUMBER	UNIT	SALES GROSS	HEAD	FREIGHT GROSS	COMMISSION %	GROSS	NET
1.CALVES	147	75	10988	5	733	8	879	9376
2.HEIFERS	50	150	7500	25	1250	8	600	5650
3.COWS	547	280	153020	35	19128	8	12242	121651
4.BULLS	8	350	2800	45	360	8	224	2216
5.STEERS	349	300	104550	30	10455	8	8364	85731
HERD	1100	254	278858	29	31925	8	22309	224624

YEAR 0 PURCHASES

	PURCHASES			FREIGHT		
	NUMBER	UNIT	GROSS	HEAD	GROSS	NET
1.CALVES	0	20	0	5	0	0
2.HEIFERS	0	180	0	25	0	0
3.COWS	0	300	0	30	0	0
4.BULLS	10	800	8000	45	450	8450
5.STEERS	0	0	0	30	0	0
HERD	10	800	8000	45	450	8450

YEAR 0 LEDGER

	Sales - Cattle	278858	2	Sales - Noncattle	0
3	Destock Income	40673	4	Sales - Assets	0
5	Investment Icome	0	6	Other Cash Income	0
	Purchase - Bulls	8000		Purc -Other cattle	0
	Freight - Cattle	32375		Comm. - Cattle	22309
11	Wages - Permanent	35000	12	Wages - Casual	0
13	Mustering - Contract	0	14	Mustering - Aerial	0
15	Fuel	23000	16	Sundry Equipment	1250
17	BTB Testing Charges	0	18	Stock Requisites	2500
19	Repairs - Improvement	7000	20	Repairs-Plant & Veh.	9000
21	Stores	750	22	Freight - Noncattle	0
23	Registration& Insurance	6500	24	Rent,Rates,Taxes	5500
25	Other Overheads	0	26	Living Expenses	0
27	Interest	0	28	Loan Repayments	0
29	Capital - Yards	20000	30	Capital - Fencing	40000
31	Capital - Water	10000	32	Capital - Plant&Veh.	10000
33	Depreciation	0	34	Accountnacy Charges	5000
35	Income Tax	0		Destock Brought Fwd	0
	Cash Income	238185		Destock Carried Fwd	40673
	Cash Expenses	238184		Balance Brought Fwd	0
	Balance for Year	1		Balance Carried Fwd	1

PROGRAM FOR THE ERADICATION OF TUBERCULOSIS AND BRUCELLOSIS ON UPSON DOWNS STATION

OWNER : P.D. & L.K. Smith
P.M.B. 31,
PORT AUGUSTA, 5710
South Australia

POSTAL ADDRESS : G.P.O. Box 9999,
ADELAIDE, 5001
South Australia

MANAGER : A. Stockman

MINUTES forming ENCLOSURE to ..... *No.* *19*

FOR ENQUIRIES REFER
M .....
Phone: .....

TO: CHIEF VETERINARY OFFICER

PROGRAM FOR THE ERADICATION OF TUBERCULOSIS AND BRUCELLOSIS FROM UPSON DOWNS STATION

1. BACKGROUND

1.1 Property Summary

Upson Downs Station is a large lease (no. 321) of 12,000 sq km located in the far north of South Australia. There are large areas of country that are periodically inundated from the several large creeks which flow through the property, with a resulting growth of thick lignum scrub and a legacy of many permanent long lasting waterholes. This country is very difficult to muster and has been a major limitation to the previous establishment of a program. The north west corner of the property has an area of thick mulga and witchitie bush. Following the good rains in 1974 much of the floodout country has been covered by heavy coolibah and acacia scrub. The flats and sandhills provide good growth of grasses after local rains and floods while to the east of the Mullins Creek a large areas of Mitchel grass country lies but cannot normally be utilized due to lack of water.

Some internal fencing was constructed in the past to enclose horse and bullock paddocks but most of it is in a poor state of repair. The owners have made plans to construct new subdivisional fencing, however this has not yet been commenced. The property relies on water holes in the floodout country and along the creeks although only one of these is a permanent water. There are additional waters established away from the floodout country consisting of 10 equipped bores and 15 dams. The recognised maximum carrying capacity of the property is 13,000 head with annual turnoff and branding depending upon seasons. The property is now carrying about 7,000 head reflecting the effects of the recent drought.

This property is owned by L.D. & P.D. Smith and has been managed by A. Stockman since August 1961. It was totally destocked in 1968 and restocked, unfortunately with infected cattle as there was no disease control program in operation at that time. Normal movement of cattle off the property is south down the Eyre Track to the railhead, a route which crosses two other heavily infected properties.

1.2 Brucellosis and Tuberculosis Eradication Campaign History

Upson Downs Station has a long history of infection with brucellosis and tuberculosis which is most likey related to it lying on a major stock route, the infection of surrounding properties and to environmental factors which favour survival and spread of disease. The first recorded T.B. testing

was in 1970 when 374 head were tested for 19 reactors (5.0%). In the intervening years spasmodic testing has been carried out depending upon seasonal conditions and the enthusiasm of management. The reactor percentage from testing for tuberculosis remains around 6% until 1974 when the property was first placed under quarantine (no. 9999).

In 1977 traceback to an abattoir in N.S.W. revealed 93 condemnations from 973 slaughtered a pecentage of 9.6%. In 1979 the condemnations dropped to 2.9% illustrating the great variability in prevalence of tuberculosis throughout the property with the small localised areas of serious infection.

Brucellosis was detected when the survey and traceback commenced with the percentage in breeding cattle sampled at abattoirs rising from 0.5% in 1974 progressively to 14.5% in 75/76 and to over 20% in 1980. The property was placed under brucellosis quarantine no. 999 on the 1st October 1979.

A number of SAGRIC officers have been involved with Upson Downs Station during the last ten years. Little progress was possible until 1978 when greater assistance could be given in assisting the management to consider the options for disease control. Over the last 12 months discussions between various departmental officers and the manager have occurred. The program as outlined in this document is the result of the previous discussions and negotiations and specific discussions on 12th September 1980 with stock inspector T. Jones and the D.V.O.

1.3 Summary of Program

The eradication of brucellosis and tuberculosis on Upson Downs Station will be accomplished by concentrating the testing effort on weaner heifers and depopulating remaining cattle. This approach is considered most appropriate after considering the initial disease prevalence, the availability of paddocks and yards, and the mustering difficulty of the major part of the property.

The destocking order (copy attached) outlines the basic requirements of this program. More specific details are included below and will be built upon and specified in greater detail as the operation proceeds.

1.4 Current Facilities

The property is ring fenced and subdivided into one large area of 500 sq km on the eastern side and two smaller paddocks of approximately 80 and 120 sq km at the bottom end. An old drafting yard at Billys Swamp services these bottom paddocks.

Some segregation fencing exists between Upson Downs and Blue Gum Station to the east mainly to control the access of cattle to waterholes along the Mullins Creek and Smiths River. A paddock at the top swamp was washed away in 1974 floods and it is planned to replace this.

The remainder of the run has a horse paddock at the station encompassing a good set of yards while there are 14 sets of bronco yards scattered over the property.

2. TESTING PROGRAM

It is understood that paddocks should be mustered clean of all non test cattle prior to the commencement of the initial test or before tested cattle are released into them.

It is further understood that musters of test cattle must be as complete as possible. All tested cattle are to be individually identified with Allflex eartags by departmental staff, tagging will be serially numbered for heifers and will be red in colour.

2.1 Heifers

* A maximum of 400 female cattle less than 2 years of age at first test will be tested and held in isolation in the testing paddock.

* Testing should begin on these as soon as fencing and condition of the females allows.

* Testing for brucellosis and tuberculosis will involve a minimum of two whole herd tests a year.

* Heifers may be added to the paddock in groups providing no more than 6 months elapses from the first to the last of such groups.

2.2 Steers

* Steers may be temporarily retained providing they will be less than 6 years of age at first test and they are unsuitable for sale at the time of muster.

* Testing of steers will commence as soon as fencing and condition of stock allows.

* Test interval will be a minimum of 60 days.

Providing a regular testing schedule is maintained there should be no difficulty in achieving disease free status by 1984.

3. DESTOCKING TIMETABLE

The company has organised detailed truckings to October 1980 for 5,220 head of cattle to move south to the railhead and then for slaughter at Gepps Cross. The balance of the sale cattle will be removed by June 30th 1981.

Following this date a period of at least 6 months will be required to mop up the outside country. A flood of the Mullins River during the next 18 months could seriously delay this process or heavy rain would have a similar effect.

Following advice from the company that all musterable cattle have been removed and stragglers destroyed, the department will provide assistance to ensure that the destocked area is completely free of cattle. It is important that restocking of the outside country does not commence until the neighbouring areas are clear of all cattle.

4. DROUGHT CONTINGENCIES

Action that could be considered include

* Vaccination with Reduced Dose Strain 19 of the females held in isolation.

* Reduction of numbers of females by pregnancy diagnosis to remove non-pregnant animals.

* Movement of test heifers to the Thompson paddock or agistment elsewhere.

* Movement of steers on test providing tuberculosis is reduced and a clean test obtained promptly.

In the long term numbers could be reduced in tested groups by selling off steers, removal of passenger cows and removal of weaners and running them on the station bore.

Flood waters do not present any real problem in the testing area, however major flooding of the Mullins could be a threat to the continued isolation of the clean herd. The effect of this could be reduced by vaccination of all breeders and ensuring that the maintenance of the boundary fence is a top priority.

The conditions for continuing approval for the program through a period of drought should be readily achieved. Thus available concessions should apply to all tested groups and their off-spring, that is market access and concessions under Section 75C.

5. OTHER CONSIDERATIONS

5.1 Release of Quarantines

Quarantines for both T.B. and brucellosis will be released when all cattle in the program have completed 2 clean (no reactors) tests at not less than 180 days (6 month) intervals. Removal of cattle or carcases from Upson Downs without prior approval is a breach of quarantine and the approved program will be cancelled if the quarantine is breached. Taxation concessions will cease when the program approval is withdrawn and cannot be reinstated.

5.2 Check Test and Continued Surveillance

A check test will be completed for each disease 12 months after the release of the Quarantine.

Further monitoring of the disease status of Upson Downs will be by abattoir traceback and (survey testing at the discretion of the Regional Veterinary Officer). Survey testing will be used where the percentage slaughtered of any identifiable group falls below 6% in any year. If this becomes a necessity all such testing will be planned to fit in with normal management practice.

5.3 Security of Tested Groups

Maintenance of isolated groups is accepted by management as a top priority.

Constant check on the groups to keep them behind fences is seen as essential.

Regular inspection of fences and removal of untested cattle is necessary for early eradication of both diseases. Departmental officers will be expected to play an increasing role in checking fences and in ensuring that all cattle movements comply with current departmental policy.

5.4 Future Movements off Upson Downs

Following the release of quarantines, movement of store cattle will be permitted provided such movements comply with whatever testing requirements are in force at the time.

It is likely that initially a free test for both diseases would be required until the area status of the district has been declared provisionally free which would remove the need for any movement testing.

Where movement testing is necessary it will be charged to the property unless it occurs concurrently with other eradication tests.

6. FACILITIES REQUIRED

6.1 Fencing

It is proposed that 2 paddocks together with holding paddocks be erected in the North West corner. This will fence off the two bores in the Mulga country below Bluegum station and joining the Susie Downs clean side.

Coombs Paddock

Approximately 20 miles of fencing required. The fence is to commence on the boundary near the main road, go south to the station horse paddock then in a north west direction to the boundary. Total distance approximately 20 miles. A holding paddock fence of approximately 8 kilometres is required to fence off the dam in the southern corner. Total 40 kilometres. To be completed by 30th December, 1981.

Hawkes Paddock

Approximatley 12 miles of fencing required from the south west corner of the station horse paddock westerly to the boundary. A holding paddock requiring approximately 10 kilometres of fencing to enclose the corner near Smith bore. Total 28 kilometres. Both these paddocks to be completed by 31st December, 1980.

Fence Construction

Eight strains per kilometre
Star droppers each 45 feet apart
Two steel spacers between stars
Three barb wires

Estimated cost including substantial line clearing is $800 per kilometre.

6.2 Yards

Coombs Bore

Trap and holding yard 40 x 80 yards divided into two 40 x 40 yards
Construction : Railway iron posts, top rail and rural mesh.
Cost approximately $4,000

Hawkes Bore

Same as above

Gregs Swamp

Drafting and testing yards, all steel.

See accompanying map for details of existing and proposed improvements.

6.3 Summary of additional fencing and yards required

Coombs paddock and holding paddock	40 kilometres	$32,000
Hawkes paddock and holding paddock	28 kilometres	$20,400
Hawkes Yard		$ 4,000
Gregs Swamp - Drafting yard		$20,000
		$80,400

7. AGREEMENT

I agree with Tom Jones, that this document is an accurate statement of the
(SAGRIC REP)
proposed program on Upson Downs Station and that I will assist to the best of my ability to ensure that brucellosis and tuberculosis are successfully eradicated.

Signed .....

Witness .....

Approved / Not Approved .....

REGIONAL VETERINARY OFFICER

Appendix 4.1

APPROVED PROPERTY PROGRAMME

PROGRESS SUMMARY TO 31st DECEMBER, 1982

PROPERTY NAME .....TAIL TAG NO.....

OWNER ..... QUARANTINE NO'S

TB ..... DATE .....

ADDRESS ..... BR ..... DATE .....

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OFFICER REPORTING ..... DATE .....

1. WEATHER

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Effect of weather on progress .....

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2. FEED AND WATER CONDITIONS - NOVEMBER 1982

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3. a) OUTLINE OF APPROVED PROGRAMME

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3. b) PROGRAMME CHANGES IN 1983

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4. DESTOCKING

* Original Estimate of surplus cattle .....
* No. of cattle trucked under permit .....
* Estimate of cattle destocked .....
* Estimate of cattle yet to be destocked .....
* Location of these cattle .....

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* Programme date for final destocking .....
* Has an extension of time been granted for final destocking ? Yes No

  Extended Deadline Date .....
* Expected time of final destocking .....
* Problems forseen in straggler removal .....

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** Will Departmental assistance be required Yes No

** If Yes what kind .....

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** Will an aerial inspection be necessary .....

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** How many hours estimate - Fixed Wing .....

- Helicopter .....

5. PROGRESS WITH TESTING

5.1 Brucellosis

5.1.1 Summary of Programme .....

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No. of mobs planned? .....

No. of mobs under test? .....

5.1.2 Traceback 1982 No. of Breeders Monitored .....

No. of Positives ..... % .....

% of Breeders monitored 1982 .....%

5.1.3 Test History under Programme - See Computer Printouts (Attached)

5.2 Tuberculosis

5.2.1 Summary of Programme .....

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No. of mobs planned? .....

No. of mobs under test? .....

5.2.2 Traceback 1982 No. Slaughter cattle monitored .....

No. of positives .....% .....

% of total cattle monitored 1982 .....%

5.2.3 Test History under Programme - See Computer Printouts (attached)

6. PROGRESS WITH FENCES AND YARDS

6.1 Summary of Original Improvement Programme

Fencing .....km Total Cost $ .....

Holding paddocks (No.) ..... Total Cost $ .....

Trap Yards (No.) ..... Total Cost $ .....

Testing Yards (No.) ..... Cost $ .....

Total of Original 75C Request $ .....

6.2 Additions or Alterations to Improvement Programme 1983 (Nil ☐)

Describe .....

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Were there extra costs involved Yes ☐ No ☐

If Yes, what was the amount of extra 75C request ? $ .....

6.3 Attach a map of the property showing fences, yards and holding paddocks :

- present at end of 1981
- completed during 1982
- still to be completed

6.4 Comments on standard of fences at present: .....

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6.5 Comments on standard of fence maintenance by management: .....

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6.6 If the fencing and yard building programme is not completed give reasons :

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Expected time of completion .....

6.7 Comments on testing Facilities : .....

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6.8 How many additional watering points have been provided since commencement of the Programme ? .....

Please indicate these on map

Are any more waters proposed ? .....

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6.9 Please include your suggestions for further improvement of testing and security facilities on this property : .....

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7. MANAGEMENT OF PROGRAMME

7.1 Mob Security - General Comments .....

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7.2 Standard of Mustering - General Comments .....

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7.3 Management of Waters and Feed .....

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7.4 Availability and Quality of station labour .....

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7.5 Record any changes of Manager or size of labour force in 1983 :

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7.6 Your comments on current economic status of cattle enterprise

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7.7 Comment on current Management attitude to BTEC : .....

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8. MAJOR PROBLEMS LIMITING PROGRESS OF BTEC : .....

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9. PROPOSALS FOR PROBLEM SOLUTION : Please include suggestions for programme change ideas on owner/manager education, change of testing strategies or restocking proposals where appropriate.

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10. VETERINARY OFFICER COMMENT

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11. SENIOR VETERINARY OFFICER COMMENT :

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Appendix 5.1

DRAFT DESTOCKING ORDER - UPSON DOWNS STATION

Mr. A. Stockman,
Upson Downs Station,
PMB 31,
PORT AUGUSTA, 5710
South Australia

1st July, 1980

Dear Sir,

RE: TUBERCULOSIS AND BRUCELLOSIS ERADICATION
UPSON DOWNS STATION

Following discussions between yourself, Tom Jones and Joe Peterson, I am writing to confirm the destocking requirements in connection with eradication of brucellosis and tuberculosis on Upson Downs Station.

As of the 1st July, 1908 the programme will be :-

1. Compulsory destock of cattle from the property to reduce the number of cattle to a maximum of 400 heifers less than 15 months of age at first test, and 1500 steers, less than 6 years of age and in unsaleable condition; all those remaining to be confined in paddocks by 31/6/82.

2. Destocking to this level is to be completed by 31/12/82 and all cattle to be retained are to be confined and held, pending inspection of the property by departmental staff. All "stranger" animals found on this inspection are to be removed.

3. Subsequent to the completion of such destocking, numbers of cattle on the lease are to be maintained at or under 2,000 head until resulting testing confirms the cattle to be free of disease.

4. The testing program which will involve all retained cattle in two tests for tuberculosis and brucellosis during 1982, is to be commenced as soon as fenced areas become available or by 31/12/81.

5. A minimum of two herd tests annually for both brucellosis and tuberculosis is required on any retained cattle until two negative herd tests at a minimum of 6 months interval are achieved.

6. Spelling of the destocked areas for a period of not less than 60 days after the last cattle are removed.

7. Regular inspection and repair of the fences at least monthly to ensure the area is, and remains free of cattle.

8. Advice to the Regional Veterinary Officer, Port Augusta, when the sixty days or other determined period has elapsed so that aerial and/or ground inspection can be undertaken to ensure no cattle remain on destocked areas.

9. Prior permission must be obtained for introduction of any stock to the property.

   Any cattle which are introduced shall be tuberculosis and brucellosis free, as certified by the Chief Veterinary Officer of the State or Territory from which they originate, and may require a free mob test before movement onto Upson Downs.

   All such cattle must be identified with an approved eartag prior to arriving on the lease.

10. Any "stranger" cattle found on the property at any time shall be removed as soon as practical after detection, and regular searches will be made for such animals. The detection of "strangers" must be reported to the Regional Veterinary Officer, at Port Augusta, so their prescence can be accounted for in preparing the disease eradication program.

11. The Upson Downs herd will be certified as a tuberculosis and brucellosis free herd by Departmental Officers provided they are convinced that every effort is made to maintain the herd as free by constant repair and regular inspection of the fence, removal of any strangers as soon as possible, reporting the same, and continuing evidence that disease is not present.

The meeting of these requirements is seen as essential to the early establishment and maintenance of brucellosis and tuberculosis free status for your property.

Yours faithfully,

(John H. Holmden)
CHIEF VETERINARY OFFICER

c.c. P.D. & L.K. Smith
R.V.O. Pt. Augusta

PASTORAL RESTOCKING PROGRAM

PROPERTY SITUATION REPORT - 1983

STATION NAME : ..... DATE OF INTERVIEW .....

OWNER : ..... INTERVIEWING OFFICER .....

MANAGER : .....

RESTOCKING DEADLINE (36AAA) .....

1. OWNER'S ESTIMATE OF TOTAL NUMBER OF CLEAN CATTLE REQUIRED .....

2. TYPES OF CATTLE REQUIRED (heifers, cows, steers, bulls) WITH APPROXIMATE NUMBER AND BREED OF EACH :

   HEIFERS : ..... BREED .....

   COWS : ..... BREED .....

   STEERS : ..... BREED .....

   BULLS : ..... BREED .....

3. APPROXIMATE DURATION OF PROPOSED RESTOCKING PHASE : .....

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4. OWNERS PREFERRED SOURCES OF CLEAN CATTLE :

   PRIVATE SALES .....

   OPEN MARKET .....

   INTERSTATE .....

5. HERD STATUS REQUIRED : .....

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6. SECURE ISOLATION AREAS AVAILABLE NOW FOR INTRODUCED CATTLE (describe areas below and indicate on map)

   PADDOCK NAME : ..... SIZE .....

   CARRYING CAPACITY : .....

APPROXIMATE DURATION OF AVAILABLE FEED AND WATER : .....

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PADDOCK NAME : ..... SIZE .....

CARRYING CAPACITY : .....

APPROXIMATE DURATION OF AVAILABLE FEED AND WATER: .....

.....

PADDOCK NAME : ..... SIZE .....

CARRYING CAPACITY : .....

APPROXIMATE DURATION OF AVAILABLE FEED AND WATER : .....

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7. PURCHASE PRICE AND OTHER ECONOMIC CONSIDERATIONS : .....

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8. BEEF MODEL (BTBEP)

REQUIRED : .....

USED : .....

RESULTS : .....

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RESTOCKING

DETAILS OF CATTLE INTRODUCTIONS

STATION.....TAIL TAG .....

PROPERTY OF ORIGIN OF INTRODUCED CATTLE.....

..... TAIL TAG.....

NUMBER OF CATTLE TO BE INTRODUCED: - COWS .....

HEIFERS .....

BULLS .....

STEERS .....

AREA / PADDOCK CATTLE ARE TO BE INTRODUCED INTO .....

MOVEMENT DATE .....

OWNER/AGENT ORGANISING MOVEMENT ..... PH. NO. .....

EARTAGS USED FOR INTRODUCED CATTLE : -

COLOUR ..... NUMBERS.....

PLIERS ISSUED

OFFICER .....

DATE .....

RECEIVED

Form 1 .....

Instruction .....

Test Results .....

Actual number of cattle sent

Cows ..... Bulls .....

Heifers ..... Steers .....