

# Supplementation of Beef Cattle using Water Medication

*A Producer's Guide to the Application and  
Use of Water Medicators for Beef Cattle*

Project number NBP.220

Report prepared for MLA by:

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## **ABSTRACT**

The project involved extensive discussions with a large number of cattle producers, research and extension staff and equipment and supplement suppliers across northern Australia to determine the extent and current state of knowledge of the application of water medication technology for beef cattle. Concurrently, a scientific Literature Review on the technology was undertaken, and a draft Producers Guide on Water Medication was prepared, designed to assist producers wishing to use the technology.

Arising from this project, a series of recommendations have been made to MLA in relation to areas of future research on aspects of water medication.

It is anticipated that once available, the Producers Guide on Water Medication will become a valuable reference and resource for both current and new users of this technology.

## **EXECUTIVE SUMMARY**

Discussions between the Western Queensland Regional Beef Research Committee and MLA on future industry research needs, led to a recommendation to review the use and application of water medication technology in the northern Australian beef industry, and to commission the production of a Producers Guide on water medication. In addition, MLA sought a scientific review of all relevant published information on water medication, and requested that after widespread consultation with industry, the review team make recommendations on any future research in relation to water medication.

The project involved visits and discussions with over 110 individuals and organizations with interests in or involvement with water medication technology in the northern beef industry. These included cattle producers, research and extension staff in public and private sector agencies, equipment and supplement manufacturers and suppliers and agents, and some consulting groups involved in water quality and livestock nutrition areas.

The literature review highlighted the fact that while nutrient supplementation via the water was seen as a cheap and effective means of supplementation of grazing cattle, there was relatively little published information on the factors influencing successful use of the technology, nor was there extensive information on responses to the technology under commercial conditions. These factors meant that the review was not a traditional scientific literature review, but rather a combination of relevant published information, together with considerable anecdotal information from producers using water medication.

The review also included a section on a range of operational issues that need to be considered by producers interested in adopting water medication as a management tool particularly for delivering non-protein nitrogen, sulphur and phosphorus supplements. The review concluded that water medication technology is not for all producers, but has wide potential application in those situations where control of watering points is possible, where water quality is suitable or can be modified and improved, and where management is adaptable and conscientious. Water quality issues; quantifying optimal urea levels for production when used in water medication; evaluation of recently developed or newly promoted supplements including slow release commercial liquid supplements and amino acids, and better definition of water intake patterns were areas identified from the literature review as requiring further research.

The draft Producer’s Guide to the application and use of water medicators for beef cattle included sections on frequently asked questions on water medication; a brief overview of ruminant nutrition; factors influencing water intake, and levels of intake; assessment of water quality; water medication technology and equipment; supplements; some do’s and don’t’s of water medication; a series of 4 case studies outlining successful and unsuccessful applications of water medication in northern Australia; a general conclusions section and some further reading lists. The written guide was supported by tables and figures and a large number of photographs illustrating various aspects of water medication use on commercial properties across northern Australia.

Recommendations made to MLA in relation to future research in relation to water medication are outlined in full in Appendix 1, but in brief included:

- Research on a range of water quality issues to ensure more effective utilisation of water medication technology
- Supplement evaluation
- Survey of water intake patterns
- Early dissemination to industry of outcomes of any further research on aspects of water medication.

## **MAIN RESEARCH REPORT**

### **Background to project and the industry context**

Nutritional supplementation to enhance production or to supply specific limiting nutrients is a widely used management tool across broad sections of the industry and the literature on supplements and traditional supplementation techniques and strategies is voluminous.

Animals have to drink water, and they do so in amounts relative to their size. Knowing this, a number of producers and scientists developed the idea that if supplements could be incorporated in water, then they would be consumed at the correct levels by all animals that drank the treated water. This approach was first tried in the 1970's. The technology used then was not consistently reliable, as there were occasional mortalities with urea-based supplements, due to excess urea being added to the water. In other cases there was poor performance when some crude forms of phosphorus supplements were fed using these early water medicators. These problems led to a loss of interest by many producers in the supply of nutrients through the water.

In the last 10 years however, a number of more reliable and safer water medicators have been developed for administration of soluble nutrients in the water. Better or more appropriate supplements have also been identified. Consequently where water sources can be controlled, producers have successfully installed water medicators to provide critical limiting nutrients to grazing cattle. The adoption of this technology has not been widespread, not only because it is not suitable for all situations, particularly where water is of poor quality, but also because of concerns by many producers regarding safety, reliability and costs of water medication equipment.

Discussions between the Western Queensland Regional Beef Research Committee and Meat and Livestock Australia on future industry research needs, led to a recommendation to review the use and application of water medication technology in the northern Australian beef industry, and to commission the production of a Producers Manual on water medication.

In addition to preparation of the Manual, the project involved a scientific review of all relevant published information on water medication, and development of recommendations to Meat and Livestock Australia regarding future research in relation to water medication.

### **Project Objectives**

BY JUNE 2004:

Undertake a literature review of the use of water medication technology in the Australian beef industry.

Produce a booklet on the use of water medication aimed at producers in the northern beef industry, suitable for publication by MLA.

Produce a booklet on the use of water medication aimed at producers in the northern beef industry, suitable for publication by MLA.

## **Detailed Methodology**

The literature review involved scanning both library and web-based sources of information on water medication, including an earlier water medicator review partly commissioned by MLA (Hirst 1996). The literature review highlighted the fact that while nutrient supplementation via the water was recognised as a cheap and effective means of supplementation, there was relatively little published information on factors influencing successful use of the technology, nor was there extensive information on responses to the technology under commercial conditions. These factors meant that the review was not a traditional scientific literature review, but rather a combination of relevant published information, together with considerable anecdotal information from producers using water medication.

An extensive series of visits and discussions were undertaken with over 110 individuals and organizations with interests in or involvement with water medication technology in the northern beef industry. These included cattle producers, research and extension staff in public and private sector agencies, equipment and supplement manufacturers and suppliers and agents, and some consulting groups involved in water quality and livestock nutrition areas. Within the major cattle raising areas where it was known that water medication was used, an attempt was made to visit or to discuss issues with 3-4 producers in each region and this objective was largely achieved. In order to standardise the information collected a proforma record sheet was developed, and this was modified slightly when used with other groups such as R&D staff, and equipment and supplement manufacturers and suppliers. These proformas are shown as Appendices 2 and 3.

Following discussions with MLA staff regarding content of the Producers Guide, information from the discussions with producers and others, together with information from the literature review was then incorporated into a draft Producers Guide, the broad contents of which are shown in Appendix 4. Earlier drafts prepared by the consultants, were then passed to a specialist extension writer, who made editorial suggestions and changes with a view to making the publication more easily readable by the target audience. Additional editorial comments and suggestions provided by MLA staff were also incorporated into the document.

Finally a series of recommendations for future research in relation to water medication were developed arising from the extensive discussions held with producers and others with interests in water medication.

## **Results and Discussion**

The consultants believe that the methodology adopted has resulted in the production of a Producers Guide that will be of value not only for new or potential users of water medication, but also for those already using the technology.

Many years of research and practical producer experience in northern Australia has given us a good understanding of the benefits of urea and P and of potential hazards with urea. This information and experience has been successfully translated and applied to water medication, but legitimate concerns regarding urea toxicity have constrained many producers from adopting water medication. These can be minimised, but not entirely eliminated, by some of the practices and techniques outlined in the Producers Guide.

The basic philosophy behind supplying critical limiting nutrients through water medication is sound, since supplement intake is directly related to water intake. Water medication is now being used successfully by many commercial producers, but comparatively speaking, the technology is in a relatively early phase of development, and success depends upon a number of factors:

- *Control of water supplies.* Water medication will have limited application in situations where uncontrolled surface waters are the major water source for cattle.

- *Water quality issues*, which were the major factor identified by a large number of producers. These issues are important not only for medicator use, but also because suitability of water has a major impact on supplement delivery and on cattle productivity.
- *Developing better water modification strategies* than presently available. While some modification techniques such as magnets have reasonably good track records, they have proved ineffective in some situations. Alternative strategies and techniques need to be tested for their practicality and cost.
- *Identifying, developing and evaluating better supplement components* than are presently available
- *Competent expertise in management* and monitoring of equipment, and mixing of nutrients. Water medication has and will only be successful in the hands of those producers prepared to understand and commit to water medication.
- *Having good information on seasonal variations in nutritional status, and on water intakes*, will assist selection of appropriate supplement rates for expected levels of water intakes, to optimise production responses.
- *Preparedness to vary water medication levels* according to changes in seasonal conditions, and status of stock being supplemented.
- *Routine equipment maintenance* and replacement of component parts is essential, and independent variations and modifications to equipment or supplement formulations should be avoided as these can prove to be disastrous.

There are a number of new developments in the pipeline

- Equipment manufacturers are putting in place a range of technological improvements to their equipment to enhance reliability and safety.
- Advances in remote sensing technology, and incorporation of sensing devices in medicators are likely to further enhance safety aspects. Remote sensing will provide the capacity for rapid shut down of equipment in the event of component failures, and enable routine monitoring of water supplies and water storage facilities, However it should never be seen as a replacement for routine monitoring of water facilities, pastures and livestock.
- A number of new products are claimed to provide a better source of slow release N and to reduce toxicity hazards, but there is no good objective evidence to support these claims.

Water medication has many potential benefits, but there are also some disadvantages. The Producers Guide should help potential users to make decisions on whether this form of supplement delivery is suitable for their individual operations. In particular, some of the experiences, tips and traps documented in the manual and in the case studies may be of assistance should water medication be the chosen delivery method.

### **Success in achieving objectives**

All objectives of the project were achieved. Copies of Milestone reports 1 and 2 are attached as Appendices 5 and 6.

### **Impact on Meat and Livestock Industry-now and in five years time**

The cost-price squeeze in the northern beef industry will continue. Many producers using strategic supplementation strategies as part of routine herd management of breeders and growing cattle are examining ways to reduce supplementation costs but maintain optimal production levels. Where water supplies can be controlled, suitable quality water is available or water quality can be improved or modified and producers are prepared to commit the time and effort to monitoring of water medicators, then water

medication offers an alternative avenue for strategic supplementation. Regardless of which type of water medication formulation is used, supplement costs are generally lower than other supplementation strategies such as dry licks or blocks.

However in situations where water supplies cannot be controlled, water quality cannot be improved, or levels of management are low, then increased application of the technology will be limited. There are also legitimate concerns regarding urea toxicity that have constrained many producers from adopting water medication. Ongoing improvements in equipment, the development of efficient remote sensing equipment, testing and evaluation of newer less toxic forms of supplements and more extensive objective evidence of the benefits of supplementation via water medication are all factors likely to lead to more widespread adoption of water medication in sections of the north Australian beef industry over the next 5 years.

### Recommendations

The recommendations to Meat and Livestock Australia in relation to future research on aspects of water medication were developed following extensive discussions with a large number of cattle producers, research and extension staff and rural consultants across northern Australia. They are prioritised on the basis of these discussions and on the professional judgement of the project consultants and are presented in full as Appendix 1. The major broad areas identified were:

- 1. Water quality issues** were the most important area requiring further work, to ensure more effective utilisation of water medication technology..
- 2. Supplement evaluation** was an area identified by a number of producers as needing further work
- 3. Water intake patterns** need to be better defined.

It is important that outcomes from any further research by MLA on aspects of water medication should be quickly communicated to industry. It is the viewpoint of the consultants that many producers, whilst interested in adopting the technology, are still hesitant about safety issues, and constrained by lack of objective independent advice on water medication.

### Bibliography

The Literature Review contains a full bibliography of over 60 scientific and technical papers on the use of water medication as a management tool and on various aspects of nutritional supplementation of beef cattle.

The draft Producer’s Guide contains a Further Reading Section (Section 10) subdivided into some general reference material, and some selected scientific and technical papers on water medication and nutritional supplementation. Section 2 of the Producers Guide (Brief Overview of Ruminant Nutrition) was drawn heavily from relevant sections of the recent MLA EDGENetwork NUTRITION EDGE Workshop Notes.

### Appendices

- Appendix 1. Recommendations to MLA in relation to future research on aspects of water medication
- Appendix 2. MLA Water Medication Project-question proforma for producers
- Appendix 3. MLA Water Medication Project-question proforma for non-producers
- Appendix 4. Contents of Producers Guide
- Appendix 5. Milestone Report 1.



Appendix 6. Milestone Report 2.



## Appendices

### Appendix 1

Recommendations to MLA in relation to future research on aspects of water medication

The recommendations that follow have been developed following extensive discussions on water medication technology with a large number of cattle producers, research and extension staff and rural consultants across northern Australia. They are prioritised on the basis of these discussions and on the professional judgement of the consultants for this project.


**1. Water quality issues** were the most important area requiring further work, to ensure more effective utilisation of water medication technology. Specific areas suggested include:

- An in-depth **literature review of all aspects of water quality** likely to be related to efficient delivery of livestock supplements through the water, with emphasis on possible relevant information and opinions from domestic water treatment publications.
- Research directed towards **pH management of water** including areas such as: determining optimum pH and ‘alkalinity’ levels for efficient water medication, and is this effected by water temperature; quantitative effects of reducing pH on water consumption and loss of urea; effectiveness of acids currently being used to reduce pH, and determining what are the interactions with other salts.
- Studies to **define the conditions under which magnets work** satisfactorily, and how they give positive improvements in water quality
- Technical evaluations to determine how **physical parameters** for example depth and length of pipelines, concentrate tank colour and type, effect water quality and efficiency of supplement delivery
- Objective assessment of the **effects of algae and bacteria** on water quality, water intake and supplement delivery efficiency, including identification of organisms that have significant effects on water quality
- Objective assessment of the effect of dissolved oxygen levels and aeration techniques on water quality and supplement delivery efficiency
- Research on **interactions between excessive levels** of ions, metals, metalloids, algae and bacteria on water intake, production levels and the application of water medication technology.

**2. Supplement evaluation** was an area identified by a number of producers as needing further work

- Quantifying **optimal urea levels for production** when used in water medication, with emphasis on growth responses in steers (to avoid confounding factors when working with breeding cattle).
- Undertake objective, independent and well managed **research** on mode of action, and production advantages (if any) for more **recently developed or promoted supplements** for use in water medication, such as methionine and other amino acids, slow release commercial liquid supplements, and any possible new energy sources.
- Encourage research leading to the development of new NPN supplement formulations of lower toxicity than urea.

**3. Water intake patterns** need to be better defined.

- 
- A **field survey** should be undertaken of producers using water medication to better establish water intake levels and patterns and frequency of watering. A range of factors need to be taken into account, including seasonal and locational variations, genotype and class of cattle effects, and relationships of intake to water quality.
  - This project could be undertaken with coordination from groups such as Rural Consulting Services who already encourage clients to record such data, and who could easily access information on water intake.

It is important that outcomes from any further research by MLA on aspects of water medication should be quickly communicated to industry. It is the viewpoint of the consultants that many producers, whilst interested in adopting the technology, are still hesitant about safety issues, and constrained by lack of objective independent advice on water medication.

**Appendix 2.**

**MLA Water Medication Project- Questions - Producers (Proforma)**

**Date:**

**Property name:**

**Owner:**

**Interviewee (if different from owner):**

**BACKGROUND INFORMATION FOR WHOLE PROPERTY AND AREAS BEING MEDICATED**

**1. Location, land type, pastures, rainfall**

- 1.1. Location
- 1.2. Dominant land type (eg Mulga, Brigalow, Downs, Forest, Gulf Savannah, Desert/Spinifex etc)
- 1.3. Dominant pastures (eg Mitchell/Flinders; Speargrass, Buffel, Spinifex, topfeed)
- 1.4. What is the land type and the pasture where the medication is used?
- 1.5. Average annual rainfall/distribution

**2. Cattle/operational Statistics**

- 2.1. Type of operation (breeding; grow-out, finishing; combination)
- 2.2. Genotypes
- 2.3. Herd size and composition (including breeder numbers if applicable)
- 2.4. No / % of herd on water medication
- 2.5. What type of cattle being medicated, ie breeders, heifers, weaners, steers, and why?
- 2.6. Breeder management strategies (eg seasonal/continuous mating; weaning practices; bull/cow replacement strategies)
- 2.7. Performance statistics (branding rates, turn-off numbers/rates, turn-off weights, mortalities) ????
- 2.8. Responses to water medication (estimated or determined?) on growth, reproduction, reduced dry-season mortalities, cf cattle not being supplemented or on other forms of supplemented. If the whole herd is medicated, are they comparing to the performance of other herds in the district?

**3. Rangeland management information.**

- 3.1. Stocking rates for general property and water medication areas (if they are different).
- 3.2. Seasonal variations in pasture quantity and quality

- 3.3. Pasture management strategies (eg cell grazing; strategic burning; pasture spelling) for general property and water medication areas (if they are different).
- 3.4. Management effects on pasture sustainability
- 3.5. Water point numbers and distribution on paddock basis for general property and water medication areas (if they are different).

## **INFORMATION PARTICULARLY RELEVANT TO WATER MEDICATION**

### **4. Water information**

- 4.1. Water sources (eg artesian, sub-artesian, other bores, pumped ground water)
- 4.2. Water quality information (eg analyses, pH, other data)
- 4.3. Problems with water quality that affects water medication?
- 4.4. Monitoring water pH, any pH modification strategies eg acidification.
- 4.5. Use of in-line magnets to change water composition/quality
- 4.6. Water distribution systems to troughs (eg pumped; gravity fed through line/from tanks)
- 4.7. Water lines (poly/galv; pipe size)
- 4.8. Water tanks (plastic/fibreglass/galv/earth turkey nest; tank sizes)
- 4.9. Daily water intakes by season; by class of stock, how measured, and how often?)

### **5. Water medication history and technology**

- 5.1. How long in use and why was it installed?
- 5.2. Cost of installation?
- 5.3. Type of equipment used (brand, mechanical, electronic, power supply)
- 5.4. Any modifications to commercial equipment?
- 5.5. Equipment set-up (eg gravity fed, in-line, other)
- 5.6. Sources of advice (eg other users, suppliers/agents, DPI, others)
- 5.7. Quality and reliability of advice
- 5.8. Monitoring procedures (eg frequency of checking; remote sensing/telemetry checking). Data recording?
- 5.9. What tools used (eg pH meter, water meters to measure consumption, remote sensing)
- 5.10. Management of cattle on water medication (hungry/thirsty cattle, newly introduced cattle)
- 5.11. Most common problems/breakdowns/hazards found (if not covered previously)
- 5.12. Mortalities experienced, or perceived risk of mortalities? How do you reduce the risk (if not covered previously)?

**6. Supplementation Strategies**

- 6.1. Duration of water medication (eg dry season only, continuous-P supp, trace minerals)
- 6.2. Types of water medication supplements used (eg urea, P, trace minerals, combinations)
- 6.3. Source of supplements (eg home made, purchased as prepared supplements). Quality and consistency of supply?
- 6.4. Supplement composition (eg tailor-made for property?- on what rationale?)
- 6.5. Seasonal changes in supplement composition?
- 6.6. Concurrent dry-lick supplementation (eg urea blocks, P dry licks), and, if used, why?
- 6.7. Total nutrients delivered to cattle (if known), ie total P and total N, as compared to requirement of the class of cattle being fed?
- 6.8. Supplementation costs and any comparative figures on dry lick supplements. Cost benefit – performance compared to cost (if known)
- 6.9. Any other comments related to water medication, supplement or technology?

**7. Future needs**

- 7.1. Will you continue to use technology?
- 7.2. What should be in Producers guide
- 7.3. What are most frequently asked questions (and answers)
- 7.4. What type of educational programs needed to increase adoption rates, and who should provide this (suppliers? DPI? MLA? others)
- 7.5. What future R&D is needed for Water medication technology
- 7.6. Is this technology suitable to all producers?

**Appendix 3.**

**MLA Water Medication Project- Questions non-producers (Proforma)**

**Date:**

**Business name:**

**Owner:**

**Interviewee (if different from owner):**

**1.Introduction**

1.1.How long have you been involved with water medication and what is your primary objective?

**2.Location, land type, pastures, rainfall**

2.1.What rural areas have you predominately been involved with water medication?

**3.Cattle/operational Statistics**

3.1.What are the average size and productivity of the producers you deal with?

3.2.Is there any commonality in the producers that use water medication?

**4.Water information**

4.1.Water sources (eg artesian, sub-artesian, other bores, pumped ground water)

4.2.Water quality information (eg analyses, pH, other data)

4.3.Problems with water quality that affects water medication?

4.4.Monitoring water pH, any pH modification strategies eg acidification.

4.5.Use of in-line magnets to change water composition/quality

4.6.Water distribution systems to troughs(eg pumped; gravity fed through line/from tanks)

4.7.Daily water intakes by season; by class of stock, how measured, and how often?)

**5.Water medication history and technology**

5.1.Cost of installation?

5.2Type of equipment used (brand, mechanical, electronic, power supply)

5.3.Sources of advice (eg other users, suppliers/agents, DPI, others). If you are the advice, how often (on average) do you have to visit / talk to producers about the water med?

5.4.Quality and reliability of advice

5.5.Most common problems/breakdowns/hazards found (if not covered previously)

**6. Supplementation Strategies**

- 6.1. Advantages of supplementing through water?
- 6.2. Source of supplements (eg home made, purchased as prepared supplements). Quality and consistency of supply?
- 6.3. Supplement composition (eg tailor-made for property?- on what rationale?)
- 6.4. Seasonal changes in supplement composition?
- 6.5. Supplementation costs and any comparative figures on dry lick supplements. Cost benefit – performance compared to cost (if known)
- 6.6. Any other comments related to water medication, supplement or technology?

**7. Future needs**

- 7.1. What should be in Producers guide
- 7.2. What type of educational programs needed to increase adoption rates, and who should provide this (suppliers? DPI? MLA? others)
- 7.3. What future R&D is needed for Water medication technology
- 7.4. Is this technology suitable to all producers?
- 7.5. Other contacts?

## **Appendix 4**

### **Contents of Producers Guide**

#### **SECTION 1. Background**

- Introduction
- Some frequently asked questions on water medication

#### **SECTION 2. Brief Overview of ruminant nutrition**

- Digestive system structure and function
- Nutrients (water, energy, protein, minerals and vitamins)
- Role of supplements in managing nutritional deficiencies
- Supplementation techniques and options
- Non-Protein Nitrogen (NPN) supplements

#### **SECTION 3. Water intake by grazing cattle**

- Factors influencing water intake
- Water intake levels

#### **SECTION 4. Assessing Water Quality**

- Importance of assessment of water quality
- Water sampling
- Water quality measurements
- Major ions of concern for livestock drinking water quality
- Organic contamination of water
- Heavy metals and metalloids
- Other minerals
- Mechanisms for modifying or improving water quality

#### **SECTION 5. Water Medication Technology and Equipment**

- Some background on water medication
- Advantages and disadvantages of water medication
- Who can or should use water medication
- How medicators work



- Potential hazards of water medication caused by technical and equipment problems
- Calibration of equipment and calculations of supplement requirements
- Currently available equipment, suppliers and current prices

**SECTION 6. Supplements**

- Background to current supplement usage through water medicators
- Advantages and disadvantages of various N, P and S supplements and of home made v prepared mixes
- Other products used through water medicators
- Which mix to use
- Cost comparisons with other forms of supplements
- Responses of grazing animals in northern Australia to NPN, S and P supplements

**SECTION 7. Some do’s and don’t’s of water medication**

- Points to consider
- Common problems with medicators

**SECTION 8. Case Studies**

- Case Study 1. “Politic”, Aramac, CW Queensland
- Case Study 2. “Kalang”, Gulugaba, Sth Queensland
- Case Study 3. “Weetalaba”, Collinsville, Nth Queensland
- Case Study 4. “Alcoota”, Alice Springs, Northern Territory

**SECTION 9. Conclusions**

**SECTION 10. Further reading**

**SECTION 11. Acknowledgements**

**Appendix 5.**



**Milestone Report**

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MLA project code: **NBP.220**

MLA project title: **WATER MEDICATION – A PRODUCERS GUIDE**

Project leader: **KEITH ENTWISTLE**

MLA project manager/coordinator: **PETER LONERAGAN**

Milestone number: **1**

- Milestone:**
- 1.1 Literature Review completed
  - 1.2 Consultation with MLA and Industry stakeholders undertaken.
  - 1.3 Case Studies identified and documented
  - 1.4 Draft Layout of booklet completed
  - 1.5 Meeting with MLA held to review draft layout of booklet.

**Abstract**

A first draft of the literature review has been completed, and is about to be re-edited before the final version is submitted to MLA.

Extensive consultations have been undertaken with stakeholders, including 55 producers who use, or have used the technology, 22 extension and advisory staff in public and private sector agencies, 6 equipment suppliers and supplement manufacturers and 11 R&D personnel (Total contacts 94).

Approximately 18 additional telephone contacts have yet to be completed.

An *earlier version* of a list of contacts by contact type and by regional area has been provided to MLA, and is attached as an appendix.

A number of producers commented that ideas interchanged during visits and discussions with the project team were very helpful, that they saw the exercise by MLA as valuable, and that the production of a booklet was a good step forward, particularly for new users. Comments received on the project from other stakeholders were also generally positive.

Two proposed case studies have been identified and partly documented.

A Draft layout of the booklet has been completed and submitted and comments and suggestions received from MLA will be incorporated.

A meeting was held with MLA in Mid-April to review the project and draft booklet contents, with a further meeting scheduled for May 18.

### ***Project objectives***

BY JUNE 2004:

- Produce a booklet on the use of water medication aimed at producers in the northern beef industry, suitable for publication by MLA
- Identify any gaps in knowledge and information on water medicators and their use and make recommendations for future R&D.

### ***Success in achieving milestone***

- 1.1. Approximately 95% completed, with minor re-editing of Draft to be done. Anticipated completion May 14,2004.
- 1.2. Approximately 90% completed with some telephone contacts yet to be done. Anticipated completion May 14.
- 1.3. Case study documentation approximately 75% completed. Anticipated completion May 14. (See note under recommendations)
- 1.4. Completed and MLA suggestions incorporated
- 1.5. Completed with next meeting scheduled for May 18, 2004.

### ***Overall progress of the project***

Overall the project is generally on track with an estimated time lag of 2-3 weeks. There were unforeseen delays in completing some discussions with producers in North and NW Queensland and the NT due to weather constraints, and a minor delay resulting from some electronic problems in forwarding reporting templates. Producers (water medication users) in 12 regional areas of the northern industry have been interviewed. The project team are confident that this very extensive level of contact, and that with other stakeholders, has resulted in a detailed appreciation of the technology, which will enable a booklet to be developed which incorporates a wide level of industry experience. Recommendations from these discussions for future research will reflect those areas identified by industry as relevant.

**Recommendations**

- Because of delays identified above, the project team request a minor modification to the schedule of the project, for a final completion date of June 30.
- Additional agenda items for the meeting with MLA on May18, should include
  - Final Booklet preparation schedules
  - Extension writer inputs
  - Discussion on case study approach v summation of outcomes of producer discussions. Alternatively, should a summary of the results of the producer questionnaire be included in the Appendix?
  - Communication strategies for project
  - Future research
  - Strategies for feedback to manufacturers and suppliers
  - Michael McKellar’s Nuffield scholarship to study water medication in Europe!!!??? Any other relevant current Australian research projects that MLA is aware of, eg AFFA sponsored study of citric acid?
  - Confirmation / clarification of the exclusion of producer (weaners) and feedlot use of the technology to distribute electrolytes.

**Appendix 6**



## **Milestone Report**

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MLA project code: **NBP.220**

MLA project title: **WATER MEDICATION – A PRODUCERS GUIDE**

Project leader: **KEITH ENTWISTLE**

MLA project manager/coordinator: **PETER LONERAGAN**

Milestone number: **2**

- Milestone:**
- 2.1 Booklet completed
  - 2.2 Final report addressing the project objectives.
  - 2.3 Budget report

**Abstract**

The draft booklet has now been completed and submitted together with figures, tables and photographs to MLA. A majority of the editorial comments made by Dr G Niethe have been incorporated into a revised draft that has been forwarded to MLA.

The final version of the Literature Review has also been submitted to MLA, together with a list of recommendations for further research in areas related to water medication.

The final report and budget report has been forwarded including this milestone report.

Due to other commitments, the consultants were unable to meet with MLA staff in July to discuss the project, but will participate in a workshop meeting convened by MLA in September where this and other northern nutrition projects will be discussed.

Dr Entwistle has been asked to participate in a Beef Plan forum in Rockhampton in October and to address delegates on the outcomes of the project.

### ***Project objectives***

BY JUNE 2004:

- Produce a booklet on the use of water medication aimed at producers in the northern beef industry, suitable for publication by MLA
- Identify any gaps in knowledge and information on water medicators and their use and make recommendations for future R&D.

### ***Success in achieving milestone***

2.1 Booklet completed and submitted to MLA on July 4, together with Final Copy of Literature Review and recommendations for future research.

2.2 Completed and forwarded with this milestone report.

2.3. Completed and forwarded with this milestone report.

### ***Overall progress of the project***

The project achieved all milestones resulting in completion of a draft booklet entitled “Supplementation of Beef Cattle using Water Medication” “A Producers Guide to the Application and use of Water Medicators for Beef Cattle” .

In addition a comprehensive literature review on water medication technology entitled “Application of Water Medication Technology in the Australian Beef Industry” was also completed.

Arising from this project a series of recommendations to MLA in relation to future research on aspects of water medication were developed.

A Final Report and Budget report have been submitted to complete the Project.

### ***Recommendations***

Recommendations on future research have been forwarded to MLA.