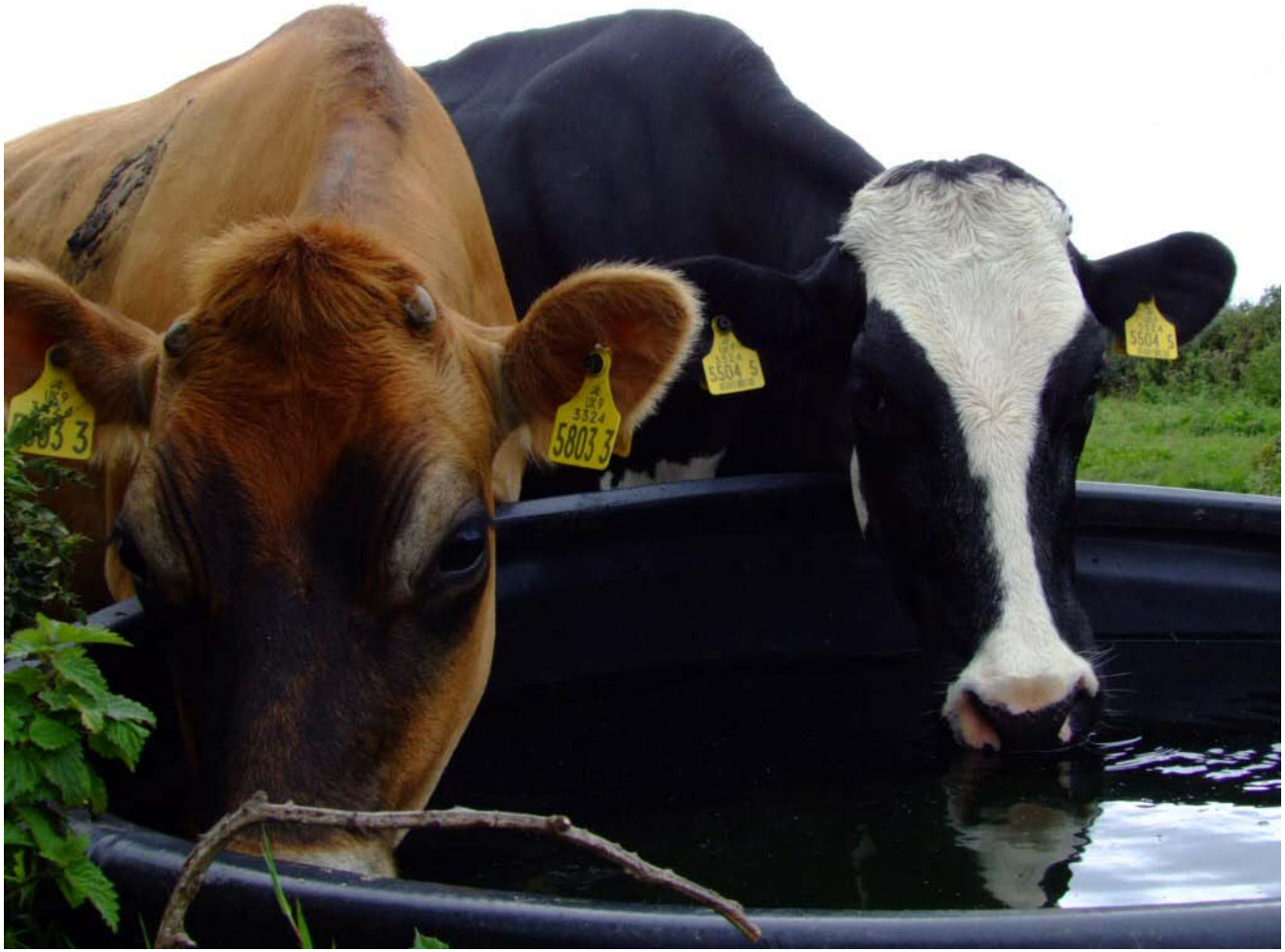


Coorong Tatiara Local Action Plan

We want our livestock to thrive, not just survive

Acknowledgements to Mark Towner and San Jolly

Managing Stock Water and Nutrients

Where are you located?

What is your enterprise?

What is your water supply?

What is your water quality like?

Is your water supply secure / viable?

We are dealing with the dual challenges of:

The security of your water supply

Managing your water quality

WATER INTAKES OF LIVESTOCK*	
Stock Type	**Litres/head/day**
Sheep - Weaners	2 - 4
- Dry Adult	2 – 6 (4 – 12 on Saltbush)
Ewes with Lambs	4 – 10
Cattle - Young Stock	25 - 50
- Dry Stock	35 - 80
- Cows & Calves	40 – 100 (70 – 140 on Saltbush)
- Dairy Milking**	70 - 250
Horses	40 - 50
Pigs - Growers (25 – 90 kg)	3 - 12
- Dry Sow, Boar	12 - 15
- Sow & Litter	25 - 45
Poultry (per 100 birds)	
- Layer Hens	33
- Meat Birds (1-8 wks)	6 - 32

* Intakes will vary depending on type of feed, production level, physiological and environment conditions, and salt content of feed and water.
** Dairy operations may require up to another 100L/head/day for washdown & hygiene.

Source PIRSA FS No. 02/07

What is Good Water?

- Clean
- Clear
- Odourless
- Without a high mineral content
- Palatable
- Without Toxins

- Salinity levels acceptable
- Nitrate - <1500 mg/l
- Sodium Chloride - <1.3%
- Magnesium - < 400 mg/l
- Sulphate – 2000 mg/l

What is Water Used For?

Water is required for:

- Normal metabolic functioning
- Blood Circulation
- Digestion
- Temperature Regulation
- Excretion & Elimination
- Protein & Energy Metabolism
- Lactation

What is Good Water Quality

- Where do Livestock get water from?
  - Primarily through
    - Drinking
    - Digestion of Feedstuffs
  - Intake Varies due to:
    - Species/Breed
    - Environment
    - Age, Stage of Lactation
    - Feedstuffs

SALINITY LEVELS ACROSS THE COORONG DISTRICT COUNCIL AREA (bores and wedges are point source test results)		
TOLERANCE OF LIVESTOCK TO SALT IN DRINKING WATER		
LOCATION	**Livestock Production can begin to decline**	
EC = electrical conductivity ppm = parts per million	**EC**	**ppm**
SA Water Mains – Tintinara 01.04.2015	**401**	**261**
Lake Albert – Historical Range pre 2006 - published 2014 - DEWNR	**1500 - 1800**	**960 - 1152**
Lake Albert – Meningie Jetty 27.03.2015	**2500**	**1600**
Hundred of Richards Bore 19.03.2015	**4220**	**2710**
Dairy Cattle (lactating)	**4600**	**2944**
Lactating ewes, weaners	**6000**	**3840**
Horses	**6200**	**3968**
Beef cattle	**6200**	**3968**
Hundred of Kirkpatrick Bore 01.04.2015	**6940**	**4460**
Hundred of Richards Bore 27.08.2014	**7300**	**4672**
Sheep on dry feed	**9200**	**5888**
Hundred of Colebatch - Wedge Hole 27.08.2014	**9300**	**5952**
Hundred of Colebatch - Wedge Hole 27.08.2014	**12,000**	**7680**
Lake Albert – Meningie - February 2010 - EPA Data	**23,000**	**1472**

Salinity Units

Be careful, there are a lot of different units. This causes confusion.

- Grains per gallon g/g
- Parts per thousand ppt
- Parts per million ppm
- Milligrams per litre mg/l
- EC units (electro conductivity) EC
- Micro siemen per cm mS/cm
- Milli siemen per cm uS/cm
- Deci siemen per m dS/m
- Specific gravity

Water Quality is lowered by:

- Soluble Salts
- Algae
- Pollution
  - (chemicals, dead animals, birds faeces or debris),
- Bacterial Contamination
- Clay in Suspension
  - (turbidity)

These contaminants may cause animals to:

- Refrain from Drinking
- Go off their Feed
- Reduce Bodyweight Gain
- Reduce Feed Efficiency
- Lose Condition
- Reduce/Stop Lactating
- Abort Young
- Die from Disease or Toxicity
- Nitrates – reduced oxygen in the blood

Effect of low water quality on livestock production

- Decreased dry matter intake
- Increased energy demand
- Reduced microbial activity
- Increased rate of rumen throughput – bypass protein
- Initial ‘water gain’ vs weight gain

Water Quality Assessment by you

- Visual Inspection
  - Colour/Clarity
  - Bubbling/Haziness
- Smell
  - Odours/Putrification
- Touch
  - Hardness/Sliperyness
  - Residues
- Taste
  - Saltiness/Bitterness/Metallic

Be Cautious with these Methods

Water Quality Assessed Scientifically

Use of Test strips/sticks – pH, Nitrogen

Use of Electronic Meters - salinity, pH

Via Laboratory Assessment

Nutrient Advantage®

Knowledge | Productivity | Responsibility

www.nutrientadvantage.com.au

Water samples for salinity testing can be dropped at any Council Office *(need about 500mls)*

We do about 20 tests per week **pH?**

Laboratory Assessments

- Odours
- Salinity
- pH
- Turbidity
- Bacterial Load
- Macro Mineral Content
- Trace Mineral Content
- Toxins

How is Water Quality Assessed

Macro Mineral Content

Waterborne minerals such as mg/l of:

- Calcium (Ca)
- Phosphorus (P)
- Magnesium (Mg)
- Potassium (K)
- Nitrogen (N) Differing Forms
- Sulphur (S)
- Sodium (Na)
- Chloride (Cl)

How is Water Quality Assessed

Trace Mineral Content

Waterborne minerals such as mg/l of:

- Zinc (Zn)
- Copper (Cu)
- Manganese (Mn)
- Iron (Fe)
- Selenium* (Se)
- Aluminium (Al)
- Fluoride (Fl)
- Boron (Bo)
- Iodine* (I)
- Cobalt* (Co)
- Molybdenum* (Mo)
- Arsenic* (As)
- Cyanide* (Cy)

* Not normally tested

See Nutrient Advantage forms

Salinity Tolerance of Livestock

TOLERANCE OF LIVESTOCK TO SALT IN DRINKING WATER				
STOCK	PRODUCTION CAN BEGIN TO DECLINE		MAXIMUM Level	
	EC	ppm	EC	ppm
Beef cattle	6,200	3968	15,600	9984
Dairy Cattle (lactating)	4,600	2944	9,200	5888
Horses	6,200	3968	10,800	6912
Lactating ewes, weaners	6,000	3840	10,000	6400
Sheep, dry feed	9,200	5888	21,800	13,952

Source PIRSA FS No. 02/07

Impacts on Animal Health - Salinity

- Salinity effects of Livestock Performance are very well studied and reported.
- As salinity increases in the water supply the stock intake of water also increases.
- The following stock are the most sensitive to salinity:
  - Young Growing Animals
  - Pregnant and Lactating Females
  - Aged & Weakened Stock

Impacts on Animal Health - Salinity

- Excess Salt Intake Results In:
  - Ill Thrift
  - Poor Immune Response
  - Poor Feed Conversion Efficiency
  - Low Weight Gains
  - Poor reproduction
  - Scouring/Diarrhea
  - Reduced Wool Growth Rate
  - Fluid Retention
  - Udder Edema
  - Reduced Milk Yield
  - Lower Weaning Weights
  - Increased Heat Stress
  - Dehydration
  - Death

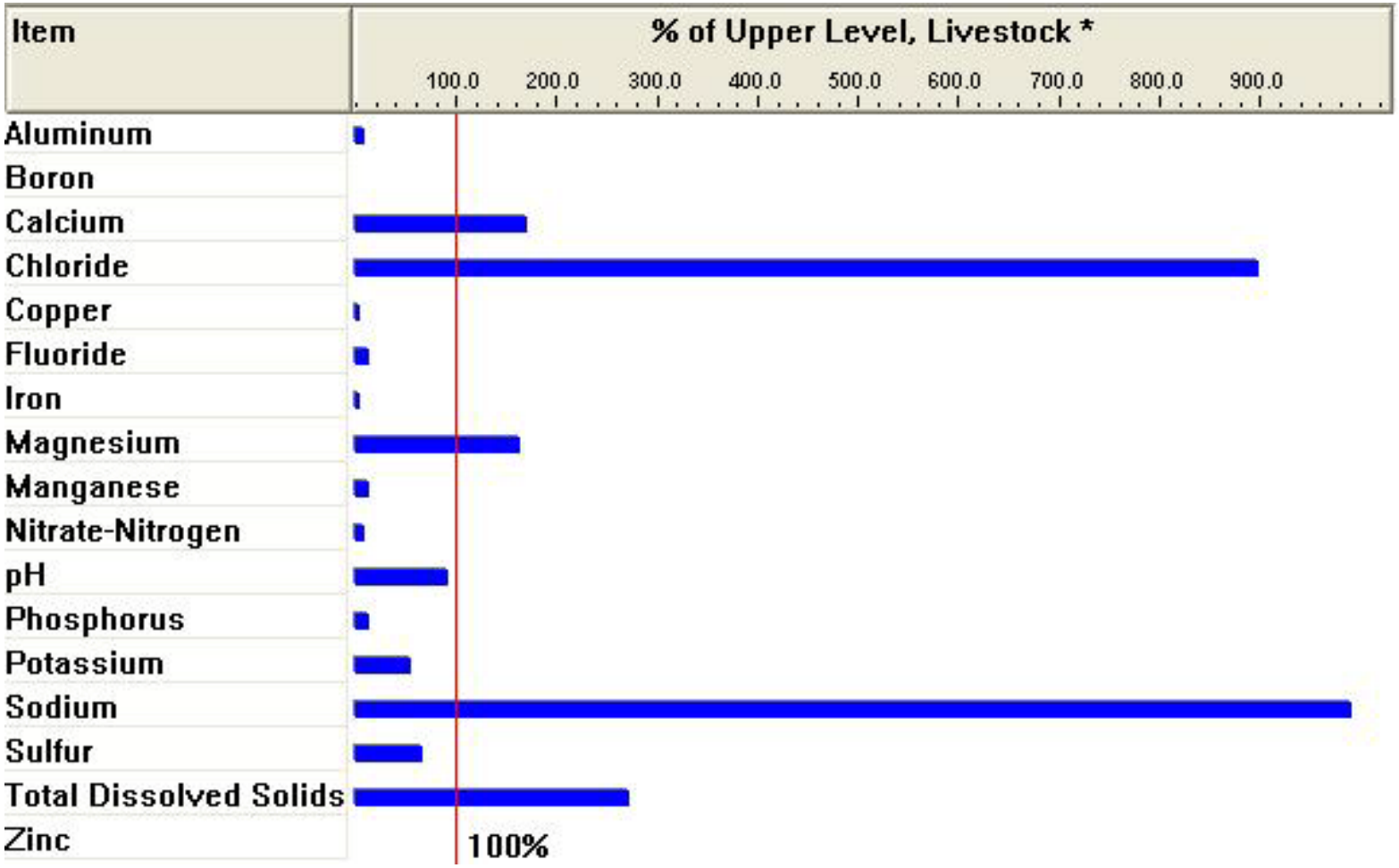
Variation in Water Quality

Upper South East Bore Water Samples 2007-8

- All examples run as if under beef feedlot conditions
- Assuming Finishing animals
  - 15kg DMI
  - Dietary Na 0.5%
  - Mean Weekly Max Temp 30 Celsius
  - 0 Precipitation
  - Predicted Water Intake 49.53l/hd/day

Examples of Variation in Water Quality

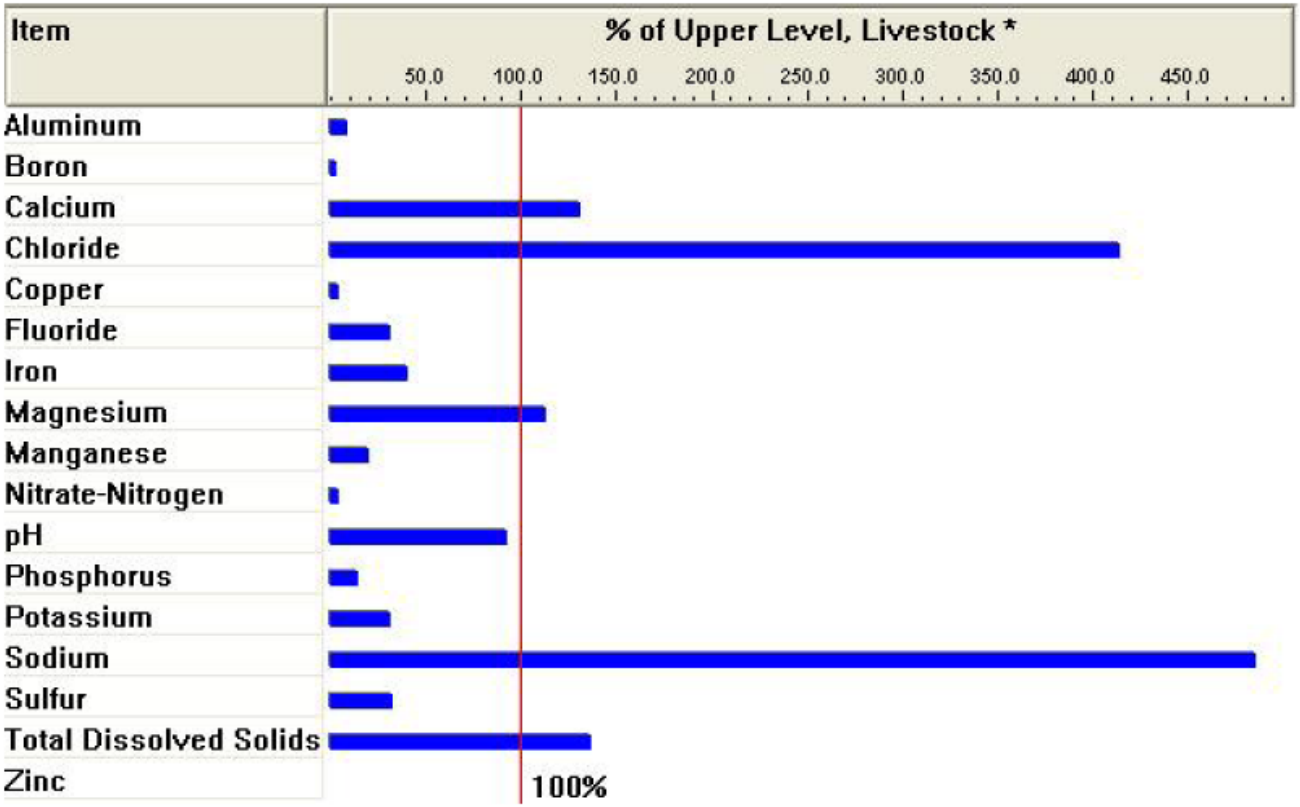
Mundulla SA 2007



Examples of Variation in Water Quality

Frances SA 2007

Mineral Amounts In Water as % of Upper Level, Livestock *

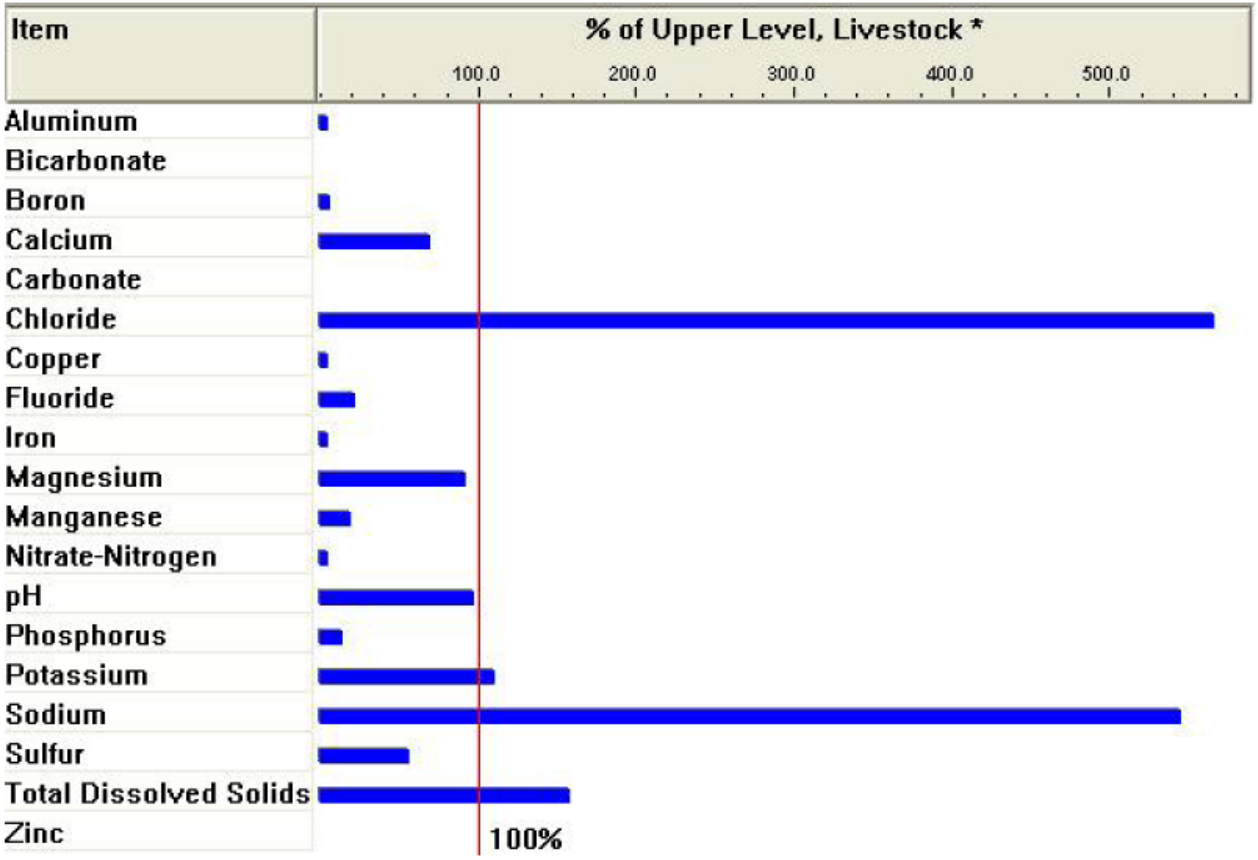


* Cattle consuming water exceeding these limits for these minerals may have reduced performance due to either taste, odor, appearance or mineral availability.

Examples of Variation in Water Quality

Tintinara SA 2007

Mineral Amounts In Water as % of Upper Level, Livestock *



* Cattle consuming water exceeding these limits for these minerals may have reduced performance due to either taste, odor, appearance or mineral availability.

Implications

Despite a wide geographical range:

- Each sample supplies between 4 & 10 times the maximum desired Sodium & Chloride levels.
- Calcium & Magnesium Levels were Elevated or greater than desired.
- Indications that the Mineral Levels in Bore Water are Increasing over time.

What does that mean here?

- The salinity impacts are widespread.
- Salt, Calcium, Magnesium and Iron are the key elements to watch in this area.
- Small elevations in Iron & Magnesium impact on taste - metallic - & reduces water intake by stock.
- Calcium and Iron interacts with and locks up trace minerals - such as: Cu, Mn, Zn and Co (Vit B12).
- This can impacts animal performance by:
  - compromising immune response
  - reduced Feed Conversion Efficiency/Average Daily Gain
  - reproduction effects
  - occasionally resulting ill thrift and death.

Managing low water quality

- Are you using salt licks? What is the salt content?
- Can the feed resources be changed?
- Can the enterprise mix be changed?
- Can the water source be diluted or changed?

Managing low water quality

- Can the water be shandied with another source?
- Do tanks need to be flushed out?
- New bore?
- *See the Water Security pull ups*