

## **Environmental Projects for Your Farm.**

Ross Digman - cane farmer, Tully, NQ .

This talk is heavily dependant on slides, so the following is really only a "background" paper. My approach when giving such a talk to canegrowers, has been to devote the first half to explaining why it is essential that an industry be seen to be environmentally sensitive. If you, the grower ( be it cane or cotton ) don't appreciate that need, you are not likely to listen with any degree of interest. I've heard Maree McCaskill, Executive Director of the Australian Cotton Foundation speak at a Canegrowers' conference, and imagine many of you are already aware of the public relations benefits of such an approach.

Never having visited a cotton growing area, you will appreciate that I have little knowledge of the natural characteristics of your country. It is consequently difficult to define specifically what environmental projects you may be able to undertake. Instead, I'll demonstrate what's being done on my sugarcane farm; detail some of the advantages that have become apparent; and leave it to you to decide if similar projects could be implemented on your properties.

John Watson, a cotton grower at Gunnedah, thought the lagoon I created in 1990 may have some application on his cotton farm. Interestingly, about twenty members of two conservation groups assisted with the planting of 500 trees around the perimeter of this lagoon. That alone demonstrates the public relations value of such an exercise.

John had seen my video titled "Rehabilitating Our Vital Wetlands" and expressed interest in the lagoon concept. I sent him some relevant information which should be of assistance in creating a lagoon of maximum environmental benefit. Copies of that video, and some more up to date information, are available to those interested.

I don't know if John has implemented anything as yet, however my lagoon may bear some similarity to pits you are installing for the purpose of recycling irrigation tailwater. Irrigation isn't undertaken on my property; ( with annual rainfall in Tully in excess of 4 metres you can understand why, ) however it is practised in other canegrowing areas. A few months ago, I was asked to give a talk to canegrowers in the Burdekin irrigation area to encourage them to plant trees around their recycling pits.

The recognition of the need to encourage canefarmers to actually implement environmentally beneficial works, no doubt stems from two factors. One is the need to meet government environmental standards, which are becoming more stringent. The other is that the sugar industry is currently undertaking an environmental audit, something the cotton industry undertook some years previously.

The findings of the sugar industry environmental audit are not available as yet, although it "should surprise" me if the final report describes the industry in the same glowing terms as does the Queensland Cane Growers' Council. The QCGC's policy has for years stated that the industry is **environmentally responsible, community caring and economically important**. It "should surprise" me because although a canegrower, along with a significant percentage of the community, I'm also a recreational fisherman, and therefore aware of the significant adverse impact farm drainage has had on wetlands which are vital to the survival of some fish species.

Only a basic understanding of ecological functions is necessary to appreciate the adverse effects of our operations. My industry has maintained for years it is environmentally responsible. However there is ample evidence to the contrary, and denying the obvious eventually achieves nothing more than a loss of credibility.

To maintain credibility we have to understand the adverse effects, acknowledge them, and take corrective measures.

The accompanying slides painted a pretty depressing picture for the environment, for the community who may utilize the area for recreational purposes, and for my industry which increasingly needs to be **seen** to be environmentally responsible if it is to survive in the long term.

Let's now look at some "Environmental Projects for Your Farm", and see what we can do to rehabilitate the environment in an agricultural area. Illustrated with slides of created lagoon - & production figures proving cost recovery in 3-4 years - timber tree plot, habitat tree plantings, riverbank stabilization.

Like many other canegrowers up and down the east coast of Australia, I've undertaken drainage and land levelling to increase my production. However, as a recreational fisherman I came to realize that these works were having a deleterious effect on wetlands on the Tully-Murray floodplain, which are vital nursery areas for barramundi, northern Australia's most sought after recreational fish species. Similar adverse impacts have occurred in many agricultural ( and some pastoral ) areas throughout Australia.

To compensate in a small way for this, I decided to excavate a lagoon. Excavation was undertaken in December 1990. The lagoon measures 152 metres in length, 35 metres max. width and 3.5 metres max depth of excavation . Cost - \$14,000 excluding tree planting around the perimeter. Perhaps surprisingly, this lagoon actually paid for itself in only 3 - 4 years.

#### **Excavated (created) wetlands versus impoundments.**

From an environmental perspective, there are major differences between excavated lagoons and impoundments. In the case of impoundments for example, the dam wall restricts native fish access. No such restriction exists in the case of an excavated lagoon ( on a floodplain ) provided the spoil is spread over adjoining land and is not used to create an embankment. Impoundments require surface run-off from a catchment. Excavated lagoons in this instance, are "window" lagoons, ie they are excavated into the existing watertable. Excavated lagoons are generally monumentally more expensive to create than impoundments of similar volumetric capacity.

#### **Created versus natural wetland - How they can compare in some instances.**

Like natural lagoons on the floodplain, my lagoon is inundated at least once every year, and aquatic life is free to come and go as it wishes. Qld Dept of Primary Industry-Resource Management fisheries biologists have electro-fished the lagoon and as of January 1995, had identified 14 species of native fish which had taken up residence. In an Environmental Assessment Study of the floodplain undertaken in 1994, the largest number of fish species found in any one natural lagoon was 17.

The foregoing indicates that widespread adoption of the "created" lagoon concept could go some way towards ensuring the biological diversity of floodplains, which are under continuing developmental pressures.

More information on lagoon creation is available in the paper "Conservation & Rehabilitation of Wetlands & Riparian & other Forest in a Tropical Agricultural Setting." Among other things, this paper deals with the **benefits** that can be derived from on farm lagoons including: utilizing excavated soil to raise or level floodprone farm land - need for less environmentally damaging drains - reducing habitat for rats - acts as silt trap etc - provides habitat for fish, birds and other wildlife - how it paid for itself - proposal for greater tax incentives for such works.

### **On farm re-forestation**

( This topic, and additional benefits and disadvantages, are discussed in greater detail on page 20 of the abovementioned paper.)

Re-forestation has a ( relatively well known ) role to play in :

- Lowering groundwater levels, thereby reducing the area of land lost to salination.
- Reducing soil loss through wind erosion.
- Reducing soil loss through water erosion.

Trees, additionally :

- May provide a source of income in the future, if suitable timber tree species are utilized. ( A form of superannuation for the property owner. )
- Make a property a far more pleasant place on which to work, ( although they may actually make some farming operations more difficult through trees interfering with machinery. )
- Root systems assist in stabilizing riverbanks.
- Provide shade which inhibits growth and spread of exotic/pest plants.
- Silt loads in the river decrease.
- Assists in maintaining a clearer, deeper stream, with pools and riffles instead of just a featureless drainage channel.
- Provides nutrients for fish and other aquatic and terrestrial wildlife.
- As mature trees fall into the river, additional fish habitat is created.
- Provides habitat for wildlife.

- Provides corridors by which wildlife, such as the endangered cassowary for example, may access isolated remnant forest areas.
- Aesthetically appealing.
- Provides a valuable recreational asset for locals and for eco-tourists.
- Ensures farm machinery will not be inadvertently driven over river and creek banks, with consequent possible loss of life.
- Reduces rate of outflow of floodwaters from rivers over adjacent agricultural land, thereby alleviating erosion to some extent.
- Improves drainage ability of natural watercourses through shade reducing growth of exotic grasses which would otherwise be capable of "choking" small streams and channels.
- Should be encouraged in lieu of levee banks, which may benefit one area, but aggravate flooding elsewhere.

Revegetation disadvantages include:

- May attract farm pests, such as sulphur crested cockatoos for example, which can eat considerable quantities of sugar cane. ( I've personally lost 200 tonnes in one season due to lack of surveillance while away on holidays.)

An additional advantage of undertaking environmentally beneficial on-farm works is that when conservationists can see a farmer genuinely trying to do the right thing, they tend to be more amenable to suggestions put forward by the farmer to overcome problems ( such as cockatoo damage to crops ) he may be experiencing.

As an example of this, I recently addressed the Northern Branches get-together of the Wildlife Preservation Society of Queensland - WPSQ. A segment of that talk dealt with the issue of cockatoo damage to sugarcane.

This, and the increasing difficulty in obtaining permits for cockatoo control, is a significant disincentive to farmers undertaking on-farm re-forestation. I advocated the trapping and sale overseas ( where the birds fetch \$25,000 a pair ) of perhaps 1000 sulphur-crested cockatoos. This may raise \$10 million, part of which could be utilized to reimburse farmers for crop damage.

This would simultaneously:

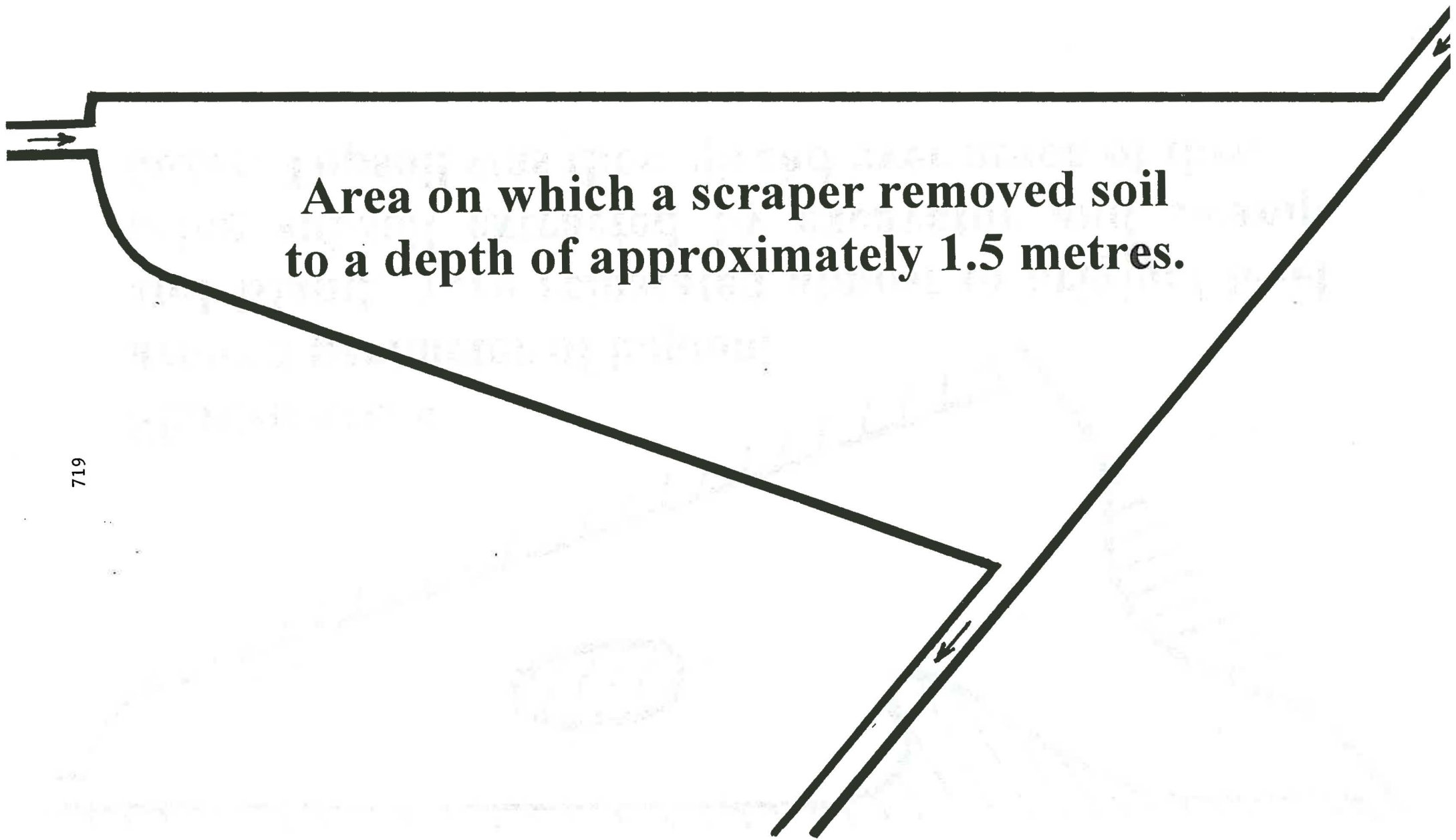
- ( i ) remove a major disincentive to farmers of planting trees.
- ( ii ) reduce the numbers of cockatoos shot by farmers protecting their crops.
- ( iii ) make illegal trafficking in the birds non-viable or less attractive, ( due to the market price falling dramatically ) thereby reducing the stress, suffering and death associated with smuggling of the birds.

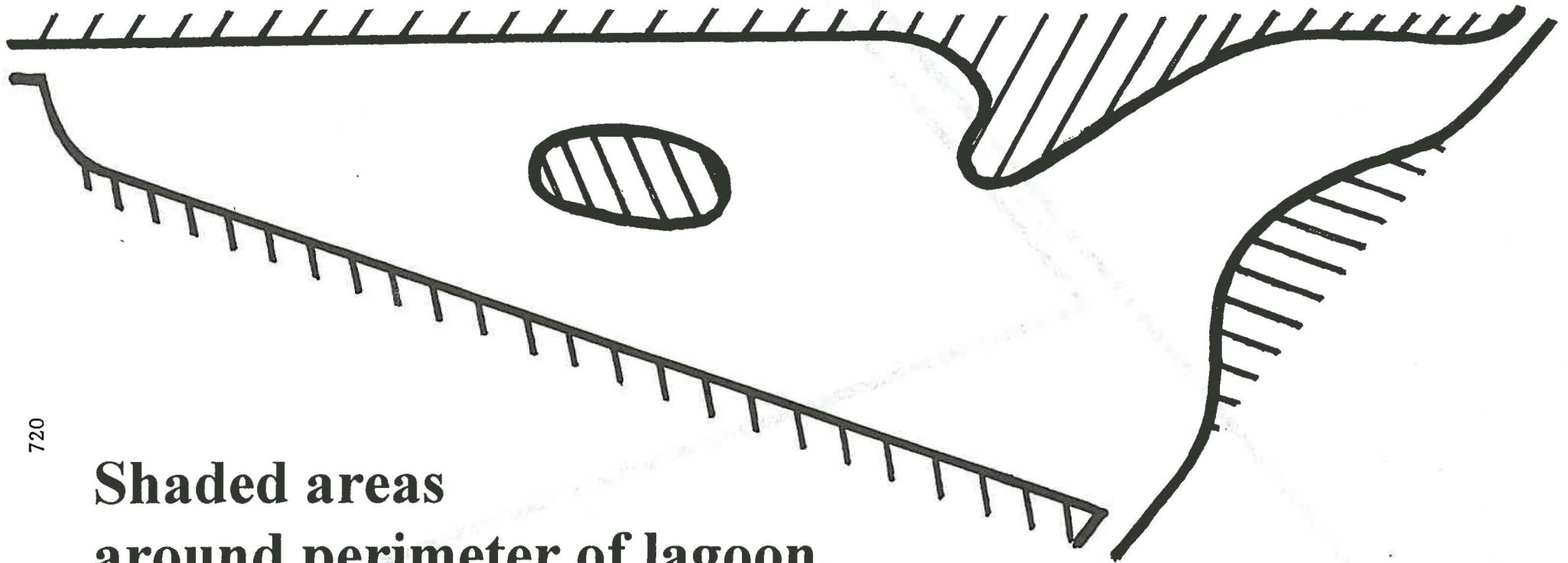
The WPSQ members present gave me a good hearing and I'm sure that group will give this subject a good deal of consideration in future. Had I not been attempting to rehabilitate the environment on my property, their reaction would no doubt have been very different. I'd have been regarded as just another farmer out to decimate as much wildlife as possible. That is but one example of the public relations value of farmers being seen to be environmentally responsible.

Considerable satisfaction is felt when originally developing a property and seeing immediate improvements in productivity. However even greater and more enduring satisfaction is obtained from seeing your property come back to life ecologically. At present, I'm probably the biggest beneficiary of the environmentally beneficial works undertaken on my property. I recommend similar activity to anyone.

**Area on which a scraper removed soil  
to a depth of approximately 1.5 metres.**

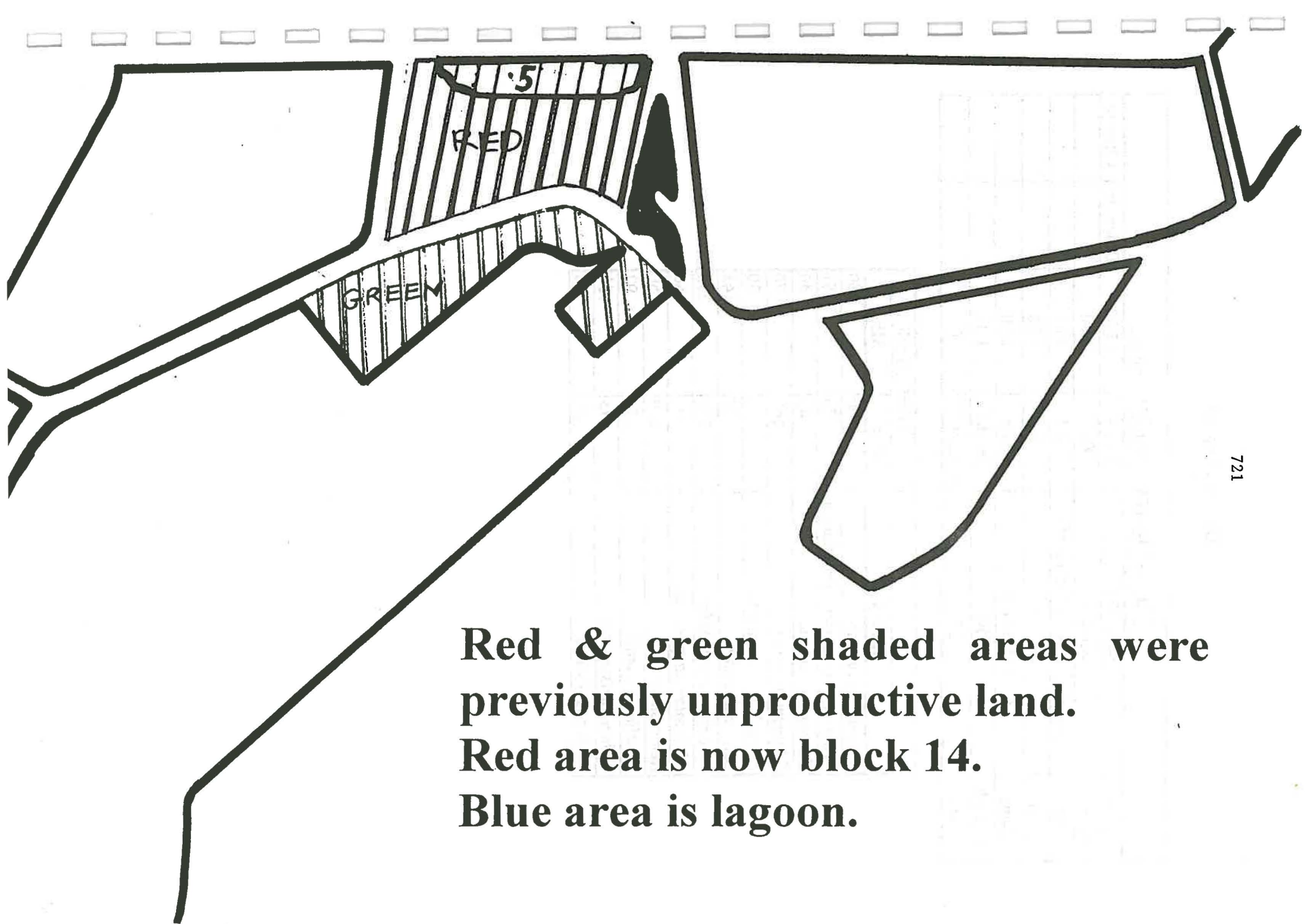
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**Shaded areas  
around perimeter of lagoon,  
and island, were reinstated almost to original level  
using subsoil extracted by excavator and swamp  
dozer. Topsoil was then spread over much of this.**



**Red & green shaded areas were previously unproductive land. Red area is now block 14. Blue area is lagoon.**

## Digman's Lagoon

Tully-Murray Fish Inventory					
Date	14-Apr-94	Time	15:30	Down 3m	Change
Stream	Murray	O <sub>2</sub>	7.80		
Site	Digman's Lagoon (Artificial)	Cond	45.3		
Lat	18° 00.427	pH	5.38		
Long	145°53.653	Temp	27.0		
Length	150	Secchi	1.45		
Width	25	Species N <sup>o</sup>	12		

Species	Total Length	
	Max	Min
<i>Anguilla reinhardtii</i>	500	300
<i>Craterocephalus stercusmuscarum</i>	76	61
<i>Denarius bandata</i>	42	40
<i>Glossamia aprion</i>	160	70
<i>Hypseleotris compressa</i>	90	30
<i>Lates calcarifer</i>	170	143
<i>Megalops cyprinoides</i>	325	235
<i>Melanotaenia splendida</i>	94	50
<i>Nematolosa erebi</i>	320	150
<i>Neosilurus hyrtlii</i>	180	92
<i>Ophieleotris aporos</i>	275	130
<i>Ambassis mulleri</i>	65	30

**Fishes of Digman's Lagoon - Tully/Murray Flood Plain**

(Underlined species were absent in the other survey.)

**Species found by A. Hogan on 1 Sept. 1993 (11 species of fish)**

1. Bony Bream	<i>Nematolosa erebi</i>
2. Eel (long finned)	<i>Anguilla reinhardti</i>
3. Empire Gudgeon	<i>Hypseleotris compressa</i>
4. Hardyhead	<i>Craterocephalus stercusmuscarum</i>
5. <u>McCulloch's Rainbowfish (with stripes)</u>	<u><i>Melanotaenia maccullochi</i></u>
6. Mouth Almighty	<i>Glossamia aprion</i>
7. Mud Cod (orange and blue colours)	<i>Ophieleotris aporos</i>
8. Rainbowfish, Eastern (without stripes)	<i>Melanotaenia splendida</i>
9. Sail-fin Perchlet	<i>Ambassis agrammus</i>
10. Tarpon	<i>Megalops cyprinoides</i>
11. Yellow-finned Tandan	<i>Neosilurus hyrtlilii</i>
Freshwater Prawn	<i>Macrobrachium sp.</i>

**Species found by A. Hogan and P. Graham on 14 Apr. 1994 (12 species)**

12. <u>Barramundi</u>	<u><i>Lates calcarifer</i></u>
Bony Bream	<i>Nematolosa erebi</i>
Eel, long finned	<i>Anguilla reinhardti</i>
Gudgeon, Empire	<i>Hypseleotris compressa</i>
Hardyhead	<i>Craterocephalus stercusmuscarum</i>
Mouth Almighty	<i>Glossamia aprion</i>
Mud Cod (orange and blue colours)	<i>Ophieleotris aporos</i>
13. <u>Pennyfish</u>	<u><i>Denariusa bandata</i></u>
Perchlet, Sail-fin	<i>Ambassis agrammus</i>
Rainbowfish, Eastern (without stripes)	<i>Melanotaenia splendida</i>
Tandan, Yellow-finned	<i>Neosilurus hyrtlilii</i>
Tarpon	<i>Megalops cyprinoides</i>
Freshwater Prawn	<i>Macrobrachium sp.</i>

doubt as to identification were kept for more positive identification either in the laboratory, or by an appropriate museum.

Water temperature, pH, oxygen concentration in mg/l, and conductivity in microsiemens/cm, were measured at the surface and at a depth of approximately 3m using the appropriate electrodes calibrated to 0.1 of the relevant unit.

Secchi depth readings were measured using a traditional Secchi disc.

Latitude and longitude was recorded by a portable GPS unit, in degrees and decimal degrees.

Depth readings were determined by an echo sounder.

Dimensions of the water bodies were determined by the GPS measurements in most cases, and estimated from 1:50 000 topographic maps in others.

Habitat was recorded using standard criteria we have developed for wetland areas elsewhere.

## FISH SPECIES

The provisional number of species actually sampled by us in six days of sampling, was 39. Note identifications still have to be verified by the museums in some cases. There were 16 different sites sampled during the period between 13 and 22 April, 1994.

Table 1: Site Summary

Site	Species No	Oxygen	Conductivity	pH	Temp	Secchi (m)
Racanello's	7	0.20	63.9	5.71	24.6	1.70
Jones'	6	0.35	57.0	5.46	24.4	2.00
Punta ( <i>Boonta</i> )	11	1.33	38.7	5.00	24.5	2.40
Bellenden ( <i>Jubin</i> )	7	1.55	69.3	5.95	28.0	0.60
Selby's	8	2.04	47.6	5.74	28.0	1.00
Hassell's ( <i>Jallum</i> )	12	3.70	50.0	5.68	26.2	2.70
Croc Hole	15	3.80	56.0	6.10	25.8	0.70
Boar Ck Drain	17	4.58	50.5	5.87	22.8	1.80
Barrett's	14	5.30	60.0	5.69	25.9	1.65
Kiambul	17	5.50	63.8	6.50	25.6	0.45
Lilly Pocket	14	7.28	66.4	6.46	22.2	1.50
Murray River	19	7.28	66.4	6.46	22.2	1.30
Tully River	29	7.92	40.5	6.62	24.3	3.00
Digman's <i>created lagoon</i>	12	7.80	45.3	5.38	27.0	1.45

*and \*  
tot 21*

*Total of 14 species have since been identified.*

*Conservation  
&  
Rehabilitation  
of  
Wetlands  
&  
Riparian &  
Other Forest in a  
Tropical Agricultural  
Setting.*

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