

## PROTECTING OUR WATERWAYS

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In New South Wales the relationship between the cotton industry and waterways is a feature of the industry. Most of the cotton grown in the State occurs on the floodplains of, and is irrigated with water from, the Macintyre, Gwydir, Namoi, Barwon and Macquarie Rivers.

The need to properly protect and manage these waters is widely recognised and much recent attention has focussed on threats to water quality and riverine ecosystems. The cotton industry has been highlighted as one of the threats to our waterways because of the intensive use of chemicals by the industry; handling of irrigation tailwater; drift of chemicals from spraying; disposal of agrichemical containers; and the use of natural billabongs for off-river storage.

These concerns need to be addressed by the industry, the community and government agencies to ensure that our waterways are fully protected. The government agency charged with the protection of the State's waters, principally through the administration the Clean Waters Act, 1970, is the State Pollution Control Commission. The Commission has undertaken to work with industry and other government agencies to ensure that the cotton industry is less of a threat to our waterways than perhaps it was in the past.

THREATS BY THE COTTON INDUSTRY TO WATERWAYS

CHEMICALS (INSECTICIDES, FERTILIZERS, HERBICIDES, DEFOLIANTS): The threat by insecticides to aquatic organisms and ecosystems, is well documented in the literature. Ecotoxicological testing of the insecticides sprayed on cotton has demonstrated the toxicity of many of them to aquatic life. This has been supported by evidence that, on occasion, fish kills occur in waterways of the cotton growing areas when insecticides accidentally disperse from the target crop. A fish kill is without doubt the most obvious environmental damage caused by insecticides. Other environmental damage, however, includes physiological impairment and sub-lethal damage to individual organisms, and bio-accumulation and the threat to those species at the top of the food chain. A quick review of those insecticides most common applied to control cotton pests shows that many are either moderately or highly toxic to fish. These include endosulfan, cypermethrin, fenvalerate, deltamethrin, alphamethrin, profenofos, chlorpyrifos, parathion, phorate, fluvalinate and methomyl.

Other chemicals applied to cotton crops, the herbicides, conditioners and defoliants, as far as we know, are much less toxic to fish and have a lesser potential to cause environmental damage than do insecticides.

Chemical fertilizers are well known for disrupting aquatic ecosystems. Nitrogen is the one of most concern in cotton growing areas. Nitrogen in solution, when added to natural waters allows

for the undesirable growth of aquatic micro-flora such as algae, some of which produce toxins. When the algal mass dies, the aerobic decay depletes the oxygen content of the water and a fish kill may occur.

**IRRIGATION TAILWATER:** Improper handling of tailwater can result in the dispersal from cotton crops to nearby waterways of agrichemicals, some of which are toxic to aquatic organisms. Silt may also reach these waters and cause problems such as an increase in turbidity which reduces the penetration of sunlight and disrupts the ecosystem. Sediments in irrigation tailwater that settle out may alter stream flows. Industry practice in relation to tailwater and runoff needs to change. All growers should collect, hold, and ideally recycle all irrigation tailwater. Similarly, all surface runoff produced by storm events, at least up to a certain sized storm, should be held, and recycled where possible.

**SPRAYING OF CHEMICALS:** The spraying of chemicals onto cotton crops, especially from the air, can lead to dispersal to the environment. Growers rather than sprayers need to accept the primary responsibility for minimising drift from agrichemicals spray. Ideal ambient conditions for spraying do not always exist when cotton crops need to be treated. Spraying, even in ideal conditions, can result in some drift and potential pollution of the surrounding environment. The risk from placing cotton fields in relation to nearby sensitive ecosystems, such as waterways, is the responsibility of the grower. The spray operator cannot be expected to avoid polluting a waterway when the crop is planted

right up to the bank.

**DISPOSAL OF AGRICHEMICAL CONTAINERS:** Empty containers are a major problem for cotton growers. They usually accumulate throughout the season in reasonably large numbers, are bulky, and present a physical problem of proper disposal. Further, if not triple rinsed, any chemical residue persists to possibly escape and disperse to the environment. In the case of fugitive chemicals, seepage from disposal sites, if not properly sealed, could result in the contamination of surface and ground waters.

**BILLABONGS FOR OFF-RIVER STORAGE:** Natural wetlands are a threatened resource in Australia. One industry practice that is little understood is the use by cotton growers of billabongs for off-river storage of irrigation water. Billabongs are ephemeral and prolonged holding of water can disrupt the wetting and drying cycle of these natural wetlands. The impact of this practice on billabongs needs to be fully researched. Until it is, the practice should be strongly discouraged.

#### HOW TO OVERCOME THE THREATS

To protect our waterways in areas where cotton is grown, there is considerable scope for joint government-industry action.

Firstly, and above all, there is the ongoing need to educate the chemical users (growers, sprayers), about chemicals and the environment. Desirably the agvet-chemicals industry and grower

associations will become the principle advocates of responsible use. Both industries have to date been active in disseminating brochure/poster information indicating which of the chemicals are of greatest threat. The State Pollution Control Commission has initiated a broad education programme aimed at all growers of irrigated cotton and is soon to publish a report on "Cotton Growing and the Environment" to educate those involved with the industry.

Secondly, much needs to be achieved to change environmentally unsound industry practices. The pathways of dispersal - spraying, tailwater management and disposal of empty containers - should be blocked. Growers should ensure that agrichemicals do not under any circumstances reach waterways. To assist this process, the Commission is working with the industry to ensure that all tailwater and runoff is held on farms and reused, and not returned to our waterways. The Commission has published a brochure on the on-farm disposal of chemicals and containers, but strongly advocates retrieval of containers by the chemical producers. The Commission is developing environmental guidelines for irrigation farming which cover all these issues and will be of considerable assistance to cotton growers.

Thirdly, those in the industry need to be educated to understand the laws currently applying to our waterways. It is a breach of the Clean Waters Act, 1970, to pollute waters. Growers need to be made aware of this and advised that where pollution occurs and can be proven, those responsible will be prosecuted. The maximum penalties now applicable are \$1 million for corporations plus

\$150 000 and seven years imprisonment for individuals involved, plus unlimited costs of cleanup (Environmental and Offences Penalties Act 1989).

Fourthly, continued research and surveillance of the cotton growing areas is needed to locate problems, derive solutions, and to discourage growers from persisting with environmentally unsound practices eg using natural billabongs as water storages.

Fifthly, ongoing cooperation between government agencies and the industry must be fostered, and community involvement encouraged as much as possible. Fora (eg. the North-West Pesticides Co-ordinating Committee) for the discussion of issues are useful in addressing ways to protect our waterways, among other issues.

### Environmental Hazardous Chemical

Chemical Control ORDER on Disposal of Chemical / Drums.

Water ways

No standards for disposal  
Just guidelines (A/C/A)

Drums → Monsanto Reusable Drums

→ 400L bottles

→ Bulk storage.

National Standards not state by state  
Community Dumps state