



The potential benefits of herbicide regulation: A cautionary note for the Great Barrier Reef catchment area



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HIGHLIGHTS

- Herbicides have been identified as a priority pollutants for the Great Barrier Reef.
- There has been recent regulation of herbicides in the Great Barrier Reef catchment.
- Risk assessment identified inconsistent benefits in shifts to alternative herbicides.
- Several alternative herbicides demonstrated similar risks to traditional herbicides.

ARTICLE INFO

Article history:

Received 8 November 2013

Received in revised form 17 March 2014

Accepted 1 April 2014

Available online xxxx

Editor: C.E.W. Steinberg

Keywords:

Risk analysis

Water quality

Perverse outcomes

Pest management

ABSTRACT

Industry transitions away from traditional photosystem II inhibiting (PSII) herbicides towards an 'alternative' herbicide suite are now widely advocated as a key component of improved environmental outcomes for Australia's Great Barrier Reef and improved environmental stewardship on the part of the Queensland sugar industry. A systematic desktop risk analysis found that based on current farming practices, traditional PSII herbicides can pose significant environmental risks. Several of the 'alternatives' that can directly fill a specific pre-emergent ('soil residual') weed control function similar to regulated PSII herbicides also, however, presented a similar environmental risk profile, regardless of farming systems and bio-climatic zones being considered. Several alternatives with a pre-emergent residual function as well as alternative post-emergent (contact or 'knock-down') herbicides were, predicted to pose lower environmental risks than the regulated PSII herbicides to most trophic levels, although environmental risks could still be present. While several herbicides may well be viable alternatives in terms of weed control, they can still present equal or possibly higher risks to the environment. Imposing additional regulations (or even de-registrations) on particular herbicides could result in marginal, and possibly perverse environmental impacts in the long term, if usage shifts to alternative herbicides with similar risk profiles. Regardless of any regulatory efforts, improved environmental sustainability outcomes in pesticide practices within the Great Barrier Reef catchment area will hinge primarily on the continuing adoption of integrated, strategic pest management systems and technologies applied to both traditional and 'alternative' herbicides. One of the emerging policy challenges is ensuring the requisite technical and extension support for cane growers to ensure effective adoption of rapidly evolving farming system technologies, in a very dynamic and scrutinised herbicide management environment.

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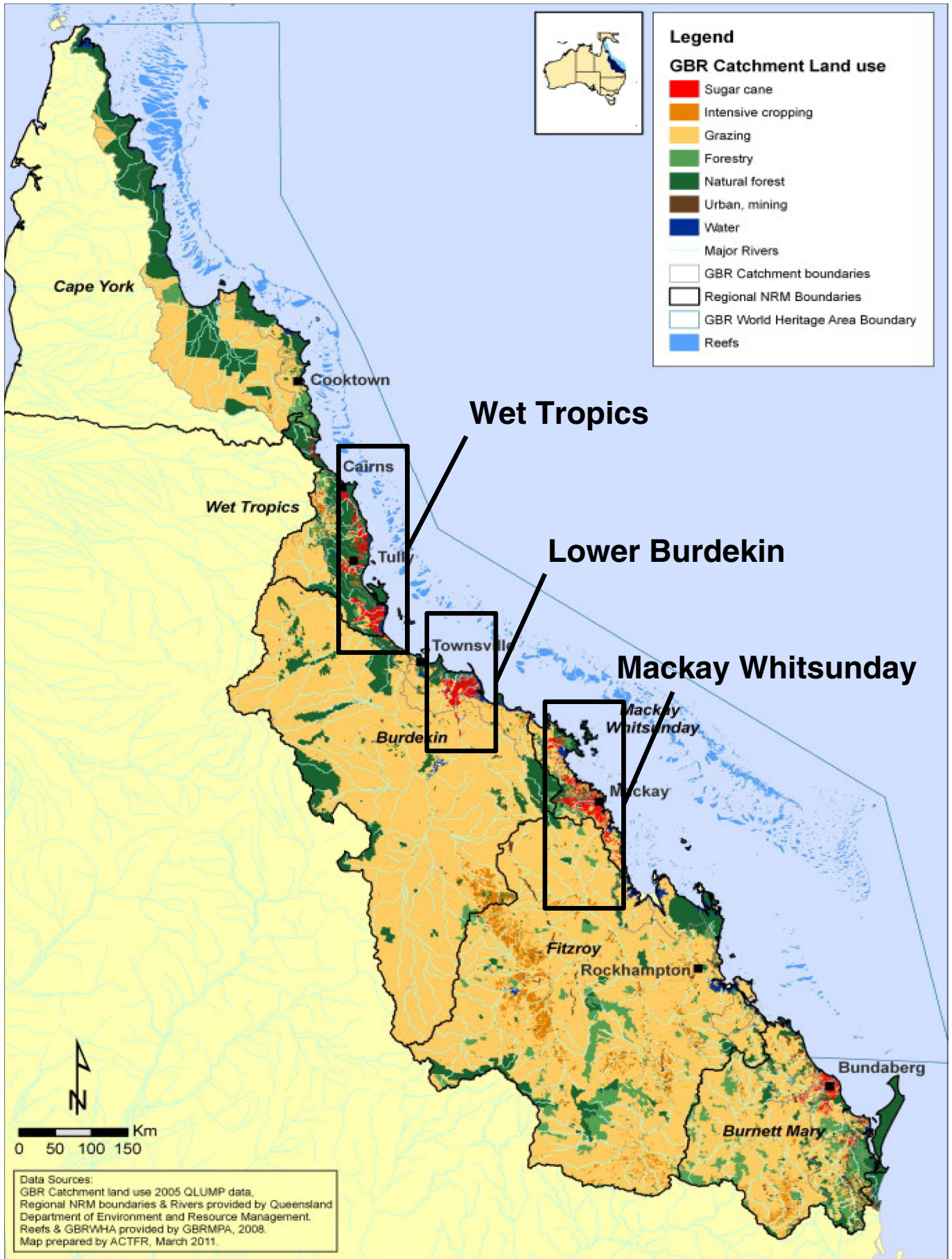
1. Introduction

The Great Barrier Reef (GBR) situated on the north-east coast of Australia contains extensive areas of coral reefs, seagrass meadows and fisheries resources (Fig. 1). It has the status of a Marine Park

under joint Australian (Federal) and Queensland State Government arrangements and was declared a World Heritage Area in 1981. Despite this protected status, the coral cover on the GBR has declined in recent decades, although the timing and trajectory of the decline are still a matter of some debate (Hughes et al., 2011; De'ath et al., 2012). While the causes of this decline are to some degree reef-specific, terrestrial runoff of sediment, nutrients and pesticides have been identified as one of the key drivers of this decline (Brodie et al., 2012; Brodie et al., 2013). Discharge from rivers adjacent to the GBR lagoon continues to be of poor quality in many locations, and land derived contaminants, including suspended sediments, nutrients and pesticides are present in

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