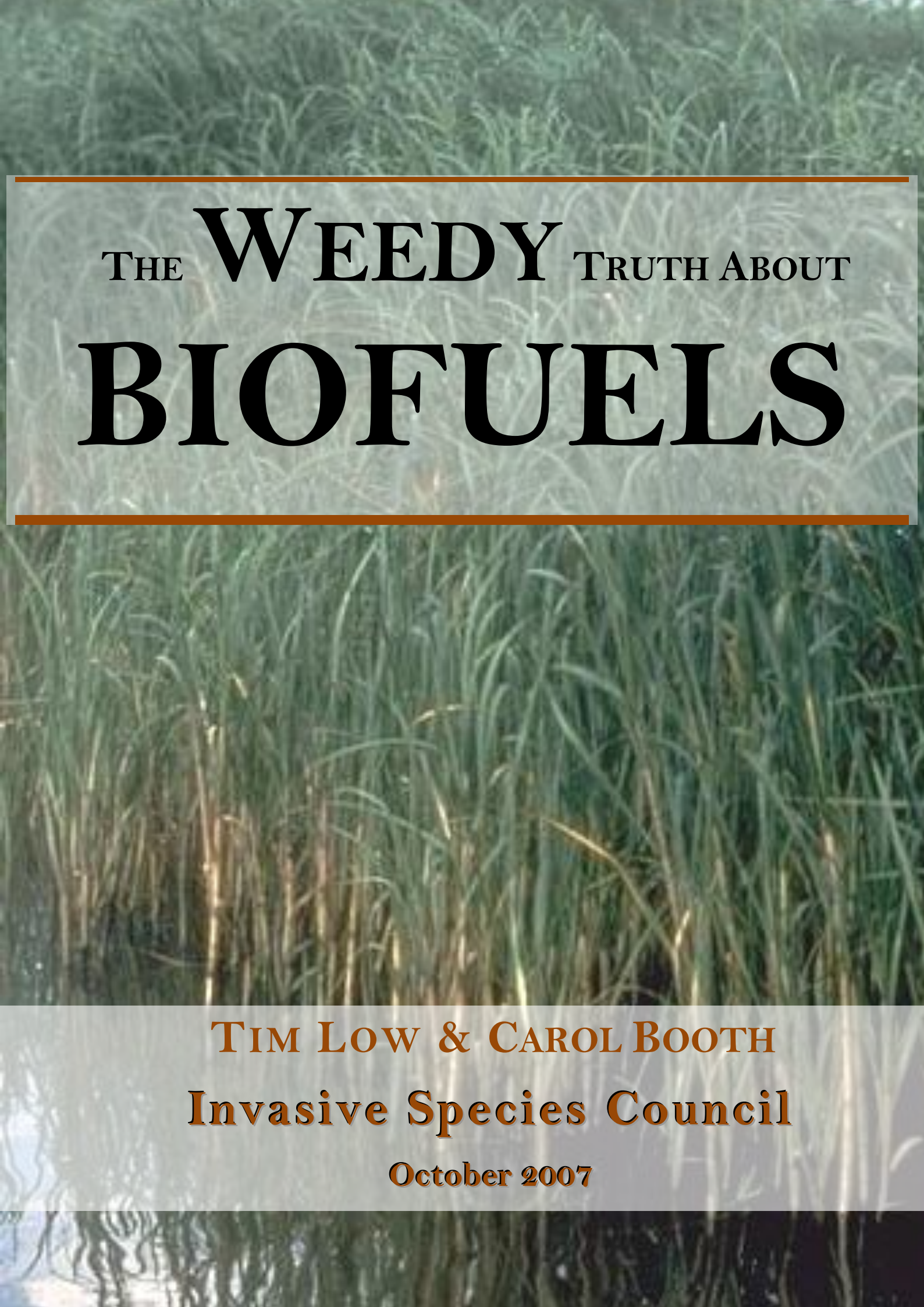

The Weedy Truth About BIOFUELS

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SUMMARY

Plant-derived substitutes for petroleum, known as biofuels, have been touted as the environmentally responsible alternative to fossil fuels—fields of lush green plants to replace oil drills, and reduce greenhouse gas emissions. But their 'bio' label does not guarantee that biofuels are climate friendly or environmentally responsible.

In fact, there is evidence that the cultivation of energy crops on a large scale will cause grave environmental damage—the further destruction of natural habitats, the depletion of scarce water resources, increased use of fertilisers—and that most biofuels offer limited potential to significantly reduce greenhouse gas emissions.

There is another enviornmental problem with the biofuels industry—one that is largely being overlooked, but which has the potential in Australia and elsewhere to inflict great costs on natural environments, as well as on agricultural productivity. That problem is the use of weedy plants for biofuels.

Weed invasions have already caused massive ecological and agricultural damage in Australia, costing agriculture alone $4 billion a year in control and lost productivity.

In this report the Invasive Species Council assesses the weed threat posed by biofuels in Australia and recommends policy reform to reduce the weed risk. We summarise the weed risks of 18 proposed biofuel plants—either species that have been nominated as potential biofuel crops for Australia or which are receiving enough attention overseas that there is likely to be some Australian interest as well.

It turns out that many potential biofuel species pose a weed risk. This is not surprising as the biofuels industry has a number of characteristics that are likely to foster weed problems, including (a) the plant qualities sought for biofuel crops, (b) the large-scale nature of agricultural plantings, (c) the development of more vigorous plant varieties, and (d) the fact that biofuels is an emerging industry, attracting considerable hype and exciting speculative ventures.

Unfortunately, the very qualities that are sought in biofuel plants are often the features of a weed—hardiness, water thrift, a paucity of pests and diseases, and an ability to outcompete other plants. Some of the world's worst weeds may be biofuel prospects for Australia—giant reed and spartina appear in the World Conservation Union's list of *100 of the World's Worst Invaders*, and Chinese tallow tree is rated as one of the the 12 worst invasive pests in the United States

One of the highest-risk plants—jatropha—is regularly lauded as a miracle plant that can grow on waste land without irrigation or fertilisation. It is said there are 20 million hectares of "marginal land" in Australia suitable for its growth. Its capacity to grow in these conditions makes it likely to thrive as a weed should it be widely planted.

The more often a plant is grown, the more likely it is to become a major weed. Cropping of a plant over hundreds or thousands of hectares greatly increases the risk a biofuel plant will become weedy.

Giant reed, which is being trialled in Australia as a biofuel, became a major problem in California more than a century after it was introduced when it was planted widely to stabilise stream banks.

Some potential biofuel species may not pose a high weed risk in their original form, but new varieties, including hybrids and genetically modified cultivars, may be more invasive. This is especially likely for biofuel crops bred for rapid growth rates or high seed output. For example, new cultivars of poplars bred for high growth rates are likely to prove weedier than the forms already present in Australia.

Finally, an emerging and speculative agricultural industry like biofuels has especially high weed risks because some landholders are susceptible to the inevitable hype and inflated hopes associated with a new industry, and keen to experiment with new species.

The Invasive Species Council recommends that the following potential biofuel crop species should not be cultivated in Australia because of their weed risks:

- Jatropha (*Jatropha curcas*)
- Giant Reed (*Arundo donax*)
- Chinese Tallow Tree (*Triadica sebifera*)
- Reed Canary Grass (*Phalaris arundinacea*)
- Neem Tree (*Azadirachta indica*)
- Switchgrass (*Panicum virgatum*)
- Miscanthus (*Miscanthus* species)
- Spartina (*Spartina* species)
- Olive (*Olea europaea*)
- Castor Oil Plant (*Ricinis communis*)
- Chinee Apple (*Zizyphus mauritiana*)
- Willows (S*alix* species)
- Poplars (*Populus* species)
- Calotrope (*Calotropis procera*)
- Giant Milkweed (*Calotropis gigantea*)
- Caper Spurge (*Euphorbia lathyris*

The following species should not be planted in or near environmentally sensitive areas:

- Moringa (*Moringa pterygosperma*)
- Pongamia Tree (*Milletia pinnata*)

Australia's history is replete with disasters arising from blind enthusiasm for new industries and a blithe disregard for the consequences of introducing new species into the landscape. Deer, neem tree, hymenachne, gamba grass and kochia are a few recent examples, and prickly pear, blackberries, rabbits, foxes, and cane toads are stand-out examples from an earlier era.

Current weed and pest policies provide only limited means to prevent such mistakes recurring. The lack of awareness of weed issues exposed by this report reflects a broader failure in Australia to recognise the risks inherent in introducing exotic species. With the emerging biofuels industry we have an ideal opportunity to apply the hard-won understanding of those risks before new problems are created.

Because the ecological and economic costs of weed mistakes are so high, and control is often ineffective once a weed is established, a highly precautionary approach is warranted. Pest experts recommend that a 'guilty until proven innocent' approach should be taken to exotic and invasive species.

To properly address the weed risks of biofuels, the Invasive Species Council recommends the following policy reforms.

(1) Develop an environmentally sound biofuels policy framework: Australia's state and federal governments should work together to develop a policy approach that addresses

all the environmental concerns about biofuels, including the weed risks.

(2) Upgrade state weed lists to include weedy biofuels such as Chinese tallow, miscanthus and giant reed.

(3) Improve processes of weed declaration to ensure rapid declarations of potentially weed biofuel plants before they become a problem. Progress is typically slow once a plant is recognised as potentially weed because inadequate resources are dedicated to risk assessments, and because processes of declaration are slow and cumbersome.

(4) Ensure that assessments consider the Increased weediness risk of cultivars: Assessments of potential biofuel species should recognise that new varieties bred for rapid growth rates or high seed outpute are likely to be more invasive than original varieties.

(5) Amend legislation to create more weed categories: Consistent categories are needed across all states that prevent new plantings of weedy plants but don't oblige landholders to control existing infestations where this is unrealistic. There should also be categories to prevent plantings of some species near environmentally sensitive or significant areas.

(6) Include risk assessment in new industry promotion and support: Organisations that promote new industries should assess and explain the environmental risks. Weed risks associated with emerging industries such as biofuels should be assessed at an early stage, prior to government support for them.

(7) Promote landholder responsibility: Currently, landholders can plant many weed species without having to accept responsibility for subsequent harm to the environment or agriculture. Legislation should be reformed to strengthen duty of care provisions. The polluter pays principle should apply when plants escape from plantings and cause harm. Australia should adopt the approach exemplified by state law in Florida which requires landholders to pay a bond to cover rehabilitation costs should the planting of a new crop, including a biofuel, result in a weed problem. There is a need for landholder education about such risks.

(8) Assess native biofuels: There should be more investigation of the potential of Australian trees, shrubs, and perhaps grasses, to serve as biofuels. Any risks associated with these species should be investigated before their use is considered. Some Australian wattles, for example, are very invasive when grown outside their native range.

(9) Act cautiously by allowing low-risk plants and banning the rest: The best approach to weedy biofuel species is prevention—preventing the planting of a species unless it has been assessed as low risk. As it is, plantings of potential biofuel species may occur before government weed agencies know about them and have a chance to assess the risk. All states should adopt an approach similar to Western Australia by maintaining lists of permitted and prohibited plants, and by banning all other species until they have been assessed.

As seven biologists recently wrote in the journal *Science*, "Experts must assess ecological risks before introducing biofuel crops, to ensure that we do not add biofuels to the already raging invasive species fire." Governments and industry should work together to ensure that any emerging biofuels industry operates sustainably, which entails, in part, that Australia's weed problems are not made worse. To date, there is almost no evidence of governments and industry recognising the weed risks. With the publication of this report, ignorance no longer remains an option.