

Assessment date 28 September 2018 Prepared by Williams and Lieurance

<b><i>Cannabis sativa</i> (Industrial hemp) ALL ZONES</b>		<b>Answer</b>	<b>Score</b>
1.01	Is the species highly domesticated?	n	0
1.02	Has the species become naturalised where grown?		
1.03	Does the species have weedy races?		
2.01	Species suited to Florida's USDA climate zones (0-low; 1-intermediate; 2-high) North Zone: suited to Zones 8, 9 Central Zone: suited to Zones 9, 10 South Zone: suited to Zone 10	2	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	2	
2.03	Broad climate suitability (environmental versatility)	y	1
2.04	Native or naturalized in habitats with periodic inundation North Zone: mean annual precipitation 50-70 inches Central Zone: mean annual precipitation 40-60 inches South Zone: mean annual precipitation 40-60 inches	y	1
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	y	2
3.02	Garden/amenity/disturbance weed	y	2
3.03	Weed of agriculture	unk	
3.04	Environmental weed	y	4
3.05	Congeneric weed	unk	
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	n	0
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals	n	-1
4.05	Toxic to animals	n	0
4.06	Host for recognised pests and pathogens	y	1
4.07	Causes allergies or is otherwise toxic to humans	n	0
4.08	Creates a fire hazard in natural ecosystems	n	0
4.09	Is a shade tolerant plant at some stage of its life cycle	n	0
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols.	n	0
4.11	Climbing or smothering growth habit	n	0
4.12	Forms dense thickets	n	0
5.01	Aquatic	n	0

5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	n	0
5.04	Geophyte	n	0
6.01	Evidence of substantial reproductive failure in native habitat	n	0
6.02	Produces viable seed	y	1
6.03	Hybridizes naturally	y	1
6.04	Self-compatible or apomictic	y	1
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation	n	-1
6.07	Minimum generative time (years)	1	1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	unk	-1
7.02	Propagules dispersed intentionally by people	y	1
7.03	Propagules likely to disperse as a produce contaminant	unk	-1
7.04	Propagules adapted to wind dispersal	y	1
7.05	Propagules water dispersed	y	1
7.06	Propagules bird dispersed	unk	-1
7.07	Propagules dispersed by other animals (externally)	unk	-1
7.08	Propagules dispersed by other animals (internally)	y	1
8.01	Prolific seed production	y	1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	y	1
8.03	Well controlled by herbicides	unk	1
8.04	Tolerates, or benefits from, mutilation or cultivation	unk	-1
8.05		?	
<b>Total Score</b>			<b>15</b>
<b>Implemented Pacific Second Screening</b>			<b>no</b>
<b>Risk Assessment Results</b>			<b>High</b>

section	# questions answered	satisfy minimum?
A		9 yes
B		12 yes
C		17 yes
total		38 yes

	Reference	Source data
1.01		cultivated but no evidence of selection for reduced invasive traits
1.02		skip to 2.01
1.03		skip to 2.01
2.01	<p>1. PERAL NAPPFAST Global Plant Hardiness (<a href="http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20lgn.d.tif">http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20lgn.d.tif</a>). 2. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896">http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896</a> (16 August 2018). 3. Efloras. Flora of China. <a href="http://www.efloras.org/flora_page.aspx?flora_id=2">http://www.efloras.org/flora_page.aspx?flora_id=2</a>. Accessed 16 August 2018. 4. GBIF (<a href="https://www.gbif.org/species/2984538">https://www.gbif.org/species/2984538</a> accessed 9/27).</p>	<p>No computer analysis was performed. 1. Global hardiness zone: (3-?)4-13. 2. Distributional range: probable origin Asia (s. &amp; c.). 3. Native to Asia. Originated in temperate central Asia. 4. Global distribution across Europe, Asia, North America (widespread), some distribution in South America, Australia, and Africa.</p>
2.02		No computer analysis was performed. Distribution including native range is well known; refer to 2.01 source data.
2.03	<p>1. Köppen-Geiger climate map (<a href="http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf">http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf</a>). 2. Efloras. Flora of China. <a href="http://www.efloras.org/flora_page.aspx?flora_id=2">http://www.efloras.org/flora_page.aspx?flora_id=2</a>. Accessed 7 August 2014. 3. CAB International, 2010. Cannabis sativa [Author unknown]. Invasive Species Compendium. Wallingford, UK: CAB International. <a href="http://www.cabi.org/publishing-products/compendia/">http://www.cabi.org/publishing-products/compendia/</a>.</p>	<p>1. Distribution in the native and cultivated range is globally widespread; occurs in more than 3 climactic groups including Af, Aw, and Cfa (3 of 4 zones found in Florida). 2. Occurs 0- 2000 m. 3. C. sativa grows from sea level to 3700 m in altitude, and from the equator to approximately 63° latitude (such as in Finland).</p>
2.04	<p>1. World Climate Maps. <a href="http://www.climate-charts.com/World-Climate-Maps.html">http://www.climate-charts.com/World-Climate-Maps.html</a>. Accessed 16 August 2018. 2. CAB International, 2010. Cannabis sativa [Author unknown]. Invasive Species Compendium. Wallingford, UK: CAB International. <a href="http://www.cabi.org/publishing-products/compendia/">http://www.cabi.org/publishing-products/compendia/</a>.</p>	<p>1. Occurs in native and cultivated areas with mean annual precipitation <math>\leq 40</math>"-70" <math>\geq</math>. 2. Duke (1985) found that C. sativa has optimum growth in areas receiving an annual rainfall of 970 mm.</p>
2.05	<p>1. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896">http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896</a> (16 August 2018). 2. Efloras. Flora of China. <a href="http://www.efloras.org/flora_page.aspx?flora_id=2">http://www.efloras.org/flora_page.aspx?flora_id=2</a>. Accessed 16 August 2018.</p>	<p>1. Widely cultivated. 2. Introduced; has been reported as cultivated illegally and as apparently ruderal in all provinces and states except Alaska. It seems to be best established in the prairies and plains of central North America.</p>

3.01	<p>1. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896">http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896</a> (16 August 2018). 2. Efloras. Flora of China. 3. Mack, Richard N. "Plant naturalizations and invasions in the eastern United States: 1634-1860." <i>Annals of the Missouri Botanical Garden</i> (2003): 77-90. <a href="http://www.efloras.org/flora_page.aspx?flora_id=2">http://www.efloras.org/flora_page.aspx?flora_id=2</a>. Accessed 16 August 2018.</p>	<p>1. Widely naturalized. 2. Principal naturalized range: Canada (Ont., Que.); USA: (AR, CT, DE, IL, IN, IA, KS, KY, ME, MD, MA, MI, MN, MO, NE, NH, NJ, NY, ND., OH, OK, PA, RI, SD, VT, VA, WV, WI). 3. <i>Cannabis sativa</i> is widely naturalized in the eastern half of the U.S. north of the 37° latitude (Haney &amp; Bazzaz, 1970)</p>
3.02	<p>1. Efloras. Flora of China. <a href="http://www.efloras.org/flora_page.aspx?flora_id=2">http://www.efloras.org/flora_page.aspx?flora_id=2</a>. Accessed 16 August 2018. 2. Plants for our Future (<a href="https://pfaf.org/USER/Plant.aspx?LatinName=Cannabis+sativa">https://pfaf.org/USER/Plant.aspx?LatinName=Cannabis+sativa</a> accessed 9/28/2018). 3. Star Tribune "Nuisance grows like a weed in metro" (<a href="http://www.startribune.com/nuisance-grows-like-a-weed-in-metro/83213597/">http://www.startribune.com/nuisance-grows-like-a-weed-in-metro/83213597/</a> accessed 9/28/2018) 4. Parsons, William Thomas, William Thomas Parsons, and E. G. Cuthbertson. <i>Noxious weeds of Australia</i>. CSIRO publishing, 2001.</p>	<p>1. Well-manured, moist farmyards, and in open habitats, waste places (roadsides, railways, vacant lots), occasionally in fallow fields and open woods 2. It is occasionally found as a casual on waste ground in Britain. It is especially found as a weed of nitrogen-rich soils near human habitations. 3. "Wild marijuana is growing along railroad tracks and roadsides, in abandoned lots and open fields, along fences and beneath stop signs." "This is hemp, the stuff farmers grew a century ago, and not the hydroponically grown, super-potent stuff that you find coming from Canada," Stanek said. "There's a reason they call it weed." 4. Occurs in disturbed situations such as stream banks, roadsides, fence lines and neglected pastures.</p>
3.03	<p>1. Holm et al. <i>A Geographical Atlas of World Weeds</i>. New York: John Wiley &amp; Sons. 1979. Print.</p>	<p>Insufficient evidence 1. Listed as a serious weed in AFG, and a principal weed in AUS, CHN, HK, PK, PR.</p>
3.04	<p>1. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896">http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896</a> (16 August 2018).</p>	<p>1. Species restricted as a state noxious weed. A declared terrestrial noxious weed and/or noxious-weed seed in these U.S. states: IL*, IN*, MN*, MO*, ND°, PA*, WV* (*Terrestrial; °In seed.).</p>
3.05		<p><i>Cannabis sativa</i> is the only species in <i>Cannabis</i>, although <i>Cannabis indica</i> L. is sometimes recognized as separate species representing the morphologically and chemically distinct drug types from Afghanistan and Pakistan. Great variation exists in <i>Cannabis</i> as a result of selection for fibre, oilseed or resin. *This*variation*is*further*enhanced*by*the*ease*of*crossing*between*these*plant*types*making*all*subspecific*classifications*inexact.*</p>
4.01	<p>USDA Plant Profile description for <i>Cannabis sativa</i> <a href="https://plants.usda.gov/core/profile?symbol=CANNA">https://plants.usda.gov/core/profile?symbol=CANNA</a> Access date 16 August 2018</p>	<p>these structures are not mentioned in any plant descriptions</p>
4.02		<p>no evidence</p>
4.03	<p>1. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896">http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896</a> (16 August 2018).</p>	<p>Family: Cannabaceae (not a parasitic family).</p>

4.04	1. CAB International, 2010. Cannabis sativa [Author unknown]. Invasive Species Compendium. Wallingford , UK: CAB International. <a href="http://www.cabi.org/publishing-products/compendia/">http://www.cabi.org/publishing-products/compendia/</a> . 2. Clarke, RC. Marijuana Botany: An Advanced Study: The Propagation and Breeding of Distinctive Cannabis. Berkeley: Ronin Publishing, Inc., 1981.	there is evidence that C. sativa is used as fodder/animal feed, it is not know if it is preferred when grazers and browsers have a choice of species. 2. Various herbarious animals prey on Cannabis. Small rodents and birds eat the seeds and sprouts, while rabbits and such grazing animals as deer eat larger seedlings.
4.05		
4.06	1. CAB International, 2010. Cannabis sativa [Author unknown]. Invasive Species Compendium. Wallingford , UK: CAB International. <a href="http://www.cabi.org/publishing-products/compendia/">http://www.cabi.org/publishing-products/compendia/</a> . 2. Wulijami-Soetjpto, N., Subarnas, A., Horsten, S.F.A.J. & Stutterheim, N.C., 1999. Cannabis sativa L.[Intemet] Record from Proseabase. de Padua, L.S., Bunyaphatsara, N. and Lemmens, R.H.M.J. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. <a href="http://www.proseanet.org">http://www.proseanet.org</a> . Accessed from Intemet: 16 August 2018.	1. Fusarium oxysporum f.sp. cannabis, Phomopsis cannabina, Phomopsis ganjae. 2. Diseases and pests in hemp may be plant specific or general. Reported damage by hemp-specific organisms are from Grapholitha delineana, Melaspora cannabina, Phorodon cannabis, Psylliodes attenuata and Septoria cannabis. Seeds of hemp may be infected by the parasitic Orobanche racemosa L. or hemp killer. The most important non-specific diseases and pests in hemp are: Botrytis cinerea, Ostrinia nubilalis and Sclerotinia sclerotiorum. Yield may also be depressed by Cuscuta europaea L., Fusarium spp., Ditylenchus dipsaci, Tetranychus urticae, some insects of the Noctuidae and larvae of Agriotes lineata, Melolontha melolontha and Tipula paludosa. Hemp may also suffer from nematodes such as Meloidogyne hapla in northern Europe and, in northern India Neottolenchus clarus and Quinsulcius similis.
4.07		no evidence
4.08		no evidence
4.09	1. CAB International, 2010. Cannabis sativa [Author unknown]. Invasive Species Compendium. Wallingford , UK: CAB International. <a href="http://www.cabi.org/publishing-products/compendia/">http://www.cabi.org/publishing-products/compendia/</a>	Grows well in bright sunlight. McPartland et al. (2000) describes best plant growth at 14,000-18,000 lx, or 215 W/m.
4.10	1. CAB International, 2010. Cannabis sativa [Author unknown]. Invasive Species Compendium. Wallingford , UK: CAB International. <a href="http://www.cabi.org/publishing-products/compendia/">http://www.cabi.org/publishing-products/compendia/</a>	"Grows well in nutrient rich, well drained, well structured, silty loam soil with high organic matter. The plant is a nitrophile and requires much nutrients. Able to tolerate dry conditions, although it does not thrive; grows poorly in wetlands or saturated soil."
4.11		no evidence of this behavior
4.12		no evidence
5.01	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896">http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896</a> (17 August 2018).	Family: Cannabaceae (not a parasitic family)
5.02	USDA Plant Profile description for Cannabis sativa <a href="https://plants.usda.gov/core/profile?symbol=CANNA">https://plants.usda.gov/core/profile?symbol=CANNA</a> Access date 16 August 2018	Family: Cannabaceae
5.03	USDA Plant Profile description for Cannabis sativa <a href="https://plants.usda.gov/core/profile?symbol=CANNA">https://plants.usda.gov/core/profile?symbol=CANNA</a> Access date 16 August 2018	Family: Cannabaceae
5.04	CAB International, 2010. Cannabis sativa [Author unknown]. Invasive Species Compendium. Wallingford , UK: CAB International. <a href="http://www.cabi.org/publishing-products/compendia/">http://www.cabi.org/publishing-products/compendia/</a>	Family: Cannabaceae; The root system is vigorous and centred by a taproot.
6.01		no evidence

6.02	1. CAB International, 2010. Cannabis sativa [Author unknown]. Invasive Species Compendium. Wallingford , UK: CAB International. <a href="http://www.cabi.org/publishing-products/compendia/">http://www.cabi.org/publishing-products/compendia/</a> . 2. Wulijami-Soetjpto, N., Subarnas, A., Horsten, S.F.A.J. & Stutterheim, N.C., 1999. Cannabis sativa L.[Internet] Record from Proseabase. de Padua, L.S., Bunyaphatsara, N. and Lemmens, R.H.M.J. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. <a href="http://www.proseanet.org">http://www.proseanet.org</a> . Accessed from Internet: 17 August 2018.	Seed germinates 3-7 days after absorbing water. 2. Hemp is usually raised from seed. The seed germinates at low temperatures, but not below 1°C.
6.03	1. CAB International, 2010. Cannabis sativa [Author unknown]. Invasive Species Compendium. Wallingford , UK: CAB International. <a href="http://www.cabi.org/publishingH-products/compendia/">http://www.cabi.org/publishingH-products/compendia/</a> . 2. Jansen, P.C.M., 2006. Cannabis sativa L. [Internet] Record from PROTA4U. Schmelzer, G.H. & GuribH Fakim, A. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. < <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> >. Accessed 11 August 2014.	1. Cannabis segregates can interbreed and hybridize, as shown by X Cannabis intersita Sojak. 2. Genetic variability is large. Production of large amounts of pollen and wind pollination tend to lead to extensive genetic exchange between different domesticated types and between domesticated and wild plants.
6.04	1. Wulijami-Soetjpto, N., Subarnas, A., Horsten, S.F.A.J. & Stutterheim, N.C., 1999. Cannabis sativa L.[Internet] Record from Proseabase. de Padua, L.S., Bunyaphatsara, N. and Lemmens, R.H.M.J. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. <a href="http://www.proseanet.org">http://www.proseanet.org</a> . Accessed from Internet: 17 August 2018	"1. Hemp is normally dioecious, but monoecious cultivars have been bred; the two sexes are normally indistinguishable before flowering. Between plants and in individual plants, flowering is more synchronized at shorter daylength and higher temperatures. Hemp is self compatible."
6.05	Ernest Small, Tanya Antle. A Preliminary Study of Pollen Dispersal in Cannabis sativa in Relation to Wind Direction. Journal of Industrial Hemp, Vol. 8(2) 2003 <a href="http://www.haworthpress.com/store/product.asp?sku=J23710.1300/J237v08n02_03">http://www.haworthpress.com/store/product.asp?sku=J23710.1300/J237v08n02_03</a> Access date 17 August 2018	"Hemp is exclusively a wind-pollinated plant. Although bees will collect the pollen, they are not attracted to the female flowers. Hemp pollen can be carried long distances by the wind."
6.06		Naturally increasing by vegetative means is not known.
6.07	CAB International, 2010. Cannabis sativa [Author unknown]. Invasive Species Compendium. Wallingford , UK: CAB International. <a href="http://www.cabi.org/publishing-products/compendia/">http://www.cabi.org/publishing-products/compendia/</a> .	"Hemp is an annual herb and has a growth period of 2-10 months."
7.01		no evidence
7.02	1. Parsons, William Thomas, William Thomas Parsons, and E. G. Cuthbertson. Noxious weeds of Australia. CSIRO publishing, 2001.	Currently and historically, fertile Cannabis being planted in multiple regions 1. the majority of spread is by deliberate human action.
7.03		no evidence
7.04	Ernest Small, Tanya Antle. A Preliminary Study of Pollen Dispersal in Cannabis sativa in Relation to Wind Direction. Journal of Industrial Hemp, Vol. 8(2) 2003 <a href="https://pdfs.semanticscholar.org/c9ec/c950ba86efa252469e943332b82e1c445163.pdf">https://pdfs.semanticscholar.org/c9ec/c950ba86efa252469e943332b82e1c445163.pdf</a> Access date 17 August 2018	"Hemp is exclusively a wind-pollinated plant. Although bees will collect the pollen, they are not attracted to the female flowers. Hemp pollen can be carried long distances by the wind."
7.05	Henderson, M., Fourie, D.M.C. & Wells, M.J. 1987. Declared weeds and alien invader plants in South Africa. Department of Agriculture & Water Supply. Pretoria. <a href="http://pza.sanbi.org/cannabis-sativa">http://pza.sanbi.org/cannabis-sativa</a> Access date 17 August 2018	"seed is dispersed by wind and water."

7.06	Parsons, William Thomas, William Thomas Parsons, and E. G. Cuthbertson. Noxious weeds of Australia. CSIRO publishing, 2001.	Seed can be spread by water, and some by birds.
7.07		no evidence
7.08	1. Watt, J.M. & Breyer-Brandwyk, M.G. 1962. Medicinal and poisonous plants of southern and eastern Africa. Livingstone, Edinburgh and London. <a href="http://pza.sanbi.org/cannabis-sativa">http://pza.sanbi.org/cannabis-sativa</a> Access date 17 August 2018 2. Clarke, RC. Marijuana Botany: An Advanced Study: The Propagation and Breeding of Distinctive Cannabis. Berkeley: Ronin Publishing, Inc., 1981.	1. Deer feed on the plant. 2. Various herbarious animals prey on Cannabis. Small rodents and mammals eat the seeds.
8.01	1. CAB International, 2010. Cannabis sativa [Author unknown]. Invasive Species Compendium. Wallingford , UK: CAB International. <a href="http://www.cabi.org/publishing-products/compendia/">http://www.cabi.org/publishing-products/compendia/</a> .	The seed is technically an achene, a small, dry nut. C. sativa plants are prolific seeders; nearly half the weight of a well-pollinated female turns to seed. For example field-grown crops yield an average of 400 g seeds per plant, or about 22,000 seeds per plant (McPartland et al., 2000).
8.02	1. Wulijami-Soetjipto, N., Subarnas, A., Horsten, S.F.A.J. & Stutterheim, N.C., 1999. Cannabis sativa L.[Internet] Record from Proseabase. de Padua, L.S., Bunyaphatsara, N. and Lemmens, R.H.M.J. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. <a href="http://www.proseanet.org">http://www.proseanet.org</a> . Accessed from Internet: 17 August 2018	1. Healthy seed should give 90% germination, and if properly stored it will remain viable for up to 2 years.
8.03	Dr. Heather Darby, UVM Extension Agronomist, Abha Gupta, Erica Cummings, Julija Cubins, Hillary Emick, Julian Post, Lindsey Ruhl, and Sara Ziegler UVM Extension Crops and Soils Technicians <a href="http://www.uvm.edu/extension/cropsoil/wp-content/uploads/2016-Hemp-Weed-Control.pdf">http://www.uvm.edu/extension/cropsoil/wp-content/uploads/2016-Hemp-Weed-Control.pdf</a> Access Date 17 August 2018	"Currently there are no pesticides (herbicides, insecticides, fungicides, nematicides, etc.) registered for hemp in the U.S, so growers must follow best practices to reduce the impact of pests, especially weeds."
8.04		no evidence
8.05		no evidence