

**Contra Costa County**  
**DECISION DOCUMENTATION for WEED MANAGEMENT: Airports**

Date: 6/17/2014

Department: Public Works Vegetation Management

Location: Buchanan and Byron Airports

Situation: Weeds on and off of pavement at airports

What are the management goals for the weed?	<p>The management goals are to maintain the definition of the runways and to maintain security, safety, and visibility at the airports. The Vegetation Manager and the airport staff work together to determine priorities.</p> <ol style="list-style-type: none"> <li>1. Keep weeds out of pavement cracks and seams on runways (where planes land and take off) and taxiways (other pavement that planes use to move around the airport)</li> <li>2. Maintain bare ground 50 to 75 ft on either side of runways (if a plane needs to leave the runway, it must be able to do so unimpeded)</li> <li>3. Maintain bare ground approximately 20 ft on either side of taxiways (if a plane needs to leave the taxiway, it must be able to do so unimpeded)</li> <li>4. Keep weeds out of parking areas for planes</li> <li>5. Maintain bare ground on dirt aprons (road shoulders), 50 to 75 ft on each side</li> <li>6. Maintain bare ground around signs, runway lights, windsocks, and instrumentation for safety and guidance.</li> <li>7. Treat infields (non-paved areas between pavement) for broadleaf weeds to prevent any tall plants from growing above 2 to 3 ft; the airports regularly mow the infields with their own equipment to reduce wildlife habitat (wildlife can be a hazard to planes landing and taking off)</li> <li>8. Maintain bare ground around perimeter fence lines for security (in order to be able to easily see the fence)</li> <li>9. Leave grass in the infields tall enough to impede the germination and growth of broadleaf weeds and decrease the attractiveness to wildlife</li> </ol>	
How often is the site monitored?	<p>The airport staff continually monitor weed conditions and alert the Vegetation Manager of any incipient problems. The Vegetation Manager drives by from time to time to look at the airport from the outside, but no Public Works staff can enter or work at the airports without being escorted by airport personnel in an airport support vehicle. This increases costs and is not done unnecessarily.</p>	
Weeds have been identified as the following:	<p>Any broadleaf weeds or grasses.</p>	
Are populations high enough to require control? Explain	<p>Any vegetation in areas where safety is concerned must be eliminated. Vegetation can reach 2 to 3 ft in the infields as long as it is of uniform height.</p>	
<p>Is this a sensitive site?</p> <p>Note that the area <i>around</i> the Byron airport is sensitive—red-legged frog, kit fox &amp; burrowing owl habitat; vernal pools</p>	Are any of the sites under management considered highly sensitive sites?	No
	Are any areas part of the court-ordered injunctions? (see: <a href="https://www.epa.gov/endangered-species/interim-use-limitations-eleven-threatened-or-endangered-species-san-francisco-bay">https://www.epa.gov/endangered-species/interim-use-limitations-eleven-threatened-or-endangered-species-san-francisco-bay</a> )	No
	Are any of the sites known or potential habitat for any endangered or threatened species?	No
	Are any of the sites on or near an area where people walk or children play?	No
	Are any of the sites near a drinking water reservoir?	No
	Are any of the sites near a creek or flood control channel?	Yes

	Buchanan is next to Walnut Creek with a levee between the airport and the flood control channel. Byron is near Brushy Creek, a seasonal creek.	
	Are any of the sites near crops?	No
	Are any of the sites near desirable trees or landscaping?	No
	Are any of the sites on soil that is highly permeable, sandy, or gravelly?	No
	At any of the sites, is the ground water near the surface?	No
	Is there a well head near the site? It is outside the immediate fence line of the airport, about ¼ mile away. Restrictions are 100 ft around well heads.	Yes
Which cultural controls were considered?	<p><b>Mulching, weed barrier:</b> Not practical at an airport because weeds would still grow in the soil that will inevitably collect on top of the mulch or weed barrier, and the mulch would blow off onto the pavement. Airport staff regularly sweep the pavement to remove anything that could compromise safety for the planes.</p> <p><b>Paving the whole airport:</b> There would still be cracks and seams where weeds could grow. It would make more work for the Vegetation Management Crew and increase herbicide use. The cost of maintaining and replacing the additional pavement would be significant for the airport.</p> <p><b>Planting Desirable Species:</b> Overseeding with ryegrass in the infields could eventually shift the plant population to something that wouldn't have to be mowed, but would probably not significantly change the amount of herbicide used since the ryegrass would still be susceptible to invasion by broadleaf weeds. Currently, the airports are actually slowly selecting for certain grasses in the infields by mowing and only treating for broadleaf weeds.</p> <p><b>Burning:</b> Burning cannot be used at the airports.</p> <p><b>CONCLUSIONS: Mulching, weed barriers, paving, and burning are not practical for the level of weed control needed or for the safety concerns at the airports. Overseeding with ryegrass is not an option at this time.</b></p>	
Which physical controls were considered?	<p><b>Mowing by machine:</b> Airport staff currently mow the infields; however, at the Byron Airport, they will be experimenting with not mowing the infields to try to reduce problematic weeds. By mowing, they have been selecting for difficult weeds, and last year, a dirty mower brought in more weeds, including <i>Dittrichia</i> (stinkwort). When they resume mowing, they will be careful to clean any mowers that are moved from one site to another.</p> <p><b>Mowing by hand:</b> This is not economical because it would be slower, cost more money, and require that the runways be closed longer.</p> <p><b>Discing or plowing:</b> Discing or plowing disturbs the soil and opens areas up to wind and water erosion and continued weed reinfestation. Discing when seed is present increases infestation size. Dust would blow onto the pavement during and after discing and might pose a visibility concern for aircraft during windy weather. Mowing is a better choice.</p> <p><b>Grazing:</b> Grazing would be too slow and costly (requiring runways to be closed too long) and too hazardous (goats might get loose on the runways).</p> <p><b>Crack sealing:</b> This is done to maintain the structure of the pavement, but budget and the issue of having to close runways prohibits doing this for weed abatement.</p> <p><b>CONCLUSIONS: Mowing is used regularly by airport staff, but other physical controls are too costly and/or not appropriate at the airports.</b></p>	
Which biological controls were considered?	<p><b>Biological controls are not applicable in this situation unless a particular invasive weed is the target, and it has a biological control available.</b></p>	

Which chemical controls were considered?

For more information on pesticides listed here visit the National Pesticide Information Center (NPIC). This a joint project of Oregon State University and the US EPA.

<http://npic.orst.edu/>

You can communicate with an actual person at

[1.800.858.7378](tel:18008587378) or [npic@ace.orst.edu](mailto:npic@ace.orst.edu)

They are open from 8:00AM to 12:00PM Pacific Time, Mon-Fri

**During many years of research, experience, and experimentation, including consulting the literature, researchers, and colleagues about materials that are labeled for, and effective on, weeds in rights-of-way, the Division has considered the herbicide options listed below. The Division continues to consult researchers and colleagues, as well as new literature, to identify new choices that may be more effective, more environmentally friendly, and of lesser human toxicity.**

**Pesticides may potentially exhibit both acute and chronic toxicity. The Signal Words below refer to acute hazards. For information on chronic toxicity, contact NPIC (info on left).**

**Herbicides and application methods are chosen that prevent or minimize the potential for drift and exposure to humans and wildlife.** As with all weed control techniques, herbicides must be reapplied periodically to suppress weeds over the long term.

**Note that the Weed Science Society of America (WSSA) and the Herbicide Resistance Action Committee (HRAC) both create resistance group designations to help weed managers reduce the likelihood of creating resistant weeds.** Every 2 to 3 seasons, the Division rotates herbicide active ingredients according to the resistance group designations from WSSA to limit the buildup of herbicide resistant weeds at the airports.

Pre-emergent (residual) herbicide? Yes, for runway shoulders, signs, lights, and fencelines.

Post emergent (contact) herbicide? Yes, as-needed in areas treated with pre-emergents, for weeds in pavement cracks, and for broadleaf weeds in the infields.

**Possible herbicide choices**

Note that pesticide labels contain a range of rates at which the material can be used. The rates in the chart below are generally in the middle of that range. Pesticides can be used below the label rate, but it is illegal to exceed the label rate. There is increasing research evidence that recurrent exposure to herbicides at rates below those on the label (rates that allow a portion of the weed population to survive) promotes herbicide resistance. Rates are chosen to be sufficient to kill the target weeds, but not to waste herbicide.

Herbicide Combinations	Rates	Use	Application Method	Notes
Esplanade Roundup	5 oz/A 1.6 pt/A	In fall and winter for lights and fencelines and for aprons (road shoulders)	Large truck with boom or small pickup truck with OC-40 on the side	This combination is sprayed at 20 gal/A.
Polaris Roundup	50 oz/A 6 pt/A	Year around for cracks in pavement	Spot spraying while walking and pulling hose with a pin stream nozzle attached to a handgun	This combination is applied at 100 gal/A.
Oust ProClipse Roundup	4 oz/A 2 lbs/A 6 pt/A	In fall and winter around utilities, signs, wind socks, guidance lights and other areas that must be done by hand	Spot spraying while walking pulling hose	This combination is applied at 100 gal/A.
Oust Milestone	4.8 oz/A 5 oz/A	In fall and winter for aprons (road shoulders)	Large truck with boom	This combination is applied at 20 gal/A.
ProClipse Pendulum Telar	2 lbs/A ½ g/A 20 oz/A	In fall and winter for signs and lights	Large truck with boom	This combination is applied at 50 gal/A.
Milestone Vanquish	5 oz/A 1/8 pt/A	Generally in late spring/early summer for broadleaf weeds	Large truck with a rear fan spray	This combination is applied at 20 gal/A.

Herbicide/ Signal Word*	Active Ingredient	Characterization	Enjoined for Endangered or Threatened Species?	Herbicide Resistance Mgmt Group
Esplanade/ <b>Caution</b>	Indaziflam	Pre-emergent herbicide for broadleaves and annual grasses	No	(29)
Milestone/ <b>Caution</b>	Aminopyralid	Broadleaf post-emergent herbicide	No	O(4)
Oust/ <b>Caution</b>	Sulfometuron methyl	Pre-emergent herbicide for many annual grasses and certain broadleaf weeds	No	K <sub>1</sub> (3)
Pendulum/ <b>Caution</b>	Pendimethalin	Pre-emergent or early post-emergent herbicide primarily for grass weeds but also certain broadleaf weeds	Yes, 100 ft buffer for bay checkerspot butterfly, 60+ft buffer for California red-legged frog and 60ft buffer for Salmonids	K <sub>1</sub> (3)
Polaris/ <b>Caution</b>	Imazapyr, isopropylamine salt	Broadleaf and grass herbicide with pre-emergent and post-emergent capabilities; it has long soil residual activity	Yes, 60+ft buffer for California red-legged frog	B(2)
ProClipse/ <b>Caution</b>	Prodiamine	Pre- and post-emergent herbicide for many annual and perennial broadleaf and grass weeds	No	B(2)
Roundup/ <b>Caution</b>	Glyphosate	Non-selective post-emergent herbicide	Yes, 60+ft buffer for California red-legged frog	G(9)
Telar/ <b>Caution</b>	Chlorsulfuron	Broadleaf post-emergent herbicide with long soil residual activity	No	B(2)
Vanquish/ <b>Caution</b>	Dicamba	Broadleaf post-emergent herbicide	No	O(4)

\* A signal word is a description of the acute (short-term) toxicity of a *formulated pesticide product*. Formulated pesticide products contain both active and inert ingredients. Active ingredients kill or control the pest the product is designed for, while inert ingredients allow the pesticide to be effectively applied against the pest. Examples of inerts are solvents, carriers, stickers, and adjuvants. The acute toxicity is the toxicity of a chemical after a single or short-term exposure.

**CONCLUSIONS:** The herbicide combinations above are used as appropriate. Pre-emergents are used preventively where no weeds can be tolerated (aprons, signs, lights, and fencelines). Cracks in the pavement are not treated preventively. These are treated as-needed and the crew waits until there is some green before treating with herbicides that kill on contact and have some pre-emergent effect. Infields are treated in late spring to early summer for winter annual broadleaves. The timing depends on the weather the previous year, the current weather, and what is already growing in the area. Throughout the year the airport staff and the Vegetation Manager monitor the property. Weeds that have broken through are treated as-needed with post-emergent contact herbicides.

<p>Which herbicide application methods are available for this chemical?</p>	<p><b>Methods available:</b></p> <ul style="list-style-type: none"> <li>• Large truck (800 gal spray tank) with side boom used primarily for aprons—sprays an adjustable swath of up to 60 ft</li> <li>• Large truck (800 gal spray tank) with rear fan sprayer for infields—sprays a swath of 30 ft</li> <li>• Large truck (800 gal spray tank) with side arm sprayer that covers ~70 ft for fencelines and runway lights that are in a straight row</li> <li>• Small truck (100 gal spray tank) with side boom that sprays a swath of 8-12 ft for fencelines and runway lights that are in a straight row</li> <li>• Small truck (100 gal spray tank) with hose and handgun with fan nozzle for spot spraying signs, windssocks, utilities, weather equipment, etc; and for spot spraying cracks (pin stream nozzle)</li> </ul> <p><b>CONCLUSIONS: All these methods are used in the appropriate situations.</b></p>
<p>What factors were considered in choosing the pesticide application method?</p>	<p>Cost and effectiveness are the main considerations for work at the airports. Other factors are always considered, such as toxicity, signal word, environmental considerations (what is adjacent to the treatment area), odor, and mode of action (resistance management group).</p>
<p>What weather concerns must be checked prior to application?</p>	<p>Wind is more important when using the large truck with the arm or rear fan. At wind speeds of 4 to 5 mph, it is still possible to spray safely with a handgun. In general, a coarse spray can be used to reduce drift. Drift control products can also be added to the herbicide mix.</p> <p>Temperature is important for herbicides such as Vanquish that could volatilize and drift off-target. Crews look up wind speeds, temperatures, and whether there is an inversion layer (that could also carry herbicides off-target).</p> <p>For pre-emergent herbicides, rainfall is very important. Pre-emergents are used preventively where no weeds can be allowed to grow, e.g., aprons, signs, lights, and fencelines. The crew aims to apply the herbicide in fall after the 1<sup>st</sup> rain but before the rain really starts to saturate the ground. Ideally there would be 1 to 1 ½ inches of rain in the previous month and a minimum of 1/2 inch of rain in the first 2-3 weeks following the application to set the pre-emergent in the seed germinating zone of the soil.</p> <p>Timing is critical for spraying infields. The soil must be dry enough to support the weight of a vehicle and to prevent the vehicle from tracking mud or rocks onto the runway. All runways must be free of debris and are regularly swept.</p>
<p>References</p>	<p>Weed Science Society of America: 2007. Herbicide Handbook, 9<sup>th</sup> Edition</p> <p>Jason K. Norsworthy, et al. 2012. Reducing the Risks of Herbicide Resistance: Best Management Practices and Recommendations. Weed Science Special Issue:31-62</p>