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October 22, 2019

Boards of Supervisors
County of Ventura
800 South Victoria Avenue
Ventura, CA 93009

Subject: **Report Back Regarding the Use of Glyphosate for Vegetation Management in the County of Ventura by the Agricultural Commissioner, Department of Airports, Fire Protection District, General Services Agency, Harbor Department and Public Works Agency**

Recommendation:

Receive and file a report on the use of glyphosate for vegetation management in the County of Ventura by the Agricultural Commissioner, Department of Airports, Fire Protection District, General Services Agency, Harbor Department and Public Works Agency.

Fiscal/Mandates Impact:

There are no additional County costs associated with this Board action.

Executive Summary:

On April 23, 2019 your Board directed County staff from the Agricultural Commissioner's office, Department of Airports, Fire Protection District, General Services Agency, Harbor Department and the Public Works Agency to prepare a report back to your Board on their use of glyphosate for vegetation management (Exhibits 1 and 2).

Combined and on average, County agencies use 1,830 gallons of glyphosate annually. It is applied to 4,368 acres throughout the county at a cost of \$795,500 including product purchase and application. Alternatives to herbicides containing glyphosate have been explored. They have been found to be less cost effective.

The Agricultural Commissioner does not use glyphosate.



The Department of Airports (DOA) uses glyphosate primarily on runways and taxiways out of general public contact. Weed abatement allows for the safe landing of planes and eliminates rodent habitat.

The Fire Protection District (Fire) uses glyphosate for weed control around its facilities.

The General Services Agency Parks Department (GSAPD) uses glyphosate-based herbicides to maintain aesthetics and control weeds around trails, walkways, shrubs, trees, planter areas, parking lots, open fields, campgrounds, and along fence lines of the parks and golf courses. This maintenance creates a safe and enjoyable experience for the public.

The General Services Agency Grounds Department (GSAGD) does not use glyphosate-based products.

The Harbor Department does not use glyphosate-based products.

The Public Works Agency (PWA) uses glyphosate to eliminate weeds in and around flood control facilities and roadsides. Weed elimination ensures the safe operation and use of mission critical flood control facilities and transportation corridors.

Discussion:

On April 23, 2019 your Board directed County staff from the Agricultural Commissioner's office, Department of Airports, Fire Protection District, General Services Agency, Harbor Department and Public Works Agency to prepare a report back to your Board on their use of glyphosate for vegetation management.

Roundup (containing glyphosate), manufactured by Monsanto/Bayer, is used by DOA, Fire and PWA. Rodeo (containing glyphosate), manufactured by Dow Chemical Company, is used by GSAPD and PWA in and around aquatic sites and wildlife habitat areas. The Agricultural Commissioner, Harbor Department and GSAGD do not use glyphosate.

Following your Board's direction to examine the use of glyphosate for vegetation management in Ventura County a task group was formed to:

- Provide an assessment of the extent to which glyphosate-based herbicides are used for vegetation management purposes
- Identify protocols that lead to the use of glyphosate as an abatement agent
- Explore alternatives to the use of glyphosate and identify recommended strategies that do not involve its use
- Identify the best practices that other jurisdictions use
- Report back to your Board on findings and alternatives within 90 days



Assessment of the extent to which glyphosate-based herbicides are used for vegetation management purposes (Exhibit 3)

DEPARTMENT OF AIRPORTS

The DOA uses 292 gallons over 208 acres for a total annual labor and materials cost of \$65,000.

The DOA oversees development, day-to-day maintenance, and safety of both the Camarillo and Oxnard airports. This involves vegetation management on the airfields, including grading, mowing, weed whacking, hand pulling, and spraying herbicides.

The Camarillo and Oxnard airports have a combined size of approximately 780 acres, of which 453 acres require vegetation management. Approximately 208 of those acres are open infield areas between runways, taxiways, and restricted roads that are mowed on a regular basis. The runway and taxiway edges encompass approximately 143 acres. These areas have electrical components (i.e., airfield lights and navigational equipment) that cannot be mowed. They are typically sprayed with herbicides that contain a mixture of glyphosate and pre-emergent products. Most of the treated areas are taken down to dirt and zero growth is promoted for runway and taxiway edges. Other restricted paved areas on the airfield (approximately 65 acres) receive spot spraying when weeds show through cracks in the pavement.

Because most of the airport is a secure area, there is no direct contact with the public in 95% of the areas sprayed with glyphosate. The areas of the airports that are not restricted and are accessible to the public are the passenger terminal, various parking lots at the Oxnard Airport, and the business park at Camarillo Airport. These areas are landscaped by airport maintenance and contract staff, who use either mechanical means of removal or herbicides that do not contain glyphosate. Captive labor crews from the Probation Agency are also used in these areas.

FIRE PROTECTION DISTRICT

Fire manages approximately 20 acres of landscaped area throughout the County. This includes landscaped areas around 35 fire stations, the Regional Training Center in Camarillo, the Fire Support Complex/Wildland Division in Oxnard, and other District-owned parcels. Glyphosate is used to control weeds and unwanted grasses around these small landscaped areas. Only a few gallons of glyphosate per year is used to control the weeds in these areas, for an approximate annual labor and materials cost of \$500.



GENERAL SERVICES AGENCY

GSAPD uses 48 gallons of glyphosate over 230 acres of parks and trails for a total annual labor and material cost of \$38,000. The GSAPD leasehold facilities use 15 gallons of glyphosate over 280 acres of golf course.

Park areas maintained with herbicide are public use. They consist of eight regional parks (Camp Comfort, Dennison, Foster, Santa Rosa, Steckel, Toland, Oak, and Tapo Canyon), one local facility (the Casitas Springs community center), one historical site (the Mission Aqueduct), and the Piru trail.

GSAGD maintains 134 acres and has not used glyphosate since 2015.

HARBOR DEPARTMENT

The Harbor Department used glyphosate-based products on 36 acres for many years as the most effective and cost-efficient method of controlling weed growth, particularly in the rock revetment areas surrounding the Harbor. In spring 2017, as a result of feedback from Harbor residents, the Harbor Department ceased using glyphosate and now controls weeds with string trimmers and Probation Work Furlough labor and is currently testing other products.

PUBLIC WORKS AGENCY

PWA uses 1,473 gallons of glyphosate over 3,460 acres for a total annual labor and materials cost of \$692,000.

Vegetation management is required for protection of public users and PWA facilities: flood control structures, roadways, and water and sanitation facilities. Vegetation must be removed from flood control structures to minimize clogging during runoff events and to prevent flooding and infrastructure damage. Vegetation must be removed around water and sanitation facilities to provide access to equipment and to maintain aesthetics. Vegetation must be controlled on road shoulders to preserve the roadway and provide adequate sight distance on curves and at intersections. In addition, many Public Works projects require mitigation planting, habitat restoration or non-native species removal – each of these activities requires vegetation management.

PWA has tested other methods of vegetation management. None have proven as effective as glyphosate.

Protocols that lead to the use of glyphosate as an abatement agent

Regulatory Agency Determinations. Glyphosate was initially registered in 1974. In 1986, the US Environmental Protection Agency (EPA) issued the Glyphosate Registration



Standard, which updated the agency's toxicity database for this compound. In 1993, the EPA issued the registration eligibility decision (RED) that indicated that glyphosate was eligible for re-registration.

On April 30, 2019, the EPA completed a Glyphosate Registration Review, a program where all registered pesticides are reviewed at least every 15 years as mandated by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). The result of the review (see Exhibit 4) is that "EPA continues to find that there are no risks to public health when glyphosate is used in accordance with its current label and that glyphosate is not a carcinogen."

Operations and Maintenance Best Management Practice. Currently glyphosate is among those herbicides approved for use by the EPA that contain some of the lowest known levels of toxicity. The California Department of Fish and Wildlife uses glyphosate extensively in many environmentally sensitive areas. PWA and GSAPD have determined glyphosate-based herbicide application to be the most cost-effective and feasible method of vegetation control. EPA's approval of glyphosate as an herbicide, its low cost and its low toxicity make it a best management practice for vegetation control.

Safety Considerations. In many areas throughout the County, safety considerations demand vegetation control. For example:

- Flood control structures are subject to clogging during runoff events as vegetation is dislodged and carried by channel flows. When the downstream structures become clogged with the now mobile vegetation, flooding and infrastructure damage occur.
- Roadside vegetation must be controlled in order to preserve roadway and intersection visibility.
- Many County facilities (PWA and GSAPD) are used for public recreation; in these cases it is necessary to control poisonous and/or thorny plants, thus avoiding contact injury by the public or by maintenance personnel.
- Vegetation control is required for fire abatement

Complaints/Aesthetics/"Good Neighbor" Practices. Glyphosate is used in response to public complaints and/or requests for vegetation control. Glyphosate is used around facilities (buildings/grounds) and wastewater treatment plants to control undesirable vegetation to achieve a desirable aesthetic. In many cases, glyphosate is used to control vegetation on the periphery of County properties to avoid its spread to neighboring properties.

Regulatory Requirements. Many mitigation planting sites require long-term (5 years or more) maintenance of installed mitigation measures (predominantly native plants). A large part of this maintenance is the eradication of non-native invasive species. Glyphosate use allows an efficient and selective eradication of unwanted plant species.



Infrastructure Inspection and Protection. Vegetation control is paramount to the protection and safe operation of critical infrastructure such as roads, dams, levees, harbor perimeters, and streambanks. Proper vegetation control eases inspection of these facilities, allowing timely identification of problems and their rapid repair. Glyphosate is especially effective in difficult-to-repair areas such as dam faces and rip-rap on streambank coverings, slopes, and embankments.

Agreements. Property acquisition agreements have often included provisions for vegetation control as a condition of sale. Glyphosate is used to control the vegetation in these cases.

Alternatives to the use of glyphosate and strategies that do not involve its use

Alternatives to use of glyphosate can be grouped into six separate categories:

- No Treatment
- Mechanical
- Chemical
- Electrical
- Biological
- Manual

No Treatment. Undesirable vegetation which can be ignored, without presenting any of the issues discussed in the protocol section above, does not receive glyphosate treatment. However, in those places where undesirable vegetation cannot be ignored, such as road shoulders and runway edges, this alternative is not an option.

Mechanical. Mechanical alternatives to glyphosate use include plowing, cutting/mowing, burning and steaming. PWA uses a combination of cutting/mowing and plowing where feasible – largely in the lower reaches of Calleguas Creek/Revolon Slough and Conejo Creek. This combination is an effective (but more expensive) practice in sandy bottom water courses. This method of control is not feasible, nor would it be effective, in rocky bottom water courses such as the Ventura River.

Due to the large areas to be treated, neither burning nor steaming is an option. With burning, there is the danger of igniting a large-scale fire, and steaming is not effective due to the length of time required for treatment.

Chemical. The use of alternative herbicides – including those thought of as “natural,” such as vinegar and/or organic herbicides – are covered by chemical alternatives. Alternative herbicides fall into seven product categories: natural acids (vinegar + citric acids), herbicidal soaps, iron-based herbicides, salt-based herbicides, phytotoxic oils (clove,



peppermint, pine, citronella), corn gluten, and combination products (including ingredients from multiple categories).

PWA and GSAPD have tried other herbicides and have not found an herbicide that is as effective on the full spectrum of vegetation that is treated. Further, other herbicides are noted as being more toxic than glyphosate in the EPA rankings and it may be argued that they have constituents that are harmful to the environment and human health that are not yet identified.

Vinegar mixtures have been tried by others with limited success even after multiple applications. Vinegar is not effective in treating some species of plants and is listed as a high toxicity agent by the EPA due to its irritating effects to human tissue. We do not have cost estimates associated with the use of other chemicals, although PWA Watershed Protection District's preliminary investigation has indicated ecofriendly herbicides could cost up to 20 times more than the glyphosate products.

A study by the University of Massachusetts (Exhibit 5, see pages 146-150) showed that glyphosate costs about \$20 per mile to control weeds along roadways. The study also found that the use of alternative materials, such as citric acid, acetic acid, clove oil, Scythe®, etc., varied in cost from \$120 to \$4,290 per mile. It is safe to assume that costs would increase simply because more frequent applications would be required. The higher toxicity of the alternatives might increase potential worker liability costs.

The DOA has tested other alternatives to using glyphosate products and found the following:

- Airport runways and taxiways must be available 24 hours, making it difficult and time consuming to eliminate adjacent vegetation.
- Tumbleweeds are a major problem at Camarillo Airport. Glyphosate has been found to be the best defense against them.
- Other glyphosate-based herbicides, like Rodeo and Aqua Master, have been tested and found to be less cost-effective than Roundup, and they do not penetrate the roots of tumbleweeds.
- Capstone, a glyphosate-free herbicide, has also been tested on tumbleweeds and found to be effective, but at three times the cost of glyphosate.

As a result, the DOA will explore installing drought-tolerant landscaping in public access areas of airport property.

Using alternative chemicals rather than glyphosate products can carry associated cost increases. The estimated cost of using an alternative chemical to glyphosate on DOA property is \$91,000 – an increase of \$26,000. The estimated cost of using an alternate chemical to glyphosate on GSAPD property is \$46,000, which increases costs by \$8,000.



Other herbicides used by GSAGD, such as Fusilade II, Gallery 75 DF, and Surflan AS, are not as effective as glyphosate, because they do not kill the roots, and they often kill desirable plants.

Electrical. In early 2019, PWA tested an electrical treatment method for vegetation management. It was determined to be of limited effectiveness for two reasons: It did not kill the roots of the plant, and it took as long as 30 seconds per plant to achieve its limited action. Because of the large scale on which PWA must accomplish its vegetation control, 30 seconds per plant would not accomplish the necessary control in the required timeframe. This method could be used for small treatment areas.

Biological. The biological alternative to glyphosate use at this time involves the use of goats, which consume the undesirable vegetation. Unfortunately, goats are not discriminating eaters. Goats are known to ingest wiring, copper, tubing and other critical equipment. Sheep are a possibility in large open areas, such as the wastewater treatment plant, for some surface vegetation clearing. Goats are not feasible where equipment or irrigation systems are in use.

Fire has experience using goats to clear large open areas. Goat or sheep use is restricted in and around watercourses – animal droppings negatively affect water quality by increasing bacteria loads. Limitations to the application of this solution rule out using it in the road right-of-way, where undesirable plants comingle with desirable plants, and where terrain and safety factors cannot be adequately addressed.

Manual. Manual alternatives to the use of glyphosate include hand mowers, weed-whackers, and hand-pulling. Captive labor, such as Probation Work Furlough crews, County staff, and contracted labor have been used in this capacity in the past and present. All manual alternatives include the removal of the vegetative matter and many applications involve stringent traffic control. This is the most expensive of the alternatives.

In 2014 the GSAPD discontinued the use of glyphosate on the Ojai Valley Trail in response to public concerns. The trail is nine miles long with 18 miles of shoulder to maintain. Because weed growth along pavement edges contributes to pavement failure from root growth and seed germination, weed control along the pavement edges is standard practice. In addition, certain weeds generate large quantities of tough thorns along the trail that are a frequent source of complaints. Staff has been manually removing weeds in place of spraying herbicide and has found that, at a minimum, the costs are 10 times higher to cut, mow, or manually remove weeds in place of using herbicide. In addition, due to the proximity of traffic, manual removal of weeds introduces a public nuisance resulting in multiple tort claims against the County for vehicle damage from string trimmers throwing rocks.

The estimated cost of manually removing weeds instead of using chemicals in GSAPD is \$180,000.



The Harbor Department has tried a variety of alternatives and has determined that none of the alternate methods have been as effective as glyphosate, as staff has been unable to identify a product which effectively kills the root of the weeds. As a result, the Harbor Department has resorted to more manual methods of controlling weeds, including weed whackers and manual removal from the rock revetment. These methods have increased operating costs by approximately \$60,000 per year. In addition, there is an increased risk associated with weed removal on the rock revetment as staff is manually removing weeds on extremely uneven surfaces.

GSAGD found that the following methods have been successful in the effort to clear weeds at the Government Center and other GSA-maintained facilities:

- Weed by hand and use string trimmers
- Install weed barrier textile and mulch to cover bare soil areas
- Plant native or non-invasive naturalized hearty plant species that do not require fertilizing or weeding, and that can compete with and choke out weeds
- Re-wild open areas and allow nature to dictate what happens
- Explore non-glyphosate-based herbicide alternatives

GSAGD costs have increased due to the discontinued use of glyphosate. While the glyphosate product costs decreased by \$600 annually, labor expenses increased by 650 hours, or \$53,000, annually based on the cost of a fully burdened Maintenance Worker II. These increased expenses have been offset through more effective landscaping strategies and other process improvements.

Because there is no single alternative method that can be substituted in all locations and instances of required vegetative management, the elimination of the use of glyphosate will require that a combination of the foregoing methods be employed by County agencies, increasing costs and the days needed for each acre maintained. Following are rough estimates of the cost of glyphosate treatment and the data PWA has developed on the costs of other methods of treatment:

Glyphosate application cost per acre treated = \$100 to \$300
(varies due to required application method – by hand and/or by boom truck spraying)



No treatment	0 times glyphosate application cost/acre
Chemical	5 times glyphosate application cost/acre
Biological	5 times glyphosate application cost/acre
Plow/Cut/Mow	10 to 20 times glyphosate application cost/acre
Manual (heavily dependent on vegetation growth, terrain & weather)	30 to 40 times glyphosate application cost/acre
Electrical	100 or more times glyphosate application cost/acre

A comparative cost analysis of the alternative methods of treatment is shown below:

Estimated Cost of using glyphosate (\$)			Estimated cost of not using glyphosate (\$)			
Agency	*Area(Acres)	Total \$ by Agency	Chemical	Plow/Cut/Mow	Manual	Electrical
Public Works Agency **	3,460	\$ 692,000	\$ 3.5M	\$ 10.4M	\$ 27.7M	\$ 69.2M
Airports ***	208	\$ 65,000	\$ 91,000	0	0	\$ -
Harbor	36	\$ -	\$ -	\$ -	\$ 60,000	\$ -
GSA Parks ****	230	\$ 38,000	\$ 46,000	0	\$ 180,000	\$ -
GSA Parks Leaseholds #	280	\$ -	\$ -	\$ -	\$ -	\$ -
GSA Grounds	134	\$ -	\$ -	\$ -	\$ 53,000	\$ -
Fire	20	\$ 500	\$ -	\$ -	\$ 4,000	\$ -
Total	4,368	\$ 795,500	\$ 3.6M	\$ 10.4M	\$ 28.0M	\$ 69.2M

*Area is the acreage that requires vegetation control and does not include developed areas.

**PWA estimates the cost of using glyphosate at \$200/acre. PWA estimates costs of not using glyphosate to be 5 times more for chemicals and biological; 15 times more for plow/cut/mow; 40 times more for manual; 100 times more for electrical.

***DOA's chemical estimate is based on using the herbicide Capstone or equivalent.

****GSA Parks chemical estimate is based on using the herbicide Capstone or equivalent.

#There are no County costs associated with glyphosate use at leasehold properties.

A Cornell University study (Exhibit 6), "Are there Alternatives to Glyphosate for Weed Control in Landscapes?", details the various alternatives to glyphosate. County agencies have tried several of the alternatives listed in the study with varying results. The alternatives have been found to be less effective and more expensive.

Best practices that other jurisdictions use

The County agencies that participated in the task group surveyed several other jurisdictions to explore alternatives and inquire about their best practices (Exhibit 7). The survey responses were mixed and did not find any common practices being used across the surveyed jurisdictions. The survey determined that many of the other jurisdictions continue to use glyphosate in a restricted or limited manner and that other alternatives are less effective and have a higher cost.

The best practices that the County and the surveyed jurisdictions have in common include:



- Ensure chemical mixing, spraying and training are conducted in the presence of a Qualified Applicator, licensed by the California Department of Pesticide Regulation.
- Do not spray when it is windy or if rain is forecast.
- Do not spray near creeks, rivers or other water courses.
- Place notification at locations being sprayed.
- Dye the herbicide to identify areas sprayed.
- Minimize the use of chemicals in landscaping areas through the use of the least toxic alternative whenever possible.
- Be more tolerant of the broadleaf weeds, specifically in open areas.
- Select and stage irrigation emitters and spray heads to avoid overspray or watering of unwanted weeds, thereby impeding their growth and conserving water.
- Use fertilizer application techniques to improve application accuracy, thereby minimizing contact and the nurturing of weeds.
- Use herbicide application techniques to reduce off-target application, including not using broadcast herbicides on lawn areas or beds and only using spot and small area treatments when needed.
- Be quick to mechanically and manually attack the weeds when they are young and slow to chemically treat them.
- Utilize Probation Work Furlough crews to perform hand weeding.
- Mulch, mow, string trim, scarify and disk the surfaces.
- Experiment with other non-glyphosate herbicides

Conclusion:

Based on the other jurisdictions surveyed, there is no single viable or effective alternative to glyphosate. Several of the jurisdictions surveyed continue to use glyphosate for the reasons indicated, some only as necessary or in areas that are not accessible to the public, and others in conjunction with other weed-control measures.

Based on the available research and data, glyphosate-based herbicides are used extensively for vegetation management because they are effective, broadband, and low in cost.

The use of alternative measures may require additional research to understand the environmental and public health risks.

There are many alternatives to glyphosate. Those alternatives have been found to be less effective and more expensive. The use of any single alternative or combination of



alternatives will increase operational and equipment costs – including, but not limited to, safety training and additional personal protective equipment.

This item has been reviewed by the County Executive Office, Agricultural Commissioner, Auditor Controller's Office, and County Counsel. If you have any questions regarding this item, please contact the following:

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Sincerely,



Jeff Pratt
Director
Public Works Agency

- Exhibit 1 – April 23, 2019 Board Letter Recommending Examination of the Use of Glyphosate
- Exhibit 2 – PowerPoint Presentation
- Exhibit 3 – Glyphosate Interactive Map
- Exhibit 4 – EPA News Release, April 30, 2019
- Exhibit 5 – University of Massachusetts Study, July 2008
- Exhibit 6 – Cornell University Study, February 2019
- Exhibit 7 – Surveyed Jurisdictions

