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## MEMORANDUM

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FROM: Brittanie Clendenin  
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SUBJECT: ESTIMATED ECONOMIC AND FISCAL IMPACT OF THE PROPOSED REGULATIONS MITIGATING IMPACTS TO POLLINATORS FROM NEONICOTINOIDS

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### Summary

The Department of Pesticide Regulation (DPR) is proposing pollinator protection mitigation measures for the use of the nitroguanidine-substituted neonicotinoids, imidacloprid, thiamethoxam, clothianidin, and dinotefuran (collectively referred to as “neonicotinoids”), in certain agricultural crops. DPR intends to implement mitigation measures through regulations. The proposed regulations will prohibit certain high pollinator exposure uses of these neonicotinoids, limit the rate and timing of applications specific to crop groups, prohibit their use during bloom, and establish seasonal application caps per crop group. This memorandum describes the estimated economic and fiscal impacts of the proposed regulations.

DPR’s economic impact estimate relies on a report developed by the California Department of Food and Agriculture (CDFA) Office of Pesticide Consultation and Analysis (OPCA), the University of California, and the University of California Cooperative Extension entitled “Economic and pest management evaluation of proposed regulation of nitroguanidine-substituted neonicotinoid insecticides: eight major California commodities” (Goodhue et al., 2021). The CDFA report dated July 2, 2021 is based on DPR’s proposed regulations, and estimates the economic effects of the proposed regulations on growers of eight major California commodities (crops). After receiving the analysis, DPR made slight changes to the proposed application timing for citrus crops. DPR then requested CDFA to analyze and determine the change in economic impact to citrus based off the revised application timings. CDFA’s OPCA provided a letter to DPR finding the changes to citrus to be negligible on the economic impact (Mace, 2021). Thus, even with the slight revisions to the mitigation proposal, DPR is relying upon CDFA’s July 2, 2021 report to provide information on the economic impact to the eight major commodities. To determine the statewide impact, DPR extrapolated the costs calculated by CDFA for the eight major crops to estimate the economic impact of the proposed regulations on the growers of the remaining impacted crops.

DPR anticipates that the proposed regulations will not have a fiscal impact on state or local government agencies. County agricultural commissioner (CAC) offices will be the local government agencies responsible for enforcing the proposed regulations. However, DPR

anticipates that any costs incurred by the CAC offices will be accommodated by their existing budgets and resources.

### **Introduction – Proposed Regulations**

DPR is actively reevaluating certain pesticide products containing the nitroguanidine-substituted neonicotinoid active ingredients imidacloprid, thiamethoxam, clothianidin, and dinotefuran. During the reevaluation, DPR determined that additional mitigation measures are necessary to protect pollinators from exposure to these four neonicotinoids during the production of certain agricultural crops. To address exposure concerns for pollinators, DPR is proposing regulations that include application restrictions for the use of the four neonicotinoids in the production of certain agricultural commodities. The proposed regulations include the following restrictions for specified crops and crop groups:

- Prohibit the use of neonicotinoids during bloom.
- Restrict the total combined application rate per season when multiple neonicotinoids are applied or both soil and foliar application methods are used.
- Restrict the rate and timing of neonicotinoid applications or prohibit certain uses for citrus fruit, pome fruit, and stone fruit crop groups.
- Restrict the rate and timing of neonicotinoid applications or prohibit certain uses if managed pollinators will be used in the field for berries and small fruits, cereal grains, coffee, cucurbit vegetables, fruiting vegetables, legume vegetables, oilseed, peanuts, root and tuber vegetables, tree nuts, and tropical and subtropical fruit.
- Prohibit the use of neonicotinoids if the crop is not harvested before bloom for bulb vegetables, globe artichokes, herbs and spices, hops, leafy vegetables, mint, and tobacco.

The above is a high level summary of the proposed regulations. See the full text of the proposed regulations for the complete scope of restrictions.

### **DPR's Estimated Statewide Direct Cost**

The CDFA report uses economic and pesticide use data from 2017–2019 to analyze the economic and pest management implications for eight focal crops that would be impacted by the proposed regulations. These eight crops are almond, cherry, citrus, cotton, grape, strawberry, tomato, and walnut. From 2017 to 2019, these eight crops accounted for approximately 90 percent of total acres treated with neonicotinoids and 89 percent of neonicotinoid use by pounds of active ingredient (AI) applied in treatments that would have been affected by the proposed regulations if they had been in effect at the time (Goodhue et al., 2021).

CDFA estimates that annual net return losses for all eight major crops would have totaled \$13.334 million in 2017, \$13.175 million in 2018, and \$12.155 million in 2019 if the draft

proposed regulations had been in effect during 2017–2019 (Goodhue et al., 2021). CDFA’s estimated impacts are the costs incurred by California growers and producers of the eight major crops due to changes in pest management costs for each crop based on the acres treated, the available alternatives, and the costs per acre of the alternative AIs.

Since the economic impact on the vast majority of estimated neonicotinoid use (89–90%) is already accounted for in the CDFA report, DPR is extrapolating the data to estimate the economic impact of the proposed regulations on 100 percent of the affected crops and use patterns. The overall economic impact of this regulation is based on the amount of use and type of use pattern that would no longer be able to occur or would be restricted under the proposed regulation. Therefore, DPR found the following strategy, to extrapolate based on use, to be appropriate.

First, DPR calculated the economic impact for neonicotinoid use on the crops not included in the CDFA report, assuming that the calculated costs were proportionately the same. DPR based this calculation on pounds of AI applied, as this covered the lower amount of estimated neonicotinoid use (89% versus 90%) and was more conservative.

Equation #1: Scaled econ. impact for remaining 11% of use= (Econ. impact based on 89% of use) $\times(11)/(89)$

This results in an estimated direct economic cost of \$1.502 to \$1.648 million.

Second, DPR considers that some of the minor crops not evaluated in the CDFA report may have different cost pressures that could impact direct economic impacts. As a result, DPR chose to double this amount to account for uncertainties including, but not limited to, changes in pest management practices from 2017–2019 to the time of implementation of the regulations. See uncertainties section (Pg. 4) for further discussion.

DPR calculated the final economic impacts for all crops as follows:

Equation #2: Econ. impact for all use = (Econ. impact based on 89% of use) + [2 $\times$ (Eq. 1)]

The result is a total estimated annual direct economic cost of \$15.159 to \$16.630 million for all crops that would be affected by the proposed regulations.

### **DPR’s Estimated Cost to Small Businesses**

DPR estimated the cost to small businesses (those with annual gross receipts not exceeding \$1 million, as defined by Government Code, Title 2, section 11342.610) using the United States Department of Agriculture (USDA) National Agricultural Statistics Service’s 2017 Census of

Agriculture (USDA 2019). The USDA report shows that about 70,521 farms operated in California during 2017, which had a combined total market value of agricultural products sold and government payments of \$43 billion. Of the 70,521 operating farms, 6,341 (9.0 percent) had an individual market value of agricultural products sold and government payments exceeding \$1 million, with a combined total value of \$39.7 billion. Based on USDA's 2017 agricultural census, DPR estimated that 91.0 percent of the growers were small businesses. Therefore 91.0 percent of the total direct cost will result in impacts to small business. DPR estimates that the annual direct cost to small businesses would be \$13.795 to \$15.133 million. This assumes the cost per grower for small businesses would be the same as the individual cost for other growers. This cost is already incorporated in the statewide direct cost.

### **DPR's Estimated Total Statewide Cost, Direct and Indirect Cost**

Using California Department of Finance's guidance, DPR assumed indirect cost to be equal to direct cost. That is, the total direct plus indirect costs were estimated as two times the direct cost. Using this assumption, DPR estimated that the annual combined direct plus indirect cost to small businesses would have been \$30.318 to \$33.260 million for California businesses. The total statewide dollar costs that businesses are expected to incur over the lifetime (5 years) of the proposed regulations is \$151.59 to \$166.30 million.

### **Uncertainties**

DPR's calculation of for the total statewide economic impact, relies on CDFA's report that assessed the economic impact of the proposed regulation to eight major California commodities. CDFA discussed uncertainties/caveats in their analysis of the eight major crops, and those uncertainties remain true for the total statewide cost calculated in this memorandum. A considerable uncertainty is the cost associated with changes in pest management practices from the time range of data used to develop this estimate (2017–2019) to the time of implementation of the proposed regulations. Beyond the uncertainties and caveats reported by CDFA in their analysis, there are a few caveats and assumptions when considering the viability of the extrapolated values in this memorandum. Most importantly, DPR's extrapolation assumes crops outside of the eight major crops in CDFA's report will not have yield losses as a direct result of the proposed regulations. In addition, neither CDFA, nor DPR attempted to estimate the cost increase or decrease resulting from resistance or changes in pests that are present. It is possible that pest resistance to neonicotinoids and other active ingredients could develop and result in higher economic impacts over time.

### **DPR's Estimated Fiscal Cost to State and Local Agencies**

DPR anticipates that the proposed regulations will not have a fiscal impact on state or local government agencies. DPR's budget revenue is based on fees from the registration and sale of

pesticide products, including neonicotinoids. The proposed regulations will not result in cancellation or prohibit the sale of any currently registered products. The proposed regulations would, however, affect the amount of neonicotinoids used, and in some cases, require growers to use alternative pesticide products. DPR expects any possible losses in general retail sales of neonicotinoid products to be offset by additional sales of other insecticide products. The expected decrease is likely to be a small percentage of DPR's overall mill assessment fee revenue and is likely to be offset by a small increase in sales of alternative pesticides. DPR anticipates that it will be able to absorb any difference within its existing budget and resources. Therefore, the proposed regulations are unlikely to have a fiscal impact on DPR. DPR does not expect any other state agencies to be affected by the proposed regulations, and thus no fiscal impact on state agencies is expected.

CAC offices are the local government agencies responsible for enforcing pesticide regulations in California, including any changes to pesticide regulations such as the proposed regulations. DPR establishes an annual work plan with the CACs, which already requires the CACs to conduct pesticide use inspections and investigations and enforce compliance with California worker protection laws and regulations. CACs will continue to enforce regulations according to their work plan and should be able to accommodate for any cost within their existing budgets and resources. Therefore, DPR anticipates that there will be no fiscal impact on these agencies. DPR does not expect any other local agencies to be affected by the proposed regulations, thus no fiscal impact on local agencies is expected.

### **Benefits**

DPR is unable to quantify the benefits of the proposed regulations. However, the proposed regulations are expected to result in reduced overall pollinator exposure to neonicotinoids; and therefore, benefit pollinator health. Additionally, the proposed regulations may decrease overall pollinator deaths, resulting in stronger bee colonies and potential financial benefits to beekeepers and growers. Today, more than 2.8 million managed honey bee colonies in the U.S. pollinate crops worth an estimated \$15 billion each year. Of these, over 1.1 million colonies are used in California. Both natural and managed pollinators are a critical piece to California agricultural, thus, protecting pollinators has economic benefits for the industry. Beyond pollinators, an overall reduction of neonicotinoid use may reduce impacts to other beneficial insects, mammals, and birds, and to the overall environment. However, DPR is not able to quantify these scenarios.

### **Alternatives**

DPR has not identified any feasible alternatives to the proposed regulatory action that would achieve the purpose of the regulations and be less burdensome, including impacts on small businesses. DPR explored four alternative mitigation options prior to this proposed action. Three

of the four alternative mitigation options were economically more burdensome, while one was less economically burdensome, but not feasible as it offered less protection for pollinators. DPR determined that the four alternatives were either unnecessary in achieving the purpose of the regulations and compliance with FAC section 12838, or offered significantly less protection for pollinators. DPR ultimately rejected all four alternatives.

*Alternative 1: Designate Neonicotinoids as Restricted Materials.* One alternative mitigation option would, in addition to establishing the comprehensive use restrictions discussed above, also designate the active ingredients as California restricted materials under 3 CCR section 6400. Pesticides may be designated as restricted materials based upon criteria specified in FAC section 14004.5, including hazards to honeybees. In general, active ingredients classified as restricted materials may be purchased and used only by or under the supervision of a certified commercial or private applicator under a permit issued by the local CAC. California requires permits for restricted materials so the local CAC can assess, in advance, the potential effects of the proposed application on health and the environment and establish site-specific requirements or restrictions over and above state regulations, if needed. In this case, the grower would need to obtain a permit from the local CAC to apply neonicotinoids in addition to complying with the restrictions identified in the proposed regulations. With the comprehensive nature of the restrictions proposed under these regulations, DPR does not anticipate the need for CACs to establish additional local restrictions. Thus, for this alternative, the mitigation measures implemented would be the same, but the means by which the mitigation is carried out would be slightly different. Additionally, most agricultural applications of neonicotinoids are already applied by certified applicators. Based on this, DPR determined that listing the active ingredients as restricted materials would not offer any significant additional environmental protections for pollinators because the restrictions are enforceable without site-specific permitting, and would require applicators to take an additional step, apply for a permit, to make the same application. Designating neonicotinoid active ingredients as restricted materials would result in additional costs for growers, including obtaining licensing or certification, getting a permit, and preparing and delivering to the CAC notices of intent each time they wished to apply the pesticide. CDFA analyzed the economic impact of this mitigation option in a report titled, “Economic impact on agricultural operations of making nitroguanidine-substituted neonicotinoid insecticides restricted material.” (Goodhue et al., 2019b.) In this report, CDFA only analyzed the impact of designating neonicotinoid active ingredients as restricted materials (not including the cost of additional restrictions), and estimated that the initial cost would be \$1.6 million and the estimated five-year lifetime cost would be \$6.58 million (Goodhue et al., 2019b). As the restricted material designation would be in addition to the comprehensive use restrictions proposed in this rulemaking action, the actual direct economic impact on growers would be a total of the cost of the restricted materials designation along with the cost of the proposed regulations discussed in this memo. As noted above, this alternative is not necessary to protect pollinator health, as it does not add significant additional environmental protections for pollinators, and thus is not included in the mitigation proposal.

*Alternative 2: Prohibition of Uses on Crops Designated as High Risk.* Another alternative would be to prohibit neonicotinoid use on crops identified as high risk in DPR's Risk Determination and Addendum. Use scenarios identified as high risk to honey bees include the following crops when at least one of the neonicotinoids was applied at maximum seasonal application rates: fruiting vegetables, cucurbit vegetables, citrus fruits, pome fruits, stone fruits, tree nuts, berries, and oilseed. Since risk to pollinators can vary depending on the application rate and the time of year when the application is made, DPR determined that this alternative is not necessary to effectively protect pollinators because it would prevent some low-risk applications where neonicotinoids serve a critical role in integrated pest management strategies. Within the high-risk crops, DPR analyzed additional data which indicate that certain applications made at lower rates, or earlier in the year, are of low risk to pollinators. Based on data on file, DPR determined that the currently proposed restrictions on application rates, application timing, and total seasonal application rate caps would effectively protect pollinators. Additionally, CDFA analyzed this scenario in a report titled, "Economic and pest management evaluation of nitroguanidine-substituted neonicotinoid insecticides: nine major California commodities." (Goodhue et al., 2019a.) In this report, it was estimated that the annual cost for prohibiting the high-risk neonicotinoid uses would be \$165–205 million (Goodhue et al., 2019a). However, as stated above, DPR rejected this alternative because it isn't necessary to effectively protect pollinators.

*Alternative 3: Same Use Restrictions for Moderately Attractive and Highly Attractive Crops.* Another alternative mitigation option would remove the distinction between highly attractive crops and moderately attractive crops. Under this alternative, moderately and highly attractive crops would receive the same level of mitigation. This alternative does not take into account a crops attractiveness as a food source and the portion of a bee's diet that the crop will likely account for. DPR found that moderately attractive crops are relatively less attractive food sources to bees and may only be attractive under certain conditions, such as when other food sources are unavailable. These crops are not expected to provide a significant portion of the bees' diet and thus, present less of a risk to pollinators. This option would increase restrictions on moderately attractive crops. DPR determined that this option is not necessary to protect pollinators and thus rejected the alternative to mitigate all crops as if they were highly attractive to pollinators.

*Alternative 4: Restrict Uses Only When Managed Pollinators are Used.* Another mitigation option would only establish crop restrictions when managed pollinators are used. This alternative does not take into account a crops attractiveness as a food source and the portion of a bee's diet that the crop will likely account for. DPR determined this alternative would have a lower economic impact, but would provide insufficient protection for pollinators. Only a limited number of crops use managed pollinators, and in addition, DPR found that citrus, a highly attractive crop to pollinators, does not rely on managed pollinators. Highly, and even moderately attractive crops, likely represent a significant portion of a bee's diet, yet would not have mitigation measures under this alternative option for the highest exposure risk period of bloom.

DPR found that more mitigation measures would be needed to protect all pollinators, even when managed pollinators are not relied upon. This alternative would fall short in protecting pollinators. While lower in economic impact, DPR found this alternative would not be equally effective in achieving the purposes of the regulation in a manner that ensures full compliance with FAC section 12838, as it does not sufficiently address risks to pollinators.

## Conclusions

DPR is proposing mitigation measures to protect pollinators from the use of the neonicotinoids in agricultural crops. CDFA estimated the economic impact that the proposed regulations would have on California growers of eight major crops during the years 2017 to 2019. DPR extrapolated the economic impacts from the report to estimate the impact on all crops treated with neonicotinoids. DPR's extrapolation contains uncertainties and may overestimate or underestimate costs. However, it provides useful information to assess the potential economic impact of the proposed regulations. For economic impact, DPR estimates that the total annual combined direct plus indirect cost is \$30.318 to \$33.260 million for California businesses. The total statewide dollar costs that businesses are expected to incur over the lifetime (5 years) of the proposed regulations is \$151.59 to \$166.30 million. DPR anticipates that the proposed regulations will have no fiscal impact on state or local government agencies.

## References

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