



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY AND POLLUTION PREVENTION

MEMORANDUM

DATE: June 23, 2022

SUBJECT: Proposed Revisions to the Atrazine Interim Registration Review Decision, Case Number 0062

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I. Overview

On September 14, 2020, the Environmental Protection Agency (EPA or the Agency) signed the *Atrazine Interim Registration Review Decision*, which can be found in docket EPA-HQ-OPP-2013-0266 at www.regulations.gov. Atrazine is a chlorinated triazine systemic herbicide that is used to selectively control annual grasses and broadleaf weeds before they emerge. Pesticide products containing atrazine are registered for use on several agricultural crops, with the highest use on field corn, sweet corn, sorghum, and sugarcane. Additionally, atrazine products are registered for use on macadamia nuts and guava, as well as non-agricultural uses such as nursery/ornamental and turf.

On October 30, 2020, Petitioners challenged the EPA's issuance of the atrazine Interim Registration Review Decision (ID) by filing a Petition for Review in the Ninth Circuit Court of

Appeals.¹ The Petition alleges that EPA violated its duties under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) by approving the atrazine ID based on a lack of substantial supporting evidence. In response to the Petition, EPA sought a voluntary partial remand that was granted by the court on December 14, 2021. Specifically, the voluntary partial remand was focused on re-evaluating the determination in the ID that the concentration of 15 micrograms per liter ($\mu\text{g/L}$) triggers required monitoring and/or mitigation² to protect aquatic plant communities.³

For the ID, EPA conducted a comprehensive ecological risk assessment for the registered uses of atrazine. Potential risks of concern were identified for mammals, birds, reptiles, amphibians, freshwater and estuarine/marine fish, aquatic invertebrates, terrestrial and aquatic plants, and aquatic plant communities. In the ID, EPA estimated potential exposure and risks associated with atrazine use to non-target birds, mammals, reptiles and amphibians; terrestrial invertebrates, including honeybees and other insect pollinators; and plants. Risk estimates (risk quotients, or RQs) were compared with EPA's level of concern (LOC). For ecological risk, RQs below the LOC are not of concern to the Agency. For all taxa in the terrestrial assessment, except for plants, the LOC for acute exposure is 0.5 and the LOC for chronic exposure is 1.0. The LOC for plants is 1.0. In the draft ecological risk assessment, the Agency identified potential chronic risk concerns for mammals, birds, terrestrial phase amphibians, reptiles, and aquatic invertebrates. The draft risk assessment assessed the maximum labeled, reduced, and typical application rates.⁴

During the partial remand EPA reevaluated the policy decision to use 15 $\mu\text{g/L}$ as the level of regulation for aquatic plant communities. The reevaluation concluded that this portion of the previous decision was not adequately supported by science. Based on this reevaluation, EPA determined that this level of regulation was not appropriate and is proposing, for public comment, additional mitigation to protect aquatic plant communities. Additionally, EPA has determined that the earlier explanation of this level of regulation was not clear and through this document clarifies its proposed revisions.

This document is organized into six sections. Section II (*Interpretation of the Aquatic Plant Community Concentration Equivalent Level of Concern [CE-LOC]*) clarifies and provides a broader explanation of EPA's determinations regarding the CE-LOC. Section III (*Further Analysis and Clarification Related to the Atrazine Interim Decision*) identifies sections of the 2020 atrazine ID that reflect the policy decision to use 15 $\mu\text{g/L}$ as the level of regulation for aquatic plant communities and reiterates EPA's determination that the CE-LOC of 3.4 $\mu\text{g/L}$ as a 60-day average is still supported by the best available science for the purposes of determining the need for any potential mitigation to protect aquatic plant communities. Section IV (*Review of Scientific Assessments*) includes the risk summary to aquatic plant communities, a summary of EPA's method for identifying predicted atrazine concentrations in watersheds, and EPA's review

¹ *Rural Coalition, et al. v. EPA, et al.*, (No. 20-73220) (9th Cir.).

² The requirements for registrants to revise atrazine labels to mitigate risk from the use of products containing atrazine were accepted on all atrazine product registrations and updated labels were stamped by the Agency on November 12, 2021.

³ The Agency did not seek a remand on any of the other determinations identified in the ID.

⁴ The ID also considered human health risks as well as consideration of benefits of the use of atrazine.

of the most current atrazine usage data available for field corn, sweet corn, sorghum, and sugarcane to assess any changes in the benefits of atrazine. Section V (*Proposed Additional Mitigations and Regulatory Rationale*) includes an overview of the proposed additional mitigation along with the regulatory rationale and describes the potential impacts of the proposed additional mitigation on atrazine users. Section VI (*Next Steps and Timeline*) provides information on the upcoming actions EPA will be taking after publication of this memorandum.

II. Interpretation of the Aquatic Plant Community Concentration Equivalent Level of Concern (CE-LOC)

In June 2016, EPA released the [Refined Ecological Risk Assessment for Atrazine](#) (ecological DRA) in support of registration review. In addition to reviewing the aquatic plant toxicity data for individual species, the toxicity of atrazine to aquatic plant communities was evaluated, and a Concentration Equivalent Level of Concern (CE-LOC) of 3.4 µg/L was identified. The CE-LOC can be interpreted as a 60-day average concentration of atrazine that, when exceeded, presents a greater than 50% chance of negatively affecting community structure or function of an aquatic environment. While the CE-LOC is based on effects to aquatic plant communities, by ensuring protection of primary producers, it is intended to also provide protection for the entire aquatic ecosystem, including fish, invertebrates, and amphibians. The scientific basis for the 3.4 µg/L CE-LOC is well described in the 2016 ecological DRA, along with an in-depth description of the method for determining the level of concern for aquatic plant communities.

EPA acknowledges the recent confusion over the CE-LOC, its determination in the 2016 atrazine ecological risk assessment, and the communication in the [Regulatory Update on the Registration Review of Atrazine](#) (2019 regulatory update) and, ultimately, in the September 2020 interim decision. This was recently addressed, in detail, in response to a letter dated March 11, 2022 from the Triazine Network, available at [EPA-HQ-OPP-2013-0266-1620](#). The value of 15 µg/L as a 60-day average in the 2019 regulatory update represented a prior policy decision, made by the prior administration, to identify a value above the CE-LOC of 3.4 µg/L (as determined in the 2016 ecological assessment) as the basis for determining the need for potential regulation of atrazine to protect aquatic plant communities during registration review. To date, EPA has received no new data or information that would change the analyses it presented in the 2016 risk assessment. Throughout this process, EPA's scientific determination of the CE-LOC remained at 3.4 µg/L as a 60-day average.

Concerns have been raised regarding whether EPA considered and incorporated recommendations from a 2012 Scientific Advisory Panel (SAP) when deriving the CE-LOC of 3.4 µg/L. As described in a Response to Comments document ([EPA-HQ-OPP-2013-0266-1267](#)) and further discussed below, EPA has carefully considered and incorporated feedback from the 2012 SAP where appropriate.

In response to feedback and recommendations provided at the 2012 SAP meeting on the CE-LOC, for the 2016 atrazine ecological risk assessment, EPA:

- 1) separated studies using flowing waters from studies using still waters,
- 2) investigated bias in choice of plant species in laboratory and cosm studies,

- 3) removed studies with endpoints from exposure durations and magnitudes that are not environmentally relevant,
- 4) evaluated the uncertainties inherent in the available cosm dataset and evaluated and quantified the cumulative error in the CE-LOC estimation,
- 5) re-reviewed studies with effects below 30 ppb, including the 11 cosm studies identified in the SAP meeting as warranting re-review, and
- 6) reviewed additional studies identified in the literature.

In the re-review of cosm studies with effects below 30 ppb, EPA did not find any errors in our interpretation of those studies or endpoints.

In the 2019 atrazine regulatory update, the Agency communicated a risk management approach for atrazine that used 15 µg/L as a 60-day average rather than the CE-LOC of 3.4 µg/L to determine the need for potential mitigation during registration review to protect aquatic communities. Based on public comments received on the 2016 draft ecological risk assessment, and EPA's acknowledgement that differences in the interpretation of effects, scoring methodology, sources of uncertainty inherent in the models, and splitting of functional groups, can greatly influence the resulting CE-LOC, the regulatory update also included a quantitative uncertainty analysis of EPA's interpretation of the 11 cosm studies that were identified at the 2012 SAP meeting as deserving a more in-depth evaluation. This quantitative analysis expanded upon the discussion of each of those 11 cosm studies in the 2016 ecological risk assessment, evaluating the impact on the CE-LOC of 3.4 µg/L if those studies were re-scored, as suggested by a panelist at the 2012 SAP meeting. However, the regulatory update did not communicate a scientific change in EPA's position on the validity or scoring of those 11 cosm studies, nor did it communicate a change in the CE-LOC of 3.4 µg/L, as EPA's re-evaluation of the 11 cosm studies did not conclude that these changes were warranted. Instead, EPA announced a risk management approach to mitigating potential risk to aquatic plant communities and set a regulatory level of 15 µg/L for this purpose. The value of 15 µg/L was not determined based on an analytical assessment, instead it was a risk management policy decision made by the prior administration based on balancing risks and benefits. There are no models, calculations, or statistics that produced the value of 15 µg/L selected as the regulatory level. To date, no new data or information has been submitted that would change the analyses presented in the 2016 risk assessment. During the reevaluation of this issue, EPA determined that this policy decision was not based in sound science. As such, EPA has concluded that the assessment establishing a CE-LOC of 3.4 µg/L is still supported by the best available science.

III. Further Analysis and Clarification Related to the Atrazine Interim Decision

After further analysis, EPA has determined that clarifications are needed in the following sections of the *Atrazine Interim Registration Review Decision* (September 2020) as it relates to the partial remand issue.

1. On page 24, in Section III.B.1., under the subtitle *Aquatic Plant Communities*, paragraphs three, four and five state, "Given the complex nature of mesocosm and microcosm studies, the various protocols used in the conduct of these studies, the model

uncertainty described in the 2016 risk assessment, the recommendation of the SAP, the potential for recovery of the aquatic plant community following exposure, and the high agricultural benefits provided by atrazine, the Agency considers it appropriate to present a range of concentrations that accounts for these factors for risk management purposes under Registration Review.

In view of the range of 1.9 to 26 µg/L presented in Table 1, the Agency believes it is reasonable to focus on the upper end of the range as recovery is more likely at lower concentrations. For the purposes of determining the need for any potential mitigation to protect aquatic plant communities during Registration Review, EPA will use the concentration of 15 µg/L as a 60-day average, which is at the upper end of the distribution of values presented in Table 1.

For more details about EPA's decision to use the concentration of 15 µg/L as a 60-day average for the purposes of determining the need for any potential mitigation to protect aquatic plant communities during Registration Review, please see the Regulatory Update on the Registration Review of Atrazine (October 21, 2019) in the atrazine docket (EPA-HQ-OPP-2013-0266)."

2. On pages 9 and 10, Section I.C., under the title *Comments Regarding the Regulatory Update on the Registration Review of Atrazine (October 22, 2019) and the Concentration-Equivalent Level of Concern (CE-LOC) for aquatic plant communities*, EPA's response states, "The Agency appreciates the commenters' input. However, the Agency's decision to use the concentration of 15 µg/L as a 60-day average for the CE-LOC has not changed. As discussed in the PID, in response to significant public comments, concerns, and inherent uncertainty related to the data, assumptions, and interpretations used to arrive at the CE-LOC in the 2016 draft atrazine ecological risk assessment, EPA considered alternate approaches for inclusion, evaluating/scoring, and interpretation of the atrazine ecosystem and related studies (e.g., mesocosm and microcosm studies). The Agency acknowledges that differences in the interpretation of effects, scoring methodology, and splitting of functional groups can greatly influence the resulting CE-LOC. There are also sources of uncertainty inherent in the models used to calculate the CE-LOC. Utilizing the scoring and study exclusions recommended by the 2012 Scientific Advisory Panel (SAP) for mesocosm and microcosm studies, and accounting for model sources of uncertainty, the resulting CE-LOC ranges from 1.9 to 26 µg/L with a median of 8.5 µg/L.

Given the complex nature of mesocosm and microcosm studies, the various protocols used in the conduct of these studies, the model uncertainty described in the 2016 risk assessment, the recommendation of the SAP, the potential for recovery of the aquatic plant community following exposure, and the high agricultural benefits provided by atrazine, the Agency considers it appropriate to present a range of concentrations that accounts for these factors for risk management purposes under Registration Review. In view of the range of 1.9 to 26 µg/L, the Agency believes it is reasonable to focus on the upper end of the range as recovery is more likely at lower concentrations. Therefore, for the purpose of determining the need for any potential regulatory action or mitigation to

protect aquatic plant communities during Registration Review, EPA will use the concentration of 15 µg/L as a 60-day average, which is at the upper end of the distribution of values. For more information see the October 22, 2019, Regulatory Update on the Registration Review of Atrazine available in the public docket (EPA-HQ-OPP-2013-0266).”

EPA acknowledges that the CE-LOC discussion, its determination in the 2016 atrazine ecological risk assessment, and the communication in the 2019 atrazine regulatory update and, ultimately, in the September 2020 interim decision could have been clearer. The following discussion provides a better explanation. The value of 15 µg/L as a 60-day average in the regulatory update represented a policy decision, made by the prior administration, to identify a value above the CE-LOC as the basis for determining the need for potential regulation of atrazine to protect aquatic plant communities during registration review. To date, EPA has received no new data or information that would change the analyses it presented in the 2016 risk assessment. Throughout this process, EPA’s scientific determination of the CE-LOC remained at 3.4 µg/L as a 60-day average. The scientific basis for the 3.4 µg/L CE-LOC is well described in the 2016 ecological risk assessment, which includes an in-depth description of the method for determining the level of concern for aquatic plant communities.

During the process of determining the CE-LOC, after following and incorporating many of the suggestions provided at the 2012 SAP meeting, the Agency: (1) separated studies using flowing waters from studies using still waters; (2) investigated bias in choice of plant species in laboratory and cosm studies; (3) removed studies with endpoints from exposure durations and magnitudes that are not environmentally relevant; (4) evaluated the uncertainties inherent in the available cosm dataset and evaluated and quantified the cumulative error in the CE-LOC estimation; (5) re-reviewed studies with effects below 30 ppb; and (6) reviewed additional studies identified in the literature. In the re-review of cosm studies with effects below 30 ppb, the Agency did not find any errors in the interpretation of those studies or endpoints. No new data or information has been submitted to date that would change the Agency’s analyses presented in the 2016 atrazine ecological risk assessment. As such, the Agency has concluded that the CE-LOC of 3.4 µg/L as a 60-day average is still supported by the best available science for the purposes of determining the need for any potential mitigation to protect aquatic plant communities.

IV. Review of Scientific Assessments

Risk Summary for Aquatic Plant Communities

The Agency’s process to determine the level of concern (LOC) for atrazine in aquatic ecosystems to protect aquatic organisms is described in the 2016 [*Refined Ecological Risk Assessment for Atrazine*](#). As mentioned in the 2016 ecological DRA, there was a need to develop a quantitative measure of the relative severity of different exposure time series to compare effects among different experimental ecosystem exposure and to extrapolate those to the field. Therefore, the methodology to determine the LOC uses single-species plant toxicity data and microcosm/mesocosm (cosm) studies to determine what atrazine exposure patterns and concentrations can cause adverse effects on aquatic plant communities. A different assessment methodology was used to address risk to aquatic plants because, although aquatic plants are

generally more sensitive than fish and aquatic invertebrates, the risk assessment endpoint relates to community structure/function rather than growth, reproduction, and survival of an individual species.

The CE-LOC was derived to ensure that the atrazine concentrations in watersheds did not cause detrimental changes in aquatic plant community structure and productivity. While the CE-LOC is based on effects to aquatic plant communities, by ensuring protection of primary producers, it is intended to also provide protection for the entire aquatic ecosystem, including fish, invertebrates, and amphibians. The focus on toxicity to aquatic plant communities is necessary to ensure that the atrazine concentrations in watersheds do not cause significant changes in plant community structure, function and productivity and thus put at risk the food chain (*e.g.*, reducing food for fish, invertebrates, and birds) and ecosystem integrity (*e.g.*, erosion control and animal habitat). Therefore, exceedances of the CE-LOC of 3.4 µg/L are considered far more meaningful than exceedances for any single aquatic plant species. Potential effects on the entire aquatic ecosystem include reduced biological diversity, reduced food items for fish, birds and mammals, reductions in spawning and nursery habitat, increased erodibility, and reduction in overall water quality. Impacts on smaller scale communities such as headwater streams, ponds, and wetlands could carry over to larger rivers, lakes, and reservoirs which contain organisms that depend on the headwaters and microhabitats the CE-LOC is intended to protect for refuge (*e.g.*, during high flow events, thermal events, predation, and competition) and rich feeding sites for spawning and nursery habitats.

During the re-evaluation process as related to the partial remand of the atrazine ID, the Agency employed the Watershed Regression for Pesticides for Multiple Pesticides (WARP-MP) model in conjunction with incorporation of the most recent water monitoring data from the Atrazine Ecological Exposure Monitoring Program (AEEMP), USGS, and the National Center for Water Quality Research (NCWQR) to conduct an analysis of predicted atrazine concentrations on the sub-watershed scale (hydrologic unit code [HUC]⁵ 12 or 12-Digit HUCs). To investigate which watersheds would exceed the CE-LOC, 12-digit HUCs were ranked by atrazine concentration (the highest of monitoring data or WARP-MP predictions) and assigned a percentile. Two bins were developed; with bin one encompassing “watersheds that were above the CE-LOC of 3.4 µg/L and below the 90th percentile of watersheds,” and bin two encompassing “watersheds exceeding the 90th percentile of the distribution of estimated environmental concentrations (EECs).” The 90th percentile of watersheds was determined to have a WARP-MP-predicted atrazine concentration of 9.8 µg/L. The analysis of all 12-digit HUCs (watersheds) in the continental U.S. (82,951 total) found predicted atrazine concentrations between 3.4-9.8 µg/L in 6,014 watersheds and predicted concentrations greater than or equal to 9.8 µg/L in 8,733 watersheds. The proposed mitigation options to address atrazine runoff in watersheds with predicted atrazine concentrations above the CE-LOC of 3.4 µg/L were compiled from previous mitigation actions and peer-reviewed research studies. Some mitigation practices were determined to be ineffective at reducing concentrations of pesticides in runoff (generally because they were aimed at reducing sediment loads in runoff), already in widespread use (therefore not providing any additional reductions in estimated environmental concentrations), or infeasible for

⁵ For more information on Hydrologic Unit Codes refer to:

https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1042207.pdf

a grower to adopt. The proposed mitigation options in Appendix A were determined to be effective options for reducing pesticide concentrations in runoff. In addition to reviewing available literature, EPA modeled the efficacy of several mitigation measures at reducing aquatic atrazine concentrations using the Pesticide in Water Calculator (PWC; Young 2014a⁶, Young 2014b⁷). Together, the findings from PWC modeling and the literature review suggest that the efficacy of mitigation measures will depend on environmental factors and the specific implementation of the mitigation measure. For additional background and technical information on the Agency's approach to conducting analysis for predicting atrazine concentrations on the sub-watershed scale, please see the Environmental Fate and Effects Division's (EFED) *EFED Support Documentation of the Proposed Revisions to the Atrazine Interim Decision Regarding Risks to Aquatic Plant Communities* (June 2022).

Benefits Assessment

Atrazine is widely used in field corn, sweet corn, sorghum, and sugarcane – over half of all acres planted of each of these crops are treated with atrazine each year. Atrazine is an important herbicide in these crops because it is economical, has a flexible use pattern, long residual herbicidal activity, is effective against a broad spectrum of weeds, and is an important tool in management of herbicide-resistant weeds. The benefits of atrazine are high in these four crops, increasing grower net operating revenue by up to \$30 per acre in field corn, up to \$52 per acre in sweet corn, up to \$16 per acre in sorghum, and up to \$13 per acre in sugarcane compared to the next best alternative weed control options. These benefits are estimated as the impact on growers if atrazine were not available – without atrazine, growers would face up to a 61% decrease in net operating revenue in field corn, up to complete net revenue loss in sweet corn, up to a 67% decrease in net operating revenue in sorghum, and up to a 17% decrease in net operating revenue in sugarcane.

As part of the Agency's re-evaluation process as related to the partial remand of the atrazine ID, the Biological and Economic Analysis Division (BEAD) reviewed the most current atrazine usage data available for field corn, sweet corn, sorghum, and sugarcane utilizing a combination of market research data, extension literature and stakeholder outreach to assess any changes in the benefits of atrazine as well as the impacts of any proposed additional mitigation options. BEAD's *Assessment of the Benefits of Atrazine and the Impacts of Potential Mitigation for Field Corn, Sweet Corn, Sorghum, and Sugarcane* (June 2022) provides both a summary of previous 2019 assessments used in the ID as well as the most current use and usage data, benefits, and impacts of proposed additional mitigation for field corn, sweet corn, sorghum, and sugarcane. The most recent benefits and impacts analysis in BEAD's *Assessment of the Benefits of Atrazine and the Impacts of Potential Mitigation for Field Corn, Sweet Corn, Sorghum, and Sugarcane* (June 2022) supplements the findings specific to field corn, sweet corn, sorghum, and sugarcane in Section II., Section III.C., and Section IV.C. of the atrazine ID.

⁶ Young, D. F. 2014 (a). The Variable Volume Water Model. U.S. Environmental Protection Agency, Washington, DC. USEPA/OPP 2014, 734F14003.

⁷ Young, D. F. and Fry, M.M. 2014 (b). A Model for Predicting Pesticide in Runoff, Erosion, and Leachate: User Manual. U.S. Environmental Protection Agency, Washington, DC. USEPA/OPP 2014, 734F14002.

V. Proposed Additional Mitigations and Regulatory Rationale

Overview of Proposed Additional Mitigation to Reduce Atrazine Runoff and Risks to Aquatic Plant Communities

Through analysis of modeling data in combination with available monitoring data, EPA has identified watersheds that exceed the CE-LOC of 3.4 µg/L and determined the level of additional mitigation needed to address this concern. The Agency's approach is targeted to provide maximum level of flexibility (recognizing atrazine's high benefits) while addressing the need for mitigation. EPA expects the developed list of potential mitigation options will reduce atrazine runoff and thus decrease environmental concentrations in those watersheds with exceedances, while also providing flexibility to growers and allowing for the continued use of atrazine.

The mitigation options being proposed focus on reducing potential exposure and risk to aquatic plant communities from atrazine via runoff from agricultural uses. The four major agricultural use sites for atrazine are field corn, sweet corn, sorghum, and sugarcane, with the most recent market research data suggesting that over half of all acres grown are being treated with atrazine annually⁸. The Agency has reviewed the risks and benefits of atrazine use in developing its proposal for additional mitigation to protect aquatic plant communities. To address potential risks of concern to aquatic plant communities from runoff as the major route of exposure, EPA has determined that the following proposed general runoff reduction measures are needed for all atrazine labels:

- prohibiting application of atrazine products when soils are saturated or above field capacity
- prohibiting application of atrazine containing products during rain or when a storm event likely to produce runoff from the treated area is forecasted (by NOAA/National Weather Service, or other similar forecasting service) to occur within 48 hours following application
- prohibiting aerial applications of all formulations
- restricting annual application rates to 2.0 lbs ai/A/year or less for applications to sorghum, field corn and sweet corn

In addition to the general runoff reduction measures listed above, the Agency is proposing to add a "picklist" to labels where growers must select a combination of application rate reductions and/or runoff mitigation measures if the field is located in a watershed with predicted atrazine concentrations that exceeds 3.4 µg/L in order to further mitigate potential risks to aquatic plant communities. In developing the picklist, the Agency considered a variety of factors including crop, soil group, slope, weather conditions, and application timing, which all influence the volume and intensity of water running off a treated field. These factors may vary even across a single field, and as such, the applicator must evaluate active conditions and make appropriate

⁸ Kynetec USA, Inc. 2020b. "The AgroTrak® Study from Kynetec USA, Inc." Microsoft Access Database. Database Subset: 2015-2019. [Accessed January 2022].

adjustments when applying atrazine products. In addition to the factors described above, the number of picklist requirements is dependent on the predicted atrazine concentrations in watersheds where fields are located. There are no picklist requirements for fields located in watersheds with predicted atrazine concentrations below 3.4 µg/L. However, there will be varying levels of picklist requirements for fields located in watersheds with predicted atrazine concentrations either between 3.4-9.8 ug/L or those above 9.8 ug/L. The highest number of picklist requirements are expected in fields located in watersheds with predicted atrazine concentrations above 9.8 ug/L.

The Agency is also proposing to require enhanced record-keeping from applicators to ensure compliance with the additional runoff mitigation requirements being proposed, and to allow for possible future evaluation of the effectiveness of the mitigation. The proposed record-keeping measures are as follows:

- Full name and certification number of the certified applicator
- Product name and EPA registration number
- Total amount of product applied
- Application month, day and year with start and finish times
- Crop receiving the application
- Location of the application (address, crossroads, or GPS coordinates)
- Size of area treated
- Application Timing: whether the applicator applied the product preemergence or post emergence
- Tank Mix Products: a list of all products (pesticides, adjuvants, and other products) that the applicator tank mixed with the atrazine product for each application including the EPA registration numbers in the case of any pesticides
- Conservation practice(s) that were chosen from the proposed picklist for implementation prior to atrazine applications (if applicable)

The proposed watershed-scale label requirements in Appendix A of this memorandum outlines a picklist approach that was chosen based on predicted atrazine concentrations in watersheds where fields are located, crop, region, field topography, soil group, and application rate to provide atrazine users flexibility while still reaching runoff reduction goals. Collectively, these proposed additional mitigation measures and record-keeping requirements are expected to reduce overall atrazine exposure to aquatic plant communities and potential risk to other non-target species.

Impacts of Proposed Mitigation

The Agency is proposing mitigation measures to reduce runoff risks to aquatic plant communities from the use of atrazine, including limiting when and how atrazine can be applied, reducing maximum use rates, and requiring the adoption of engineering and agronomic practices that reduce runoff. While certain proposed mitigations would be required for all growers to adopt, the Agency is also proposing requiring a “picklist” for field corn, sweet corn and sorghum where growers can select some combination of runoff mitigation measures to reduce runoff to

continue using atrazine. Compared to specifying a fixed set of mitigations, a picklist of mitigation measures gives growers flexibility, allowing growers to select the least burdensome method to achieve the required number of practices necessary to use atrazine. The number of proposed mitigation practices required for growers to adopt is determined by crop, region, soil erodibility, and watershed. Further, the Agency's proposed mitigation practices provide flexibility for growers by allowing growers who need higher rates to be able to use higher rates when necessary while still reducing atrazine runoff by adopting other measures. The Agency's proposed picklist of conservation practices for field corn, sweet corn and sorghum is as follows:

- No preemergence applications (to the crop)
- Greater than or equal to 30 ft vegetative filter strips on A and B hydrologic group soils⁹
- Greater than or equal to 100 ft vegetative filter strips on C and D hydrologic group soils
- Grassed waterway
- Field border
- Irrigation water management
- Cover crop
- Contour buffer strips
- Contour farming
- Terrace farming
- Strip cropping
- Soil incorporation to a depth of 2.5 cm (1 in)
- No tillage/ reduced tillage

The impact on growers from the proposed mitigation is as follows:

- Reducing the rate of atrazine used is likely to complicate herbicide resistance management by potentially increasing selection pressure for atrazine-resistant weeds and making atrazine less effective as a tool to control weeds that are resistant to other herbicides. The lower the new maximum rate, the larger the number of growers impacted, and the more difficult it will be for growers to reduce their rate and still continue to use atrazine effectively. Depending on the magnitude of the rate reduction, growers may be able to achieve effective control with lower atrazine rates using banded applications, tank mixes, or reduced number of applications. The impacts of annual rate reductions vary both between crops and between regions within crops. Regionally, rate reductions are likely to be less feasible for growers of field corn, sweet corn, and sorghum in the Southern U.S. and for sugarcane growers in Florida. However, the Agency is proposing to allow higher rates in Southern field corn production and Florida sugarcane production, which will give Southern field corn growers and Florida sugarcane growers flexibility to use higher rates as needed, reducing regional disparities in the burden imposed by rate reductions.
- Not using aerial applications of atrazine, not making applications of atrazine when soil is saturated, and not applying atrazine for 48 hours prior to forecasted rainfall that is likely

⁹ More information on hydrologic soil groups is available at:
<https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>

to produce runoff would limit the ability of growers to use atrazine in the period from 48 hours before rain is expected until the ground is no longer saturated. Growers are unlikely to apply shortly before a rainfall that they expect to produce runoff as this could result in poor weed control and may be unable to make ground applications to saturated soil, so the impact of this restriction may not be high. However, timely applications during this period may be delayed. If weed control is necessary in that window of time, growers would need to seek alternatives to atrazine, facing impacts as described above, or else face yield losses.

- Restricting applications of atrazine during rainfall or for 48 hours prior to a forecasted storm event that is likely to produce runoff is not expected to have a large impact on growers. This application does not prohibit applications prior to light rain. While growers often need some rainfall or irrigation in order to activate atrazine, growers are unlikely to apply atrazine prior to a storm event likely to produce runoff, as their product would not stay on the field as intended, resulting in poor weed control.
- Not using preemergence applications eliminates a common application timing for atrazine, but is likely feasible for some growers, especially sweet corn growers. Atrazine is frequently used prior to crop emergence in sorghum and field corn production, and to a lesser extent in sweet corn. Some growers who currently use atrazine prior to crop emergence can move these applications after crop emergence, but may face cost increases to replace weed control prior to crop emergence. Growers who use atrazine twice a year would need to replace atrazine, and may face cost increases or a reduction in weed control.
- Depending on tank mix partners used with atrazine, growers may use soil incorporation, but this application method is only viable preplant. Therefore, soil incorporation cannot be used in conjunction with eliminating preemergence applications and is not compatible with no-till or conservation tillage systems.
- No- or reduced-tillage production may be feasible for many corn and sorghum growers. Switching to no-till or conservation tillage systems would likely require investment in new equipment for managing the crop under high-plant residue conditions. Also, as no-till and reduced tillage systems rely heavily on herbicides for early-season weed control these systems may increase the cost of other mitigation measures such as reducing application rates or prohibiting preemergence applications. These systems are not feasible in sugarcane because tillage is important for weed control in sugarcane and are unlikely to be feasible in sweet corn because the crop does not establish well in no- or reduced-till fields.
- Cover crops can be incorporated into corn and sorghum production systems that have adequate natural rainfall or are irrigated (e.g., the Corn Belt and Southeast) but are less feasible in dryland areas with low rainfall (e.g., the Plains states). Cover crops are unlikely to be feasible for use with sweet corn due to the low seeding vigor of sweet corn and are not feasible for use with sugarcane due to the perennial production system.
- Irrigation water management requires managerial expertise and may require purchasing specialized equipment. Irrigation water management can only be done on irrigated fields and is not applicable to dryland production systems.
- The impact of adopting vegetative filter strips (VFS), field borders, grassed waterways, contour buffer strips and contour terracing, and grass ditch banks is dependent on the size of the field and on the size of the required buffer. As buffers take land out of production,

EPA anticipates that growers could face substantial loss of cultivated land and thus loss of revenue. Growers with smaller fields and growers of crops that are typically grown in small fields, particularly sweet corn and sugarcane, would lose a larger portion of their field to buffers compared to growers with large fields if adoption of VFS is chosen. VFS have additional costs to establish and maintain, with establishment costs ranging from \$165-\$927 per acre of VFS and maintenance costs ranging from \$40-\$240 annually per acre of VFS. Contour terracing may be more expensive than other kinds of buffers, as they require the creation of semi-permanent ridges. Contour buffer strips and terracing are only possible on sloped land that has contours to follow, and are not applicable to sugarcane production, which is generally grown in flat areas.

- Contour farming and strip cropping may be feasible for production of annual crops on sloped fields but may require substantial managerial effort and purchasing specialized equipment. Like contour buffer strips and terracing, contour farming and strip cropping are not feasible on flat land and are not likely to be applicable to sugarcane.

The impacts of complying with a required picklist depend on the grower's current agronomic production practices, region of the country, and whether the grower is already undertaking any of the measures described on the proposed mitigation picklist. Some runoff reduction practices preclude adoption of other practices. How burdensome this proposed picklist is for growers depends on how many runoff reduction practices are required for growers to use atrazine. It may be harder for sweet corn and sugarcane growers to adopt multiple practices from the proposed picklist compared to field corn and sorghum growers, therefore, the Agency is proposing to require only one conservation practice for sugarcane and requiring fewer practices be adopted in sweet corn relative to field corn and sorghum. The potential mitigations may also be more burdensome for small and lower-income farmers. Growers for whom achieving the required number of required practices is too burdensome will have to replace atrazine with other herbicides and will lose the benefits of atrazine as described previously.

For additional information on the impacts of these proposed mitigations on growers, please see *Assessment of the Benefits of Atrazine and the Impacts of Potential Mitigation for Field Corn, Sweet Corn, Sorghum, and Sugarcane* (June 2022) in the docket.

Regulatory Rationale for Proposed Additional Mitigation

In evaluating potential risk mitigation for atrazine to address risks to aquatic plant communities, the Agency considered the risks, benefits, and use patterns of atrazine, as well as the potential impacts of the proposed mitigation. EPA's Office of Pesticide Programs (OPP) had several discussions with USDA's Office of Pest Management Policy (OPMP) about potential mitigation measures. As a result of these discussions, OPP provided OPMP with a set of outreach questions for weed scientists and extension specialists regarding current atrazine runoff reduction practices categorized by crop. OPMP sent these questions to the weed scientists and extension specialists. OPP took the responses synthesized by OPMP into account while considering the impacts and benefits of preliminary runoff mitigation options. A copy of OPP's questions and the responses received from OPMP can be found in the atrazine docket: [EPA Information & Data Inquiry on Proposed Atrazine Runoff Mitigations for Field Corn, Sorghum, Sugarcane and Sweet Corn](#). The benefits of continued atrazine use are high because it is economical, has a flexible use

pattern, long residual herbicidal activity and is effective against a broad spectrum of weeds. However, the Agency determined that additional proposed mitigation is necessary to address the identified potential risks of concern to aquatic plant communities. The mitigation focus on toxicity to aquatic plant communities is needed to ensure that atrazine concentrations in watersheds do not cause significant changes in plant community structure, function and productivity and thus put at risk the food chain with potential effects on the entire aquatic ecosystem including reduced biological diversity, reduced food items for fish, birds, and mammals, reductions in spawning and nursery habitat, increased erodibility, and reduction in overall water quality. Additionally, based on the benefits of atrazine and risk mitigation impacts analysis, implementation of the proposed mitigation is not expected to result in an unreasonable burden to growers.

Regulatory Rationale for General Proposed Mitigation on All Atrazine Labels

The proposed general mitigation measures for all atrazine labels are expected to reduce potential risks of concern to aquatic plant communities from runoff as the major route of exposure. The proposed mitigation prohibiting atrazine applications during periods of active rainfall, when a storm event likely to produce runoff events is forecasted to occur within 48 hours following application, or applications to saturated soils align with best management practices that are generally already implemented by atrazine users. Prohibiting all aerial applications is expected to reduce the potential for atrazine runoff while also reducing risk to non-target species from spray drift. According to current usage information identified in *Assessment of the Benefits of Atrazine and the Impacts of Potential Mitigation for Field Corn, Sweet Corn, Sorghum, and Sugarcane* (June 2022), 99% of atrazine applied to field corn and sorghum is applied via ground applications, 95% of atrazine applied to sweet corn is applied via ground applications, and there are no reported aerial applications to sugarcane. Therefore, the Agency has determined that the proposed general mitigation requirements will not fundamentally change how atrazine is used by most growers and is expected to reduce potential risks of concern to aquatic plant communities via atrazine runoff.

Regulatory Rationale for Proposed Mitigation: Field Corn

Limiting maximum application rates of atrazine would reduce the amount of atrazine entering the environment by limiting the total potential amount of atrazine that could be applied. Reduced atrazine application rates are being proposed with two options: lower maximum rates prior to crop emergence, and/or lower maximum annual rates. Currently, the maximum annual rate is 2.5 lbs of atrazine per acre for field corn and the Agency is proposing lowering maximum annual rates to 2.0 lbs a.i./acre, which represents a potential 20% reduction in annual rates. The benefits of atrazine are particularly high for growers in the Southern U.S. and rate reductions are likely to be less feasible for field corn growers in the Southern U.S due to generally higher weed pressure and greater current use rates. However, because the Agency is proposing options through a picklist format to allow higher rates in Southern field corn production, relative rate reductions are not expected to be more difficult in Southern field corn production than Northern field corn production. Additionally, the Agency is proposing twelve conservation practices as picklist options for field corn growers to choose from depending on mitigation requirements that are feasible for individual fields. Based on predicted atrazine concentrations in the watershed where a field is located and annual application rates being used in that field, field corn growers would be required to adopt between zero and four mitigation options by choosing from the

following list of conservation practices: no preemergence applications to the crop, vegetative filter strips, cover crops, contour buffer strips, terrace farming, field borders, grassed waterways, irrigation water management, contour farming, strip cropping, soil incorporation to a depth of 2.5 cm (1 in), or no tillage/reduced tillage. The Agency has determined that these identified twelve proposed conservation practices are expected to reduce atrazine runoff and are options for field corn growers to choose from and implement those that are feasible after considering variations in field topography, growing conditions and regional weed pressure.

Regulatory Rationale for Proposed Mitigation: Sweet Corn

Limiting maximum application rates of atrazine would reduce the amount of atrazine entering the environment by limiting the total potential amount of atrazine that could be applied.

Reduced atrazine application rates are being proposed for implementation with two options: lower maximum rates prior to crop emergence, and/or lower maximum annual rates. Currently, the maximum annual rate is 2.5 lbs of atrazine per acre for sweet corn and the Agency is proposing lowering maximum annual rates to 2.0 lbs a.i./acre, which represents a potential 20% reduction in annual rates. The Agency has identified five conservation practices (no preemergence applications to the crop, vegetative filter strips, field borders, grassed waterways, or irrigation water management) that are currently likely to be feasible as picklist options for sweet corn growers to implement. However, to provide growers further flexibility, the Agency is proposing additional conservation practices as options that may be feasible in the future in the event that agronomic practices are diversified. Therefore, depending on predicted atrazine concentrations in the watershed where a field is located and annual application rates being used in that field, sweet corn growers would be required to adopt between zero and two mitigation options by choosing from the following list of conservation practices: no preemergence applications to the crop, vegetative filter strips, cover crops, contour buffer strips, terrace farming, field borders, grassed waterways, irrigation water management, contour farming, strip cropping, soil incorporation to a depth of 2.5 cm (1 in), or no tillage/reduced tillage. The Agency has determined that the twelve proposed conservation practices are expected to reduce atrazine runoff as picklist options for sweet corn growers to implement.

Regulatory Rationale for Proposed Mitigation: Sorghum

Limiting maximum application rates of atrazine would reduce the amount of atrazine entering the environment by limiting the total potential amount of atrazine that could be applied.

Reduced atrazine application rates are being proposed for implementation with two options: lower maximum rates prior to crop emergence, and/or lower maximum annual rates. Currently, the maximum annual rate is 2.5 lbs of atrazine per acre for sorghum and the Agency is proposing lowering maximum annual rates to 2.0 lbs a.i./acre, which represents a potential 20% reduction in annual rates. Additionally, the Agency is proposing twelve conservation practices as picklist options for sorghum growers to choose from depending on mitigation requirements that are feasible for individual fields. Depending on predicted atrazine concentrations in the watershed where a field is located and annual application rates being used in that field, sorghum growers would be required to adopt between zero and four mitigation options by choosing from the following list of conservation practices: no preemergence applications to the crop, vegetative filter strips, cover crops, contour buffer strips, terrace farming, field borders, grassed waterways, irrigation water management, contour farming, strip cropping, soil incorporation to a depth of 2.5 cm (1 in), or no tillage/reduced tillage. The Agency has determined that these identified twelve

proposed conservation practices are expected to reduce atrazine runoff and are options for sorghum growers to choose from and implement those that are feasible after considering variations in field topography, growing conditions and regional weed pressure.

Regulatory Rationale for Proposed Mitigation: Sugarcane

Limiting maximum application rates of atrazine would reduce the amount of atrazine entering the environment by limiting the total potential amount of atrazine that could be applied. Currently, the maximum annual rate is 10 lbs of atrazine per acre for sugarcane. The Agency is proposing lowering maximum annual rates to 8.0 lbs a.i./acre in Florida and 4.0 lbs a.i./acre in Louisiana and Texas. The Agency is proposing less of a reduction in maximum annual rates in Florida than in Texas and Louisiana due to the organic soils in Florida that sugarcane is typically grown in. The organic soil tightly absorbs atrazine and therefore requires higher rates for effective weed control. Additionally, the Agency is proposing to require vegetative ditch banks in all sugarcane fields for growers in Texas, Louisiana, and Florida to reduce atrazine runoff and risks to aquatic plant communities. EPA determined that incorporation of vegetative ditch banks in sugarcane fields is the only feasible conservation practice that could reasonably be implemented due to the specific topography and design of sugarcane fields. Based on feasibility and the need for atrazine use on sugarcane, EPA is not proposing a picklist of mitigation options for sugarcane.

For updates to the impacts and benefits assessment reflecting the proposed revisions to the ID and regional, crop-specific mitigation in Appendix A, please see BEAD's *Assessment of the Benefits of Atrazine and the Impacts of Potential Mitigation for Field Corn, Sweet Corn, Sorghum, and Sugarcane* (June 2022).

After re-evaluating whether additional measures are necessary to mitigate potential risks of concern to aquatic plant communities, EPA determined that the exceedances of the CE-LOC due to runoff needed to be addressed based on the aforementioned level above the CE-LOC, taking into account the feasibility of options to reduce these potential risks. Therefore, EPA is proposing general mitigation and picklist options to provide growers flexibility that allow for continued use of atrazine, which has high benefits for the crops mentioned above, while also reducing potential risk from runoff to aquatic plant communities. The Agency acknowledges that even with the implementation of the proposed mitigation, there may still be some exceedances of the CE-LOC in some watersheds resulting in potential risks of concern to aquatic plant communities. However, when these remaining potential risks are weighed against the impacts to growers and the need for atrazine, there are still high benefits for the use of atrazine on these crops.

VI. Next Steps and Timeline

The Agency is issuing this memorandum as a proposal for revisions to the atrazine ID to: (1) provide clarification to specific sections of the ID that address atrazine exposure in aquatic plant communities; and (2) propose additional mitigation to address potential risks of concern to aquatic plant communities identified through this re-evaluation. These proposed measures supplement the mitigation requirements identified in the [“Error Correction to June 25, 2021 Letter”](#) posted to the docket on August 17, 2021, and later accepted on all atrazine labels on

November 12, 2021. Taking into account the high benefits of atrazine and potential impacts to growers, EPA proposes the additional mitigation identified in Appendix A of this memorandum to address potential risks of concern to aquatic plant communities.

A Federal Register Notice will announce the availability of this proposal for revisions to the atrazine ID and will open a 60-day comment period. The Agency is not soliciting comment on any other aspects of the atrazine ID other than those specifically identified in this document. If there are no substantive comments or additional information submitted to the docket during the comment period that leads the Agency to change its proposed revisions to the ID, EPA may issue a memorandum identifying additional mitigation requirements and revisions to the interim registration review decision for atrazine. A final decision on the atrazine registration review case will occur after: (1) an EDSP FFDCA § 408(p) determination, and (2) an endangered species determination under the ESA and any needed § 7 consultation with the Services.

Once the *Revisions to the Atrazine Interim Registration Review Decision* memorandum is issued, the atrazine registrants must submit amended labels that include the label changes described in this document. The revised labels and requests for amendment of registrations must be submitted to the Agency for review within 60 days following issuance of the *Revisions to the Atrazine Interim Registration Review Decision* memorandum in the docket.

Appendix A: Proposed Labeling Changes for Atrazine Products

Table 1. Proposed Label Changes for All Atrazine Technical Products		
Description	Proposed Label Changes for All Atrazine Technical Labels	Placement on Label
Soil Saturation Restriction	For all formulations, add the following restriction: “Do not apply atrazine products when soils are saturated or above field capacity.”	Directions for Use
Aerial Application Prohibition	For all formulations, add the following restriction: “Aerial application is prohibited.”	Directions for Use
Precipitation Restriction	For all formulations, add the following restrictions: <ul style="list-style-type: none"> • “Do not apply atrazine containing products during rain.” • “Do not apply atrazine containing products when a storm event likely to produce runoff from the treated area is forecasted (by NOAA/National Weather Service, or other similar forecasting service) to occur within 48 hours following application.” 	Directions for Use
Use Restrictions for Sorghum; Field Corn; Sweet Corn	For all formulations, add the following restriction: “Do not apply more than 2.0 lbs ai/A/year”	Directions for Use

Table 2. Proposed Label Changes for All Atrazine End-Use Products		
<u>Reference Guide for All Proposed Label Changes for Sweet Corn, Sorghum, and Field Corn¹⁰</u>		
<p>Atrazine Concentration List 1: Watersheds with Predicted Concentrations of 3.4-9.8 ppb Atrazine Concentration List 2: Watersheds with Predicted Concentrations >9.8 ppb</p> <p>Hydrological Soil Group A: Sand, Loamy Sand, or Sandy Loam¹¹ Hydrological Soil Group B: Silt Loam or Loams Hydrological Soil Group C: Sandy Clay Loam Hydrological Soil Group D: Clay Loam, Silty Clay Loam, Sandy Clay, Silty Clay, or Clay</p> <p>Region 1¹²: AL, AR, AZ, FL, GA, KY, LA, MO, MS, NC, NM, OK, SC, TN, TX, VA Region 2: CA, CO, CT, DE, ID, IL, IN, IA, KS, MN, MD, MA, MI, MN, MT, NE, NV, NH, NJ, NY, ND, OH, OR, PA, RI, SD, UT, VT, WA, WI, WY, WV</p>		
Applications to Sweet Corn		
	Table A. Picklist for Sweet Corn	
	No pre-emergence applications	
	Utilize ≥ 30 ft (Hydrological Soil Groups A & B) or ≥100 ft (Hydrological Soil Groups C & D) vegetative filter strip	

¹⁰ For additional information regarding atrazine watershed concentrations, characterization of soil groups, and regional variations in weed pressure please see *EFED Support Documentation of the Proposed Revisions to the Atrazine Interim Decision Regarding Risks to Aquatic Plant Communities* (June 2022) and/or *Assessment of the Benefits of Atrazine and the Impacts of Potential Mitigation for Field Corn, Sweet Corn, Sorghum, and Sugarcane* (June 2022).

¹¹ More information on hydrologic soil groups is available at: <https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>

¹² “Region 1” consists of southern states with severe weed pressure

	Cover crop	
	Contour buffer strips	
	Terrace farming	
	Field border	
	Grassed waterway	
	Irrigation water management	
	Contour farming	
	Strip cropping	
	Soil incorporation to a depth of 2.5 cm	
	No tillage or reduced tillage	
Description	Proposed Label Changes for All Atrazine Sweet Corn End-Use Labels	Placement on Label
All States	<ul style="list-style-type: none"> Do not apply more than 2.0 lbs ai/A/year. 	Directions for Use
For Watersheds Included in Atrazine Concentration List 1 if Applying to Highly Erodible Lands ¹³	<ul style="list-style-type: none"> If applying 1.0 lb ai/A/year or less, one runoff reduction practice must be present from Table A. If applying more than 1.0 lb ai/A/year, two runoff reduction practices must be present from Table A. 	Directions for Use
For Watersheds Included in Atrazine Concentration List 1 if Applying to Non-Highly Erodible Lands	<ul style="list-style-type: none"> If applying 1.0 lb ai/A/year or less, no additional runoff reduction practices must be present from Table A. If applying more than 1.0 lb ai/A/year, one runoff reduction practice must be present from Table A. 	Directions for Use
For Watersheds Included in Atrazine Concentration List 2 if Applying to Highly Erodible Lands	<ul style="list-style-type: none"> If applying 0.625 lbs ai /A/year or less, one runoff reduction practice must be present from Table A. If applying more than 0.625 lbs ai/A/year, two runoff reduction practices must be present from Table A. 	Directions for Use
For Watersheds Included in Atrazine Concentration List 2 if Applying to Non-Highly Erodible Lands	<ul style="list-style-type: none"> If applying 0.625 lbs ai/A/year or less, no additional runoff reduction practices must be present from Table A. If applying more than 0.625 lbs ai/A/year, one runoff reduction practice must be present from Table A. 	Directions for Use
Applications to Sorghum		
	Table B. Picklist for Sorghum	
	No pre-emergence applications	

¹³ Highly erodible lands contain soils that have an erodibility index of eight or more. For additional information please see <https://www.ecfr.gov/current/title-7/subtitle-A/part-12/subpart-B/section-12.21>

	Utilize ≥ 30 ft (Hydrological Soil Groups A & B) or ≥100 ft (Hydrological Soil Groups C & D) vegetative filter strip	
	Cover crop	
	Contour buffer strips	
	Terrace farming	
	Field border	
	Grassed waterway	
	Irrigation water management	
	Contour farming	
	Strip cropping	
	Soil incorporation to a depth of 2.5 cm	
	No tillage and reduced tillage	
Description	Proposed Label Changes for All Atrazine Sorghum End-Use Labels	Placement on Label
All States	<ul style="list-style-type: none"> Do not apply more than 2.0 lbs ai/A/year 	Directions for Use
For Watersheds Included in Atrazine Concentration List 1 if Applying to Highly Erodible Lands	<ul style="list-style-type: none"> If applying 1.0 lb ai/A/year or less, two runoff reduction practices must be present from Table B. If applying more than 1.0 lb ai/A/year, four runoff reduction practices must be present from Table B. Do not apply more than 1.6 lbs ai/A for pre-emergence applications. 	Directions for Use
For Watersheds Included in Atrazine Concentration List 1 if Applying to Non-Highly Erodible Lands	<ul style="list-style-type: none"> If applying 1.0 lb ai/A/year or less, one runoff reduction practice must be present from Table B. If applying more than 1.0 lb ai/A/year, two runoff reduction practices must be present from Table B. Do not apply more than 2.0 lbs ai/A for pre-emergence applications. 	Directions for Use
For Watersheds Included in Atrazine Concentration List 2 if Applying to Highly Erodible Lands	<ul style="list-style-type: none"> If applying 0.625 lbs ai/A/year or less, two runoff reduction practices must be present from Table B. If applying more than 0.625 lbs ai/A/year, four runoff reduction practice must be present from Table B. Do not apply more than 1.2 lbs ai/A for pre-emergence applications. 	Directions for Use
For Watersheds Included in Atrazine Concentration List 2 if Applying to Non-Highly Erodible Lands	<ul style="list-style-type: none"> If applying 0.625 lbs ai/A/year or less, one runoff reduction practice must be present from Table B. If applying more than 0.625 lbs ai/A/year, two runoff reduction practices must be present from Table B. Do not apply more than 1.2 lbs ai/A for pre-emergence applications. 	Directions for Use
Applications to Field Corn		
Table C. Picklist for Field Corn		

	No pre-emergence applications Utilize ≥30 ft (Hydrological Soil Groups A & B) or ≥100 ft (Hydrological Soil Groups C & D) vegetative filter strip Cover crop Contour buffer strips Terrace farming Field border Grassed waterway Irrigation water management Contour farming Strip cropping Soil incorporation to a depth of 2.5 cm No tillage and reduced tillage (>30% of soil covered)	
Description	Proposed Label Changes for All Atrazine Field Corn End-Use Labels	Placement on Label
All States	<ul style="list-style-type: none"> Do not apply more than 2.0 lbs ai/A per year. 	Directions for Use
Region 1 States in Watersheds Included in Atrazine Concentration List 1 if Applying to Highly Erodible Lands	<ul style="list-style-type: none"> At an application rate of 1.2 lbs ai/A/year or less, two runoff reduction practices must be present from Table C. At an application rate above 1.2 lbs ai/A/year, four runoff reduction practices must be present from Table C. Do not apply more than 1.6 lbs/A for pre-emergence applications. 	Directions for Use
Region 1 States in Watersheds Included in Atrazine Concentration List 1 if Applying to Non-Highly Erodible Lands	<ul style="list-style-type: none"> At an application rate of 1.2 lbs ai/A/year or less, one runoff reduction practice must be present from Table C. At an application rate above 1.2 lbs ai/A/year, two runoff reduction practices must be present from Table C. 	Directions for Use
Region 1 States in Watersheds Included in Atrazine Concentration List 2 if Applying to Highly Erodible Lands	<ul style="list-style-type: none"> At an application of 0.8 lbs ai/A/year or less, two runoff reduction practices must be present from Table C. At an application above 0.8 lbs ai/A/year, four runoff reduction practices must be present from Table C. Do not apply more than 1.6 lbs ai/A for pre-emergence applications. 	Directions for Use
Region 1 States in Watersheds Included in Atrazine Concentration List 2 if Applying to Non-Highly	<ul style="list-style-type: none"> At an application of 1.0 lb ai/A/year or less, one runoff reduction practice must be present from Table C. At an application above 1.0 lb ai/A/year, two runoff reduction practices must be present from Table C. 	Directions for Use

Erodible Lands		
Region 2 States in Watersheds Included in Atrazine Concentration List 1 if Applying to Highly Erodible Lands	<ul style="list-style-type: none"> At an application rate of 1.0 lb ai/A/year or less, two runoff reduction practices must be present from Table C. At an application rate above 1.0 lb ai/A/year, four runoff reduction practices must be present from Table C. Do not apply more than 1.6 lbs/A for pre-emergence applications. 	Directions for Use
Region 2 States in Watersheds Included in Atrazine Concentration List 1 if Applying to Non-Highly Erodible Lands	<ul style="list-style-type: none"> At an application rate of 1.0 lb ai/A/year or less, one runoff reduction practice must be present from Table C. At an application rate above 1.0 lb ai/A/year, two runoff reduction practices must be present from Table C. 	Directions for Use
Region 2 States in Watersheds Included in Atrazine Concentration List 2 if Applying to Highly Erodible Lands	<ul style="list-style-type: none"> At an application rate of 0.625 lbs ai/A/year or less, two runoff reduction practices must be present from Table C. At an application rate above 0.625 lbs ai/A/year, four runoff reduction practices must be present from Table C. Do not apply more than 1.2 lbs ai/A for pre-emergence applications. 	Directions for Use
Region 2 States in Watersheds Included in Atrazine Concentration List 2 if Applying to Non-Highly Erodible Lands	<ul style="list-style-type: none"> At an application rate of 0.625 lbs ai/A/year or less, one runoff reduction practice must be present from Table C. At an application rate above 0.625 lbs ai/A/year, two runoff reduction practices must be present from Table C. Do not apply more than 1.2 lb ai/A for pre-emergence applications. 	Directions for Use
Applications to Sugarcane		
Description	Proposed Label Changes for All Atrazine Sugarcane End-Use Labels	Placement on Label
Florida	<ul style="list-style-type: none"> Do not apply more than 8 lbs ai/A/year Must use a vegetative ditch bank 	Directions for Use
Texas and Louisiana	<ul style="list-style-type: none"> Do not apply more than 4 lbs ai/A/year Must use a vegetative ditch bank 	Directions for Use