October 7, 2022

Mr. Alex Hazlehurst, Chemical Review Manager
US Environmental Protection Agency
Office of Chemical Safety and Pollution Prevention
Risk Management Implementation Branch
Pesticide Re-evaluation Division Office of Pesticides

Via regulations.gov: https://www.regulations.gov/commenton/EPA-HQ-OPP-2013-0266-1627

SUBJECT: **Comments concerning substantial environmental benefits that are at-risk and that must be considered and reflected in the risk assessment associated with possible revisions to the atrazine interim registration review decision (Case Number 0062, Docket IDEPA-HQ-OPP-2013-0266-1627).**

Dear Mr. Hazlehurst:

The undersigned agricultural organizations are members of the Agricultural Nutrient Policy Council (ANPC). The ANPC was formed in 2010 to help American agriculture effectively engage in legal, technical and policy issues related to farming, nutrients and water quality. ANPC membership includes approximately 40 national and state agricultural trade associations and companies. We appreciate this opportunity to offer the US Environmental Protection Agency (Agency) with comments concerning its "Proposed Revisions to the Atrazine Interim Registration Review Decision, Case Number 0062" (IRRD).

These comments are offered from the perspective of ANPC's focus on sound federal policy to support reducing nutrient losses to protect water quality. Atrazine, working often in tandem with many other herbicides that constitute modern weed control systems, is a critical tool in agriculture's efforts to reduce nutrient losses to protect aquatic health and surface water quality. Our comments address what we believe to be a major and highly problematic oversight in the Agency's "Assessment of the Benefits of Atrazine and the Impacts of Potential Mitigation for Field Corn, Sweet Corn, Sorghum, and Sugarcane." That assessment failed to account for the real and substantial risks of significant environmental damages to aquatic ecological health and water quality should the IRRD, despite the "pick-list" options, result in restrictions in atrazine use that lead directly to reductions in the use of conservation tillage and cover crops. Those risks and the environmental costs associated with those risks must be considered to ensure that the IRRD is grounded in a complete and sound risk assessment. We offer more details on these considerations below.

1. **Conservation tillage is now in use on most agricultural acres, greatly reducing soil erosion as well as sedimentation and mineral phosphorous enrichment of aquatic systems and thereby helping to restore and maintain their ecological health.**

The production of field crops has never been possible without managing, reducing or eliminating weed pressure on the planted crop. For most of agriculture's history weed control was achieved through the physical removal, disturbance, cutting or burying of weeds or weed seeds. This was done by hand, with manually operated tools, or mechanically with the help of animals. Since the industrial era this has been done with implements pulled through fields and operated with tractors. The time, energy, cost and direct negative natural resource consequences of these methods, particularly widespread plowing and soil cultivation for weed control, are often very substantial.

Soil erosion from US cropland in 1987, when mechanical tillage (so-called "conventional tillage") prevailed was estimated to be 2.79 billion tons; 1.49 billion tons from water (sheet and rill) erosion, and 1.3 billion tons from wind erosion (USDA NRCS 2007 *NRI Soil Erosion*.) Wind erosion was prevalent during the 1930's Dust Bowl when water across the Plains States was scarce. The conditions were severe and alarming enough to lead Congress in 1935 to create an entirely new federal agency dedicated to addressing this problem, the Soil Erosion Service. Today that agency is known as the Natural Resources Conservation Service (NRCS).[1]

Soil erosion processes lead directly to significant surface water quality degradation. Sediments that are deposited in streams, rivers, and lakes reduce water clarity and physically change the ecology of the aquatic system. Sediments are among a handful of pollutants that are responsible for over 50% of the waters considered "impaired" under the Clean Water Act (See the Congressional Research Service's *Clean Water Act and Pollutant Total Maximum Daily Loads (TMDLs)*, 2014). High suspended sediment concentrations degrade water quality habitat for plants and animals in many ways. Sediments impair filtration feeding (of clams, krill, sponges and fish), reduce food quality and light quantity in the water column affecting visibility and photosynthesis. They scour food sources and animal tissues, and allow for greater heat absorption, raising water temperatures. Sediment deposition also smothers fish and insect eggs, altering the physical structure of the waterway, and supports greater non-optimal plant growth that, when decomposing, reduces biological oxygen levels. (See EPA, *Sediments*.)

When soil erodes the attached phosphorous (P) is moved with the soil. Soil erosion is the most significant source of mineral forms of P that can pollute surface waters. While P is a critical element to the health and functioning of both terrestrial and aquatic systems, high levels of P (or nitrogen (N)) can cause over enrichment of surface waters, resulting in excessive algae or plant growth (eutrophication). The largest contributor to P losses from farm fields is in mineral forms attached to eroding soil particles, although other pathways of P losses from farm fields are important.[2] These sediments can move offsite into streams, rivers, and other aquatic systems, contributing to eutrophication, reducing storage capacity, and harming aquatic ecologies. Nutrient pollution is often cited as the top source of surface waterbody impairment, leading to regulatory planning tools that calculate total maximum daily loads (TMDLs) to restore water quality (see for example US EPA *Environmental Indicators Of Water Quality In the United States*).

The advent of herbicides has changed this picture completely. Herbicides have made it possible to minimize, reduce and even largely eliminate the disturbance of soil while still economically managing or eliminating weed pressures. Less or undisturbed soil surfaces are less prone to erosion, and less soil disturbance or plowing also leaves greater amounts of crop residue on the surface and organic matter in the soil, all with beneficial effects including reducing erosion.

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[1] See *Soil Conservation in the New Deal Congress* for a good discussion of this history.

[2] "Phosphorus (P) loss to surface freshwater is a key driver of environmental degradation…While agricultural runoff is not the only source of P loading to surface water, it is significant in many areas and is implicated as the dominant source to some of the most heavily impacted waters…Given the importance of agricultural runoff in P loading to surface water, there is great interest in finding ways to mitigate these losses." (See Components of Phosphorus Loss From Agricultural Landscapes, and How to Incorporate Them Into Risk Assessment Tools, 2018.).

Conventional, mechanical tillage prevailed in In 1989, when about 278 million acres of field and forage crops were planted in the US. About 75 percent or 207 million of these acres were in conventional tillage (137 million) or reduced tillage (70 million) (both practices leave less than 30 percent of the soil surface covered with residue) (Conservation Technology Information Center, National Crop Residue Management Survey). Only the remaining 25 percent was managed under the relatively new "conservation tillage" systems relying on herbicides for weed control.

Today those percentages have essentially flipped. About 72% of row crop acres are in no-till (37 percent, 104 million acres) or conservation tillage (35 percent, 98 million) and the remaining 28 percent (80 million acres) are in forms of conventional tillage (2017 Census of Agriculture).

USDA's Natural Resources Conservation Service (NRCS) estimated that in the absence of the conservation practices farmers had adopted in the 2003-2006 period that sediment-bound P losses from all croplands through wind erosion would be 0.83 pounds per acre, and from water erosion 1.04 pounds per acre. Compared to no-practices baseline, including the use of reduced tillage on 90 percent of crop acres, resulted in a 51 percent reduction in P loss due to wind erosion, and a 49 percent loss due to water erosion. Farmers' use of conservation tillage does not account for all of these estimated reductions, but it is most certainly a very large contributor.

NRCS reported in 2022 that between 2006 and 2016, losses of sediment-bound P were further reduced by 14,000 tons, noting that "Rainfall and inherent soil runoff vulnerability are the primary forces driving sediment transported phosphorus loss from cultivated cropland." (See USDA-NRCS Conservation Systems on Cropland, 2022).

2. **Conservation tillage is only possible because of the use of herbicides, often as a system of multiple products, and atrazine is often integral to that system.**

As reported earlier, approximately 70 percent or more of row crop acres are using weed control systems that are consistent with conservation tillage. The majority of US row crop acres, including essentially all of the conservation tillage acres, are treated with a combination of herbicides each year. In the case of the corn-soybean rotation, USDA's National Agriculture Statistics Service reports that 65 percent of the corn acres are being treated with atrazine, with four other products commonly in use, and then 3 other products are used on the soybean acres (see Table 2 below).

Table 2. Herbicide treated acres in corn, soybean, cotton, and wheat and the most used herbicides (based on NASS reporting data corn – 2019, and soybean- 2021).

Crop	No of acres (U.S.)	Planted acres treated with herbicide	% of acres treated with a specific herbicidal active ingredient				
	(million)	(%)	atrazine	mesotrione	glyphosate	acetochlor	alachlor
Corn	89.1	97	65	42	34	33	29
			Dicamba	sulfentrazone	glyphosate	s-metolachlor	

Soybean	83.1	98	18	21	78	19	

The reason for atrazine's wide-spread use is its efficacy (provides good to excellent control of a wide spectrum of broadleaf and some grass weeds), flexibility (can be used at multiple timings, and can be tank mixed (used effectively with other herbicides simultaneously). Atrazine is soil applied and does not need to be incorporated to be effective, making it highly congruent with conservation tillage operations. Lastly, atrazine has a low-cost relative to other herbicides.

Farmers are commonly using mixes of herbicides in this corn-soybean rotation to address complex arrays of weeds in fields and also to help reduce weeds' development of resistance to the herbicides. Atrazine is a highly effective tool in the fight against weed resistance as there are few atrazine resistant weeds despite its use for over 60 years.

In general terms, it is common today for growers to apply a pre-emergent mix of herbicides, some of which enter the soil to control any weeds that will soon emerge, and some of which provide residual control of weeds that may appear during the early season (3 or more weeks after planting) while the planted crop is getting established. A second application of post-emergent herbicides is also common to control weeds that emerge late (e.g. warm season species) and uncontrolled weeds remaining from the first application. Whether and how these post-emergent applications take place is based on the weeds present. Commonly these are "foliar" herbicides (as opposed to soil applied herbicides) that are applied to and taken up through weeds' leaves.

Atrazine applied to the soil as a preemergent application controls broadleaf and some grass weeds during emergence, as well as those that have emerged. Atrazine is often pre-mixed in with other herbicide combinations to control many types of weeds. Atrazine use rates have been reduced over the past 50 years. When first released, atrazine rates were up to 4 pounds of active ingredient per acre to control weeds such as quackgrass. In 2022, 'typical' use rates range from 0.3 (when mixed with another active ingredient) to 2 pounds (if used alone) of active ingredient per acre.

3. Economical and practical cover crop use is commonly highly dependent on herbicides to ensure the cover can be terminated and allow for timely planting of the cash crop.

Cover crops must be terminated early in the growing season to ensure a successful cash crop is possible. Herbicides are the most common method used to terminate cover crops, although other physical measures are sometimes used with varying degrees of success ("Herbicide is the most common tool to terminate cover crop. It is fast, generally very effective, and uses equipment that most farmers already own…Most cover crops are fairly easy to control in a burn-down program as long as you pay attention to detail." See *A practical guide to No-till & Cover Crops in the Mid-Atlantic*, 2020.)[3] While atrazine can be used for this purpose, commonly glyphosate is used. But as noted above, atrazine, glyphosate and other key herbicides are used as a system of products to control weeds while preventing the development of weed resistance. Cover crop termination is a good example of how attention has to be paid to how these systems are used to deal with resistance while accomplishing the other agronomic

[3] *A practical guide to No-till & Cover Crops in the Mid-Atlantic* provides a practical and relatively complete discussion about how cover crop termination is accomplished in general, with considerable detail on how the contact and systemic herbicides can be used for this purpose. See "Cover Crop Termination" at pages 142 to 167.

objectives; in this case termination of the cover crop in a timely manner to allow the cash crop to be planted during the optimal agronomic window.

4. **Cover crops are growing in use and are one of the central practices in state's Nutrient Loss Reduction Strategies, consistent with the Agency's Nutrient Framework Memoranda of 2011, 2016 and 2022.**

Cover crops also reduce erosion and therefore can play an important role reducing mineral forms of P losses from croplands. NRCS estimates there is a 17 percent reduction in sediment losses attributed to the use of cover crops in 2016 when compared to a no-cover crop scenario; P is commonly bound to such sediment losses, and the cover crops are reducing P loads leaving the farm as a result (See Conservation Systems on Cropland.)

Nitrate nitrogen (N) is water soluble and can move with water that leaves a farm field whether through surface runoff or movement of water through a soil profile (leaching) into tile drainage or into groundwater. N, along with P, is commonly identified as a major cause of impairment of surface water quality. In excessive quantities, N promotes excessive plant growth and/or algal blooms, many that are very toxic to fish and mammals. Nitrate in drinking water in excessive quantities is considered a threat to human health. Therefore, drinking water sources (surface and groundwater) are treated for nitrate when it is present at potentially harmful levels. (See US Geological Survey's Nitrogen and Water, 2018).

N losses are not significantly reduced through reduced soil erosion (N is soluble and not bound to soil particles, but organic matter containing N can and often is part of the erosive materials leaving a field). But cover crops significantly reduce nitrogen losses by the plants' uptake of available N into their tissues. Planted near or at the end of a cash crop's growing season or after it is harvested in the fall, a growing cover crop takes up available soil N and retains it in plant tissues through the winter and into spring. That N would otherwise be vulnerable to water-borne losses from the field with water movement (rainfall infiltration or snow melt) or be available for gaseous emissions due to microbial activity as the soil warms in spring.

After the cover crop is terminated in the spring, typically two or more weeks before the next cash crop is planted, the resulting cover crop residues aid in recycling N back to the cash crop through microbial degradation acting as a slow-release N source during or closer to the time when the cash crop is actively growing and assimilating N. USDA NRCS estimates that there is a 25 percent reduction in surface and subsurface N losses from crop fields attributed to the use of cover crops in 2016 when compared to a no-cover crop scenario (see Conservation Systems on Cropland).

Cover crops valuable capability reduce N losses as well soil erosion, and therefore mineral P losses, have led to cover crop practices being a top priority selected by many states in the Mississippi River Basin under their Nutrient Loss Reduction Strategies. These strategies, undertaken in light of the Agency's Nutrient Framework policies of 2011 and reaffirmed earlier this year (see the 2011 memo, Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reduction and also 2022 EPA Nutrient Reduction Memorandum), have embraced cover crops as one of their critical practices needed to reduce nutrient losses consistent with State-Federal Hypoxia Task Force goals relative to the aquatic ecological health of the Gulf of Mexico.

For example, Iowa's science assessment to support its Nutrient Reduction Strategy found that cover crops could reduce N losses by 28 to 31 percent and mineral P losses by 29 percent (see Reducing

Nutrient Loss: Science Shows What Works). Iowa's Nutrient Reduction Strategy consequently has made cover crop adoption one of its top practices to achieve the N and P loss reduction goals. Similarly, a goal of cover crop adoption on several million acres figures prominently in the nutrient loss reduction strategies for Illinois and Minnesota.

In addition, there are multiple other federal, state, and NGO initiatives seeking to promote the adoption of cover crops to reduce nutrient losses, protect aquatic health and achieve other "climate smart" and "soil health" objectives that result from cover crop use.[4]

5. **Among the pick-list options are practices that are internally inconsistent and impractical or impossible for many farmers to use.**

With respect to the following practices on the picklist for field corn, we offer these observations:

- *No pre-emergence applications*—In many instances this practice will be highly inconsistent with a successful conservation tillage and cover crop program, as pre-emergent uses of atrazine can be critical to successful weed control programs. It also could lead to **greater** atrazine runoff in instances where growers instead make an early post-emergent application in the timeframe which corresponds to the highest risk for runoff in crop fields, as post-emergent is the period often with larger amounts of rainfall and certainly with soil conditions more vulnerable to erosion. In many instances pre-emergent applications should instead be considered an erosion mitigation practice as a result.
- *Cover crop*—As noted above, cover crop use is only practical if the cover can be effectively and promptly terminated in time to allow for the cash crop to be planted. The most common, effective and economical method of cover crop termination is through the use of herbicides, including atrazine. That termination practice is a pre-emergent activity. We are concerned that the new label restrictions on atrazine use will not allow for adequate preemergent use of atrazine given the overall total limit on atrazine use per year. Note also that cover crop seeds are commonly planted into a standing cash crop late into the growing season before harvest to ensure the cover can germinate and get sufficiently established before the frost. This good practice is at odds therefore with statements in the Agency's mitigation practices supporting documents which say that "*The cover crop must be planted after harvest of the previous season's crop*…". We note also that the supporting documents states that *"The cover crop must… remain on the field up to the field preparation for planting the crop*." Cover crop termination commonly takes place well before the cash crop is planted, and such cover crop termination practices are rightfully considered part of *"…the field preparation for planting the crop."* Lastly, depending on the growing zone, the cover crops used can include "winter kill" varieties that are killed by the winter's cold but retain sufficient biomass on the soil surface to protect it from erosion in the spring before the cash crop is established. Oats are a prime

[4] For example, cover crops (as well as conservation tillage) are central to the federal government's initiatives to promote the adoption of "Climate Smart Agriculture." Also, corn, soybean and pork grower groups have joined with USDA NRCS and conservation organizations increase cover crops used in corn and soybean acres to 30 million by 2030 (USB, NCGA, PORK BOARD, USDA Announce "Farmers for Soil Health" initiative, 30 Million Cover Crop Acres by 2030.)

example of this type of cover. The Agency's discussion of a cover crop practice needs to reflect all of these critical considerations.

- *No tillage and reduced tillage (>30% of soil covered)*-As noted above, conservation tillage (no-till and reduced tillage achieving greater than 30% residue cover) is only possible through the use of a system of herbicides that includes atrazine, and that system is critical also to address the problem of weed resistance. We are concerned that this picklist option will not be available in practice given the quantities of atrazine that need to be used both pre- and post-emergent to make these conservation tillage systems work.
- *Soil incorporation to a depth of 2.5 cm*—Incorporation will reduce the risk of atrazine runoff, but it will increase the amount of soil erosion as well as P loss, which are, as noted above, major sources of impairment to aquatic ecological health. Incorporation is not allowed under no-tillage systems and is restricted in certain specific ways under other conservation tillage systems. Furthermore, this practice could well be at direct odds with many farmers' Highly Erodible Land (HEL) conservation compliance plans, which are required since the 1985 Food Security Act. Farmers must have such plans in use on their HEL in order to be eligible for farm program, crop insurance and conservation financial assistance benefits. Many of those plans rely on conservation tillage and residue management to reduce erosion. As such, these growers are often expected to studiously avoid incorporation of residue into the soil because of what this means for erosion. We are concerned that this option could be effectively unavailable to farmers on HEL, or if used put them out of compliance and putting their farm program participation at risk.

6. The Agency's risk assessment for atrazine should include the consequences of the development of weed resistance and the effects on conservation tillage and cover crop use and the resulting potential for ecological harms to water quality and aquatic life.

We are deeply concerned that the net effect of the proposed label changes significantly limiting atrazine's use will lead farmers to reduce their use of conservation tillage and cover crops. They will be forced to increase the use of mechanical tillage to control weeds and helping to manage the development or presence of weed resistance to herbicides. We are not at this time in a position to offer you estimates of exactly how all of this will play out, but the risk of this occurring is very real and very serious and will have serious negative consequences for aquatic health due to the effects of sedimentation and nutrient over-enrichment. We note that there is great irony in the fact that in the Agency's efforts to regulate atrazine use to reduce its runoff to protect aquatic health it could very well be unintentionally causing great damage to aquatic health.

It is for this reason that we encourage the agency to step back from this interim decision and conduct a more complete risk assessment of the possible effects of an atrazine IRRD on aquatic health. That more complete assessment must take into full consideration the potential effects of atrazine, sediment, mineral P and nitrate N, as these are all relevant ecological stressors that could play a role in aquatic ecological health.

Sincerely,

American Farm Bureau Federation
Agricultural Retailers Association
Illinois Corn Grower Association
Illinois Farm Bureau
Mid-America Crop Life Association
Missouri Corn Growers Association
Minnesota Agricultural Water Resource Center
National Council of Farmer Cooperatives
National Corn Growers Association
National Milk Producers Federation
National Pork Producers Council
Ohio Agribusiness Association
South Dakota Agri-Business Association
The Fertilizer Institute
United Egg Producers