Recent EPA Consideration of Vegetative Filter Strips and Next Steps

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EPA Stance on VFS After 2018 Workshop

- A well-maintained VFS can be an effective technology to reduce soil erosion as evidenced by the Conservation Reserve Program.
- EPA still needs to further evaluate available approaches for suitability for use in pesticide risk assessments
  - Further evaluate VFSMOD, which will require additional peer review
  - Further evaluate interim approaches which suggest ranges of pesticide removal based on chemical properties and VFS width (e.g. European Approach)
- EPA will consider data on VFS effectiveness and cost of establishing and maintaining as lines of evidence for risk management decisions.

2019 Pyrethroid Proposed Interim Decision

- The ecological draft risk assessment (DRA) concluded that agricultural (and other) uses of pyrethroids pose a risk to aquatic animals, especially aquatic invertebrates.
- The DRA did not quantitatively account for the effect of 10-ft VFS already required on agricultural pyrethroid labels.
- EPA considered data on the effect of VFS as a line of evidence when considering mitigation for pyrethroids.

Original Proposal for Mitigation

- The first proposal EPA made in mitigation negotiations was to increase the VFS width for pyrethroids from 10 to 66 feet.
- This width is consistent with buffers in the Conservation Reserve Program.
- This width is similar to those evaluated for sediment-bound pesticides in the European Interim Approach.

VFS Comments on Pyrethroid DRAs

- The Pyrethroid Working Group (PWG) ran VFSMOD to show that a 10-ft VFS "does most of the work most of the time."
- Combining VFSMOD with a high-erosion modeling scenario from the EPA pyrethroid PID, the PWG claimed a 10-ft VFS could trap more than 85% of sediment from a 95th percentile rain event.
- Because pyrethroid transport occurs mainly by movement with eroding sediment, this would greatly reduce estimated environmental concentrations (EECs).

VFS vs. Other Conservation Practices

- PWG and other stakeholders questioned the need for large VFS nationwide.
- Farms designated as Highly-Erodible Land require soil conservation plans to be eligible for federal incentives and subsidies.
- For Western irrigated agriculture, commenters indicated that VFS are difficult and expensive to maintain and other erosion controls are more prevalent. VFSMOD suggests a 10-ft VFS would be sufficient if one were required.

Costs of VFS

- EPA recognizes that farmers incur a cost to construct and maintain a VFS.
- If a field is adjacent to a water body, some of that field might be taken out of production to construct the VFS.
- Based on the potential cost of an in-field buffer for several crops with different field sizes, high-value crops with smaller field sizes could lose hundreds of dollars per acre (depending on VFS width).
- Other erosion controls might be more cost effective in some circumstances.

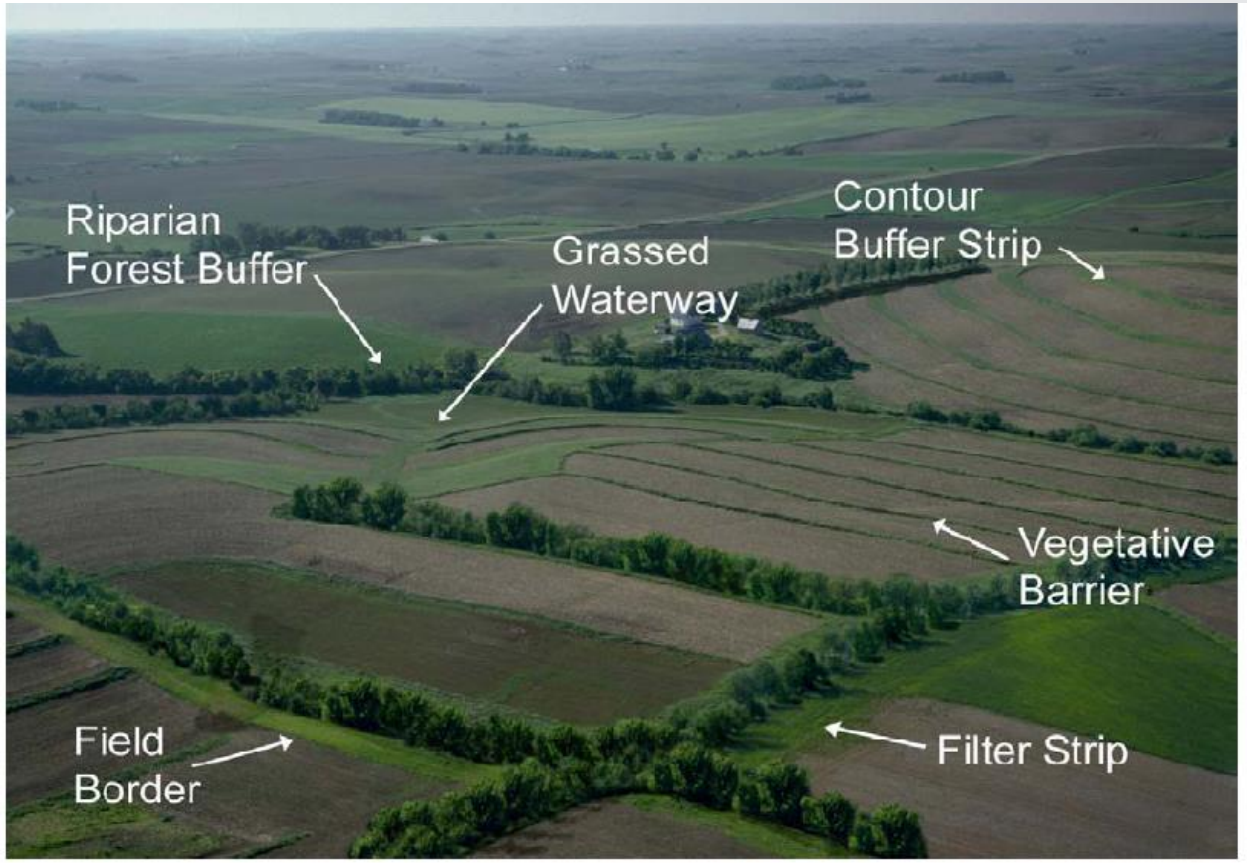

Figure 4-1. Illustration of several vegetative buffer types (photo courtesy of USDA-NRCS).

Pyrethroid VFS Language

- After considering lines of evidence, including from VFSMOD as discussed by the PWG, EPA proposed VFS requirements be revised as follows on agricultural pyrethroid product labels:
- "Construct and maintain a vegetative filter strip, according to the width specified below, of grass or other permanent vegetation between the field edge and nearby down gradient aquatic habitat (e.g., lakes, reservoirs, rivers, permanent streams, marshes, natural ponds, estuaries, commercial fish farm ponds).
- Only apply products onto fields where a maintained vegetative filter strip of at least 25 feet exists between the field edge and where a down gradient aquatic habitat exists. This minimum required width of 25 feet may be reduced under the following conditions:
  - For Western irrigated agriculture a maintained vegetative filter strip of at least 10 feet wide is required. Western irrigated agriculture is defined as irrigated farmland in the following states: WA, OR, CA, ID, NV, UT, AZ, MT, WY, CO, NM, and TX (west of I-35).

Pyrethroid VFS Language, cont.

- In all other areas, a vegetative filter strip with a minimum width of 25 feet is required, unless the following conditions are met. The 25 feet vegetative filter strip requirement may be reduced from 25 feet to 15 feet if at least one of the following applies:
  - The area of application is considered prime farmland (as defined in 7 CFR § 657.5).
  - Conservation tillage is being implemented on the area of application. Conservation tillage is defined as any system that leaves at least 30% of the soil surface covered by residue after planting. Conservation tillage practices can include mulch-till, no-till, or strip-till.
  - Terrace farming is functional and maintained on the area of application.
  - Water and sediment control basins are functional and maintained on the area of application."

VFSMOD vs EPA Risk Assessment Endpoints

- While not quantified in the pyrethroid DRA, it gave insight to the effect VFS might have for acute exposure.
- VFSMOD runs performed by the PWG estimated that VFS can trap the great majority of eroded sediment from most rainfall events simulated by the EPA's surface water transport model PWC.
- PWG commented that the largest rainfall events in a 30-year modeling scenario overwhelm the ability of a 10-ft VFS to trap sediment and result in the highest surface water EECs for pyrethroids.
- In their comments on the DRA, PWG indicated that at the 90th percentile, VFSMOD indicated that a 10-ft VFS would reduce EPA acute EECs in the pyrethroids DRA by factors ranging from 1.0 (no effect) to 3.8, with a mean of only 1.58.

Evidence from Pyrethroid Monitoring

- PWG commented that the highest concentrations in extensive agricultural surface-water monitoring for pyrethroids were observed at the edge of treated areas after significant rainfall events.
- Based on when samples were collected, these monitoring results reflect use under labels with 10-ft VFS.
- Such results are consistent with EPA's understanding that VFSMOD predicts lesser pesticide removal during significant rainfall events.
- Monitoring results from fields near water bodies is important for EPA risk assessments because such fields (adjacent to water bodies) are consistent with the Agency's conceptual model for scenarios in the Pesticides in Water Calculator.

Goals of the CERSA 2020 VFS Workshop

1. Organize an update on scientific research and regulatory developments relative to VFS.
2. Examine and compare approaches to incorporate VFS into the risk assessment of pesticides.
3. Review and examine potential strategies for the implementation of VFS in the field with producers.

General Questions on Vegetative Filter Strips

- How frequently are VFS maintained and how quickly do they degrade and lose efficiency/effectiveness? Are there geographic differences?
- How do VFSs fit into other soil erosion control programs?
  - Where are they most effective?
- What data are available on the transport of pesticides from the vegetated filter strip to the water body *via* infiltration?

European Interim Approach

- "The aim of the EU Annex I risk assessment is to demonstrate that a major safe use of the compound in the EU is possible (i.e., not necessarily to be protective of every individual set of circumstances)."
- This approach accounts for both mobile and hydrophobic pesticides and gives a range of removal efficiencies for 10 to 20 m VFS.

Goal 1 — European Interim Approach

- EPA interested in better understanding:
  - Updates in approach?
  - Any changes in consideration/adoption by other regulatory authorities?
  - Where is it most predictive?
  - Major uncertainties or limitations of current approach?

Goal 1 – European Interim Approach

- EPA's understanding is that:
  - This approach accounts for both mobile and hydrophobic pesticides and gives a range of removal efficiencies for 10 m VFS.
  - The original values were based on 14 studies, but the approach is to be revised to incorporate many newer studies.
  - The sets of circumstances not in this approach include larger storm events which overwhelm the sediment trapping ability of VFS.

Goal 1 – Update of Scientific Research - VFSMOD

- At the August 2019 American Chemical Society meeting in San Diego, Sur, et al. presented a poster evaluating pesticide removal efficiencies from the European approach using VFSMOD incorporating recent research on the function of VFS.
- The newer approaches suggest that for “the vast majority” of simulations, the new approach resulted in greater pesticide removal.
- However, the newer approach yielded lesser pesticide removal for “events with high precipitation.”

Goal 1 – Update on Scientific Research - VFSMOD

- EPA interested in better understanding:
  - Revisions to model since last workshop?
    - Based on what new information?
  - Where is it most predictive, where does it underpredict?
  - Major uncertainties or limitations of current approach
    - For example, how it accounts or deals with
      - Large rainfall events
      - Potential degradation of the VFS over time

Goal 2 – Incorporate Use of VFS in Risk Assessment

Potential ways to consider incorporation:

- Risk Estimation
  - Link VFS model to current modeling output to reduce exposure concentrations used to determine risk quotients (RQ = exposure/toxicity) used to determine potential risk
- Risk Characterization
  - Discuss range of potential reductions by use of VFSs and how impact potential risk

Peer Review of Models by EPA

- Regulatory models should be:
  - Nonproprietary
  - Available for public vetting
  - Subject to quality assurance guidelines
  - Complexity of model should be in balance with data available for assessment

Peer Review of Models by EPA

- Internal review by EPA –
  - QA Project Plans (QAPP)
- External review - Public process which can include:
  - Scientific Advisory Panels (SAPs)
  - Outreach to stakeholders
  - Public comment period
- Rely on USEPA guidance document such as –
  - 2009 USEPA Council for Regulatory Environmental Models
  - 2020 USEPA Quality Assurance Program

Goals for Future Work on VFS

- Based on outcomes of updates on scientific approaches in this workshop,
  - Consider an approach that could be further evaluated for potential for use in risk assessment
    - Follow the development of interim approaches like the European approach, especially focusing on the effect of VFS on acute exposures from high rainfall events.
    - Continue to evaluate a model like VFSMOD keeping in mind the level of peer review needed for full adoption.
- EPA would like to work with NRCS and others at the workshop on a framework for identifying the most cost-effective means of erosion/runoff control, whether by geographic area or irrigated land/non-irrigated land, etc.