

Module 7 — Environmental Protection, Water, Pollinators & Endangered Species

CORE exam · 9 practice questions · Drift and runoff, leaching and groundwater, the pollinator protection box, endangered species bulletins, and Ohio-specific nutrient and water rules.

Key numbers & facts to memorise

Four pathways	Drift · Runoff · Leaching · Volatilisation
Leaching risk	Sandy, low-OM soil, shallow water table, soluble persistent product
Inversion	Calm stable air traps fine droplets — do not spray
Pollinators	Avoid blooming plants when bees forage; spray evening/night/early morning
Endangered species	Bulletins Live! Two — obtain within 6 months of application

How pesticides move off target — the four pathways

Everything that goes wrong environmentally is one of four movements. **Drift** is airborne movement of droplets or vapour during or shortly after application. **Runoff** is surface movement in water across the soil, typically after rain on saturated or compacted ground. **Leaching** is downward movement through the soil profile toward groundwater. **Volatilisation** is conversion to vapour after application, which can carry a product off target hours later on a warm, still afternoon.

Each pathway has predictable drivers. Drift is worst with fine droplets, high release height, high wind — or, counterintuitively, **near-zero wind under a temperature inversion**, where fine droplets hang in a stable layer and then move as a concentrated cloud when the inversion breaks. Runoff rises with slope, rainfall intensity, bare soil and low infiltration. Leaching rises with **sandy, coarse soils, low organic matter, shallow water tables, high rainfall or irrigation, and products that are highly water-soluble and persistent**.

The management levers are equally predictable, which is what makes this examinable. Increase droplet size, lower the release height, respect the label's wind range, avoid inversions, use downwind buffers, avoid application before heavy rain, maintain vegetative filter strips near water, and choose products with lower solubility and shorter persistence where groundwater is vulnerable. Sensitive-area awareness — wells, sinkholes, tile inlets, ponds, streams, wetlands, schools, apiaries, organic and specialty-crop neighbours — belongs on your pre-application checklist, not in your memory.

Pollinator protection is now explicit on labels

Many insecticide labels carry a **Protection of Pollinators** box marked with a bee icon, and its restrictions are enforceable label language. Typical directives prohibit application to blooming crops or weeds when bees are foraging, restrict application to specific hours, or require notification of beekeepers within a set distance. Read the box before you plan the timing, because it frequently changes what "legal" looks like for a field that is already flowering.

Practical bee stewardship goes beyond the box. Apply in the **late evening, at night, or in early morning** when foraging is minimal; mow or control blooming weeds in the target area before spraying; use larger droplets and avoid dusts and micro-encapsulated formulations, which bees can carry back to the hive as if they were pollen; and choose products and formulations with lower bee toxicity where an equally effective option exists.

Communication prevents most incidents. Learn where the hives are within a couple of miles, exchange phone numbers with beekeepers, and give notice before you spray a bloom-adjacent field so hives can be closed or moved. Ohio maintains an **apiary registration** programme through ODA, and honey bee colonies must be registered annually with the department — a courtesy call is both good neighbouring and good liability management.

Endangered species, Bulletins Live! Two, and buffers

Federal law requires EPA to ensure registered pesticide use does not jeopardise **federally listed threatened and endangered species** or their critical habitat. EPA implements this partly through **Endangered Species Protection Bulletins** delivered by the **Bulletins Live! Two** system at epa.gov/endangered-species/bulletins. When a label references a bulletin, that bulletin becomes enforceable label language for the county and month in which you apply.

The mechanics matter for compliance. Bulletins are county-specific and month-specific, and you must obtain the bulletin **no more than six months before** the application. Keep the bulletin (or a screenshot) with your application record — it is the only way to prove you checked the version in force on the day. Bulletins may impose buffers around habitat, timing windows, or outright prohibitions on specific active ingredients.

Newer labels increasingly add **runoff and erosion mitigation menus** and **downwind spray-drift buffer distances** tied to droplet size, application height and boom width. For drone applicators this cuts both ways: your low release height and ability to fly precisely means you can respect a narrow buffer accurately, but a coarse droplet requirement may force an atomiser setting you were not planning to use. Read those sections before you quote the job, not after you have loaded the tank.

Ohio-specific water and nutrient context

Ohio applicators operate inside an unusually active water-quality policy environment because of harmful algal blooms in Lake Erie and Grand Lake St. Marys. While those rules primarily target **fertiliser** rather than pesticides, the two regulatory systems intersect for many custom applicators, and exam questions in Ohio commonly test whether you know the difference between a pesticide licence and a **fertiliser applicator certification**.

Ohio requires **fertiliser applicator certification** for those applying fertiliser to more than 50 acres of agricultural production grown primarily for sale — a separate credential from a pesticide licence, administered by ODA. In the Western Lake Erie Basin, Ohio Revised Code 905.326 additionally restricts

surface application of nutrients on snow-covered or frozen ground, on saturated soil, or when the forecast calls for a defined amount of precipitation within a set window. If you offer both services, you need both credentials and both sets of timing rules.

Beyond statute, several habits reduce real risk and read well to a regulator: keep application setbacks from wells and surface water even where the label does not require them, avoid mixing and loading near a wellhead or a tile inlet, use nurse tanks with anti-backflow protection, and document weather at the time of application. In the event of a complaint, contemporaneous weather and setback notes in your record are the difference between a conversation and an enforcement action.

Practice questions

Answer these closed-book, then check against the answer key that follows. Ohio requires 70% to pass.

1. Which soil condition most increases the risk of pesticide leaching to groundwater?

- A) Heavy clay with high organic matter
- B) Sandy soil with low organic matter and a shallow water table
- C) Compacted subsoil
- D) Frozen ground

2. A temperature inversion increases drift risk because:

- A) Wind speeds are high
- B) Fine droplets remain suspended in a stable layer and can move off target as a concentrated cloud
- C) It raises soil temperature
- D) It increases droplet size

3. To protect pollinators, the best time to apply an insecticide to a blooming field is:

- A) Midday when bees are most active
- B) Late evening, night, or early morning when bees are not foraging
- C) Any time — bees avoid sprayers
- D) Only during rain

4. Endangered species protection bulletins are obtained from:

- A) The product manufacturer
- B) EPA's Bulletins Live! Two system
- C) Your county auditor
- D) The FAA

5. An endangered species bulletin must be obtained no more than:

- A) One week before application
- B) Six months before application
- C) Two years before application
- D) After the application

6. Runoff risk is highest when:

- A) Soil is dry and freshly tilled with no rain forecast
- B) Soil is saturated or compacted and heavy rain is expected
- C) Wind is calm
- D) Humidity is low

7. In Ohio, applying fertiliser to more than 50 acres of agricultural production for sale requires:

- A) No credential
- B) A fertiliser applicator certification from ODA
- C) Only a pesticide licence
- D) A CDL

8. Volatilisation refers to:

- A) Downward movement through soil
- B) Conversion of pesticide to vapour that can move off target after application
- C) Runoff in surface water
- D) Breakdown by sunlight

9. Which practice best reduces pesticide movement into surface water?

- A) Applying just before heavy rain
- B) Maintaining vegetative filter strips and setbacks near water
- C) Increasing spray pressure
- D) Reducing droplet size

Answer key & explanations

1. B) Sandy soil with low organic matter and a shallow water table — Coarse, sandy soils with little organic matter and shallow groundwater allow water-soluble, persistent products to move downward.

2. B) Fine droplets remain suspended in a stable layer and can move off target as a concentrated cloud — Under an inversion, cool air is trapped near the ground and fine droplets do not disperse — they drift as a concentrated mass.

3. B) Late evening, night, or early morning when bees are not foraging — Apply outside foraging hours, and control blooming weeds in the area beforehand.

4. B) EPA's Bulletins Live! Two system — Bulletins Live! Two provides county- and month-specific bulletins that become enforceable label language.

5. B) Six months before application — Bulletins must be obtained within six months before the application and retained with your records.

6. B) Soil is saturated or compacted and heavy rain is expected — Saturated or compacted soil cannot infiltrate, so rainfall moves product across the surface.

7. B) A fertiliser applicator certification from ODA — Fertiliser applicator certification is a separate ODA credential from a pesticide applicator licence.

8. B) Conversion of pesticide to vapour that can move off target after application — Volatilisation is vapour movement, which can occur hours after application on warm days.

9. B) Maintaining vegetative filter strips and setbacks near water — Vegetative buffers and setbacks intercept runoff before it reaches surface water.