# Answers to Review Questions

## Chapter 1: Laws and Regulations

1. False. FIFRA is the federal law regulating pesticides and their use.
2. C
3. C
4. True
5. True
6. They must employ at least one certified commercial applicator who has two years of experience or has one year of experience and a related four-year college degree.
7. C
8. D
9. A
10. Michigan Department of Environmental Quality (MDEQ)

## Chapter 2: Pesticide Safety

1. An applicator should know what pesticides are and how they work, what is the best product for controlling the target pest, the appropriate timing of the pesticide application, what personal protective equipment is necessary, how to mix, load and apply pesticides, proper storage and handling of pesticides, and pesticide fate.

Much of this information can be found on the pesticide label.

2. D
3. Brand name, ingredient statement, chemical name, net contents, registration and establishment numbers, name and address of manufacturer, signal words, statement of practical treatment, directions for use, etc.
4. D
5. Caution, Warning, Danger, and Danger Poison. Danger Poison signal words will also be displayed with a skull and crossbones symbol.
6. The minimum amount of personal protective equipment that must be worn when using the pesticide.
7. C
8. - Using the product at a lower rate than on the label.

   - Mixing two or more pesticides together if it is not prohibited according to label directions.

   - Applying the pesticide at the label rate on a pest when the pest is not listed on the label but the site where the pest is located is on the label and the label does not specifically prohibit treating the pest.
9. Hazard = toxicity x exposure
10. Hazard is the risk of harmful effects caused by pesticides. Hazard depends on both the toxicity of the pesticide and the exposure you receive in a given situation.
11. By reading the pesticide label an applicator can determine the minimum PPE to wear. Additional protection may be beneficial.
12. Long pants, a long-sleeved shirt or coveralls, gloves, plus socks and footwear. These garments provide minimum protection for granular pesticides and pesticides labeled with the signal word "Caution."
13. D
14. 1. Secure the area — keep people at a safe distance.
    2. Put on safety equipment to protect yourself from exposure.
    3. If possible, stop the leak without endangering yourself or others. To stop a small spill on the ground, use adsorbent material and contain it with a dirt dike. Do not use water, it will only spread the spill.
    4. Notify the local fire department.

## Chapter 3: Integrated Pest Management

1. False
2. D
3. Monitoring
4. - Location of the body of water, and water uses — e.g., irrigation, recreational uses.

- History of the water uses and previous management practices.
- Desired goals, objectives, attitudes and expectations of the water users.
- Water quality, fertility, pH, clarity, temperature, hardness.
- Inflowing and outflowing water routes.
- Fish species present, their age, size and abundance and ecosystem roles.
- Diversity of birds and animals, including bottom-dwelling organisms.
- Aquatic vegetation, submerged, emergent, shoreline and wetland.
- Bottom characteristics such as depth, slope, sediment type and quantity.
- Appearance of water's edge, shoreline or banks.
- Surrounding development and activity (housing, agriculture, industry, etc.) that can influence aquatic environments.

5. False
6. E
7. B
8. Weeds
9. A
10. C
11. E

## Chapter 4: Conditions for Aquatic Plant Growth

1. D
2. Photic zone
3. B
4. Soft
5. True
6. A
7. B
8. D
9. -Life cycle.

   -Geographic distribution of aquatic plants.

10. So life stages susceptible to your management technique can be predicted and identified. With this information, management treatments can be targeted to the point in the pest's life when it is most easily controlled.
11. B

## Chapter 5: Aquatic Plant Identification and Management

1. D
2. Planktonic-type filamentous algae
3. Exotic
4. 1. Serve as food, habitat or shelter for other aquatic organisms.

   2. As stabilizing features for the substrate.

   3. Filter storm and runoff water.

5. A
6. Curly-leaf pondweed
7. Turions
8. True
9. Annuals, seed
10. B
11. True
12. American eelgrass
13. Duckweed
14. C

## Chapter 6: Nonchemical Aquatic Vegetation Management Techniques

1. 1. Prevention of weed spread.

   2. Elimination of nutrient sources that support growth.

   3. Deepening or increasing the slope of shallow areas where plants can grow.

2. False
3. Eutrophication is the aging and deterioration of a lake's ecosystem, often influenced by the addition of nutrients which increases production of plants and algae.
4. Point sources
5. B
6. 1. Prevent runoff by planting vegetation along drainage areas.

   2. Avoid fertilizing turf near water by leaving a 20-foot buffer.

   3. Prevent livestock from entering the water.

4. Practice conservation tillage to prevent erosion.
5. Construct a settling pond to receive nutrients before the flow reaches the main body of water.
6. Avoid adding fertilizers to a body of water.
7. Check for hidden sources of nutrients such as septic fields and drainage tiles.
8. Plant deciduous trees far enough from water bodies so leaves will not fall into the water and accumulate.

7. C
8. True
9. C
10. C
11. F
12. Biological
13. A
14. Biomanipulation

## Chapter 7: Herbicide Technology and Application Considerations

1. C
2. 1. Proper identification of the weed or weeds.
   2. Uses of the water to be treated.
   3. Timing of the treatment.
   4. Water characteristics including temperature, alkalinity, % saturation of dissolved oxygen.
   5. Method of application.
   6. Probability of re-treatment, potentially within the same year.
   7. Impact on nontarget plants and animals.
   8. Weather.
   9. Cost.
   10. Permission from appropriate agencies and property owners/managers to perform the treatment.
3. False
4. **Contact** herbicides act quickly and are generally lethal to all plant cells that they contact.

   **Systemic** herbicides are absorbed into the living portion of the plant and move within the plant (translocate).
5. E
6. Plant growth regulator (PGR).
7. B
8. B
9. C
10. Turbidity
11. 1. Degraded.
    2. Become inactive.
    3. Dissipated.

## Chapter 8: Aquatic Herbicide Application Equipment and Techniques

1. Application technique
2. A
3. False
4. True
5. A
6. Ethylene vinyl acetate (EVA).

   Ethylene propylene dione monomer (EPDM).
7. Pump inlet port.
8. 0-150 gpm, 70 psi
9. A
10. True

## Chapter 9: Calibration: Applying the Right Amount of Herbicide

Work through examples 12-15 found at the end of chapter 9.

## Chapter 10: Fish Management

1. Piscicides
2. False
3. 1. Large predators are unavailable.

   2. Sunfish are able to hide from predators in dense stands of weeds.
4. E
5. True
6. 1. When products are handled and transported.

2. Where products are stored.

3. At treatment site.

7. E

8. - Volume of inflow to the treatment zone.
   - Tributaries.
   - Volume of outflow.
   - Temperature.
   - Turbidity.
   - Chemical and biochemical oxygen demand.
   - Species composition.
   - Profile of water velocities across a stream channel.
   - Dilution.

9. True

10. - Chemical concentration (calculate volume of area being treated to determine dose).
    - Contact time (determine flow rate in cubic feet per second).
    - Type of target fish.
    - Water temperature (colder water temperatures may reduce effectiveness of piscicides).
    - Water turbidity and pH.
    - Weather conditions.

11. C

12. a. $\frac{200 \text{ ft.} \times 80 \text{ ft.} \times 5 \text{ ft.}}{43{,}560 \text{ cubic ft/acre foot water}} = 1.8 \text{ acre feet}$

    1.8 acre ft x .326 gal. piscicide/acre ft water/ppm x 3 ppm = 1.7 gal

    or 1.7 gal x 3,785 ml/gal = 6,435.5 ml

    b. First, Duration of treatment (ECT) x Pumping rate (GPM) =

    15 ECT x .25 GPM = 3.75 gallons of solution.

    Next, Total solution – Amount of piscicide =

    3.75 gallons – 1.7 gallons piscicide = 2.05 gallons of water to add to sprayer.

13. Step 1 7920 ft x 15 ft x 5 ft = 594,000 cubic feet

    Step 2 $\frac{594{,}000 \text{ cu. ft.} \div 20 \text{ cfs}}{3{,}600 \text{ sec/hr}} = 8.25 \text{ hours}$

    Step 3 Part 1 – 1.5 ml/cfs/min x 60 min/hr = 90 ml/hr

    Part 2 – 90 ml/hr x 20 cfs x 8.25 hours = 14,850 ml

    Convert ml to gallons 14,850 ml ÷ 3,785 ml/gallon = 3.9 gal

    Step 4 3 drip sites taken from chart.

    $\frac{7{,}920 \text{ ft}}{3} = 2{,}640$ ft. between drip sites.

    Step 5 3.9 gallons ÷ 3 = 1.3 gallons piscicide/site

    Step 6 $\frac{1.3 \times 3{,}785 \text{ ml/gal}}{1.5 \text{ ml/cfs/min} \times 60 \text{ min/hr} \times 20 \text{ cfs}} = 2.7 \text{ hours/site}$

    Step 7 20 cfs x 1.5 ml/cfs/min = 30 ml/min

## Chapter 11: Invertebrates

1. C
2. False
3. C
4. D
5. Plankton
6. Chemical treatment, heat, electrical shock, sonic vibrations.
7. True
8. Exoskeleton

## Chapter 12: Vertebrates

1. D
2. False
3. Deepen edges to form steep underwater side slopes.
4. A
5. False
6. Wire mesh
7. National Wildlife Rehabilitators Association (NWRA)

   or

   International Wildlife Rehabilitation Council (IWRC).

8. No

9. True

10. Mowing may reduce the advantage of having a vegetational buffer strip to filter nutrients and silt out of runoff water.

## Chapter 13: Public Relations and Risk Communication

1. 1. Potential residue in potable water, fish, shellfish and irrigated crops.

   2. Environmental fate of the compound, or where it goes after application and what happens to it when it gets there.

   3. How the compound breaks down and what the breakdown products are.

   4. Whether the compound is absorbed through the skin or other acute routes of entry by test animals.

   5. Short-term or acute toxicity of the compound to test animals.

   6. Whether the compound causes birth defects, tumors, or other abnormalities after long-term exposure.

   7. Toxicity of the compound to aquatic organisms such as waterfowl, fish and invertebrates.

2. D

3. Risk communication is an interactive exchange of opinions and information.

4. Pesticides may be perceived as being risky because people do not feel they have control over their exposure to them, or the decision to apply them did not include their consent.

5. E

6. Begin early and maintain interaction with all stakeholders; listen; accept emotions as legitimate; avoid finger pointing; be cautious of using comparisons of different risks; be honest and state your credentials and limitations.

7. D

8. There is a direct correlation between the lack of experience and training of the crew and the number of problems that can be expected on the job.

9. True

10. They should understand and be able to communicate the pesticide registration process, pesticide mode of action and environmental fate of pesticides to satisfy questions.