

Grand Junction High School – Baseline IPM Assessment Report

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Assessment conducted August 9, 2017 by;

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The School Integrated Pest Management (SIPM) initiative in Colorado is supported by the Colorado Coalition for School IPM, which is a cooperative effort to encourage schools and school districts to implement this sustainable environmental health program. Current participating organizations in the Colorado Coalition for School Integrated Pest Management includes the Colorado Department of Education, the Colorado Department of Public Health and Environment, the Colorado Department of Agriculture, Colorado State University, the National Environmental Health Association, the University of Colorado, the U.S. Environmental Protection Agency, Region 8 and 17 Colorado School Districts that is attended by nearly 600,000 K - 12 Colorado students.

On August 9 -10, 2107 the assessment team consisting of representatives from the U.S. Environmental Protection Agency, Colorado State University, the Mesa County Public Health Department and the Mesa County Valley School District 51 Environmental Health and Safety Department conducted the initial baseline assessments in the Fruitvale Elementary School, Mt. Garfield Middle School and Grand Junction High School.

Children in the United States continue to face risks arising from pests and exposure to pesticides in school settings. They may contract diseases vectored by biting insects and rodents, suffer asthma attacks from allergens or triggers from cockroach and rodent infestations, and be exposed unnecessarily to pests and pesticides in schools.

More than 53 million U.S. children and 6 million adults in this country spend a significant portion of their days in more than 120,000 public and private schools. Full implementation of Integrated Pest Management (IPM) is cost effective, reduces exposure to pests and pesticides, and reduces pesticide use and pest complaints. Unfortunately, however, it is estimated that a relatively small percentage of U.S. K-12 schools currently have verifiable IPM programs.

IPM is a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks. IPM provides an opportunity to create a safer and healthier learning environment by helping to manage pests and reducing children's exposure to pesticides.

An effective School IPM (SIPM) program uses common sense strategies to reduce sources of food, water, and shelter for pests in school buildings and grounds. Because protecting children's health is a top priority, EPA encourages school officials to adopt IPM practices to reduce children's exposure to pest and pesticides.

Children are more uniquely vulnerable to diseases that are vectored by pest and exposures to chemical and other contaminants that may be present in the school environment. Because of their size in relative comparison to adults, for the equivalent exposure to any substance such as residues

from pesticides that may be on surfaces in a classroom or in the air, the child will receive a much greater dose than the adult.

Current CDC estimates indicate that 1 child in 10 suffers from Asthma. With pest and pesticides both being potent asthma triggers, keeping the classrooms free of pest and eliminating unnecessary exposures to pesticides will help to create a school environment that is healthier for all of the school building inhabitants.

Implementing IPM practices in the school environment creates valuable benefits:

- A healthier school environment = Greater academic achievement.
- School IPM programs minimize the potential for food contamination from pests and pesticides.
- School IPM program implementation reduces Asthma episodes by reducing environmental asthma triggers from pest and pesticides, thus minimizing missed school days for students and staff.
- School IPM program implementation provides better management of the district's financial resources.
- School IPM implementation reduces the school and district's liability exposure.

This Report Highlights the Assessment Teams findings at Grand Junction High School, Grand Junction, CO on August 9, 2017;

According to the 2016 - 2017 Colorado Department of Education enrollment statistics, Grand Junction High School is home to 1,684 9th through 12th grade students. The original school facility was constructed in 1956, with several additions added over the years.

We started the assessment in the Main Building and quickly noticed evidence of mice activity in Rooms 114, 115, 117 and 118 where mice dropping were visible. In Room 115- Mouse droppings were near the faucet, and urine trails (that were visible with a black-light) and mice droppings were found in the closet next to the sink.

In Room 117- All storage cabinet had considerable mouse droppings that needed to be removed and the cabinets cleaned. When removing mice droppings that have accumulated in confined spaces over time, the possibility of having a transfer of viral or bacterial organisms from the excessive mice droppings to food or humans exists. Therefore, it is recommended that the mice dropping be wetted down with either a 10% Clorox and water mixture or sprayed until wet with Lysol before removal by custodial staff using protective gloves and paper towels. The contaminated paper towels should be placed immediately into a plastic trash bag and removed from the property

to an outside trash bin. For more details on the proper cleaning of mice waste see;
<https://www.cdc.gov/rodents/cleaning/index.html>

In Room -118 mice droppings were found in the stove at Station 4 (see picture below with red section containing concentrated droppings). Mice nesting created from frayed paper and other cloth scraps was found, and Oriental cockroaches were also found in this location.





The picture above is and Oriental Cockroach, that was also found in **Room 118 at the school**

While the Oriental Cockroach is primarily and outdoor species, they favor crawl spaces, cracks and mulch around building foundations, basements and other moist places. The Oriental Cockroach prefers starchy foods and will live where garbage accumulates. Placing sticky traps in the location where the oriental cockroach was observed will help to determine the route by which the pest could be entering the building, and how prolific the population might be based on the number of roaches trapped. **Since the cockroach above was discovered near the Family and Consumer Kitchen drain pipe, this could represent a route of entry since they frequently live in floor drains that lead directly outside.**

Utilizing cockroach bait and gel products in the areas where active cockroach populations are observed, is the best approach to managing this pest risk. Baiting can be effective when placed in appropriate quantities, however, particular attention must be paid to pesticide degradation due to moisture that may be in close proximity to the baiting treatment.

Room-116 was the only room in the immediate vicinity to the aforementioned rooms where we did not find mice droppings or signs of mice activity, that were consistent with the mice and cockroach activity observed in the other rooms in this section of the building. Interestingly enough, it was the only room in the area that seemed clutter free, and where food items found in the classroom were stored in high-density plastic seal tight containers. We can't emphasize enough, the importance of storing packaged food items in seal-tight high density plastic containers or tin containers with seal-tight lids when food items are being kept in the class rooms overnight.

The picture below with packaged food items stored in a seal-tight high density plastic container is a good example of the desired storage of food items in the classroom setting;



Open food items that were easily accessible were noted in Rooms 102, 104-H, 107, 109, 205, 209, 210, 218, 221, 223, 224 and the Main Office. All of these areas with available open food items were also active for significant mice activity because of the available food. **The Main Office had a relatively high concentration of mouse droppings as well as active cockroach populations.** The Athletic Directors Office also had significant evidence of a mice activity. Both mice and cockroaches will thrive in any environment where there is available, food, water and places to hide and survive. Encouraging the occupants in these locations to store food items that are left in the rooms overnight in high-density plastic and tin containers with seal-tight lids to make food less available, will be central to reducing these incidences of mice and cockroach activity.

Examples of open food found in the school that was easily assessable to mice moving about the building.



Where populations of mice exist, they can cause Leptospirosis. Leptospirosis is a bacterial disease that affects humans and animals. It is caused by bacteria of the genus *Leptospira*. In humans, it can cause a wide range of symptoms, some of which may be mistaken for other diseases. Some infected persons, however may have no symptoms at all. Leptospirosis may be contact through the skin or mucous membranes (such as inside the nose) from exposures or contact with the urine from infected mice.

Without treatment, Leptospirosis can lead to kidney damage, meningitis (inflammation of the membrane around the brain and spinal cord), liver failure, respiratory distress, and even death.

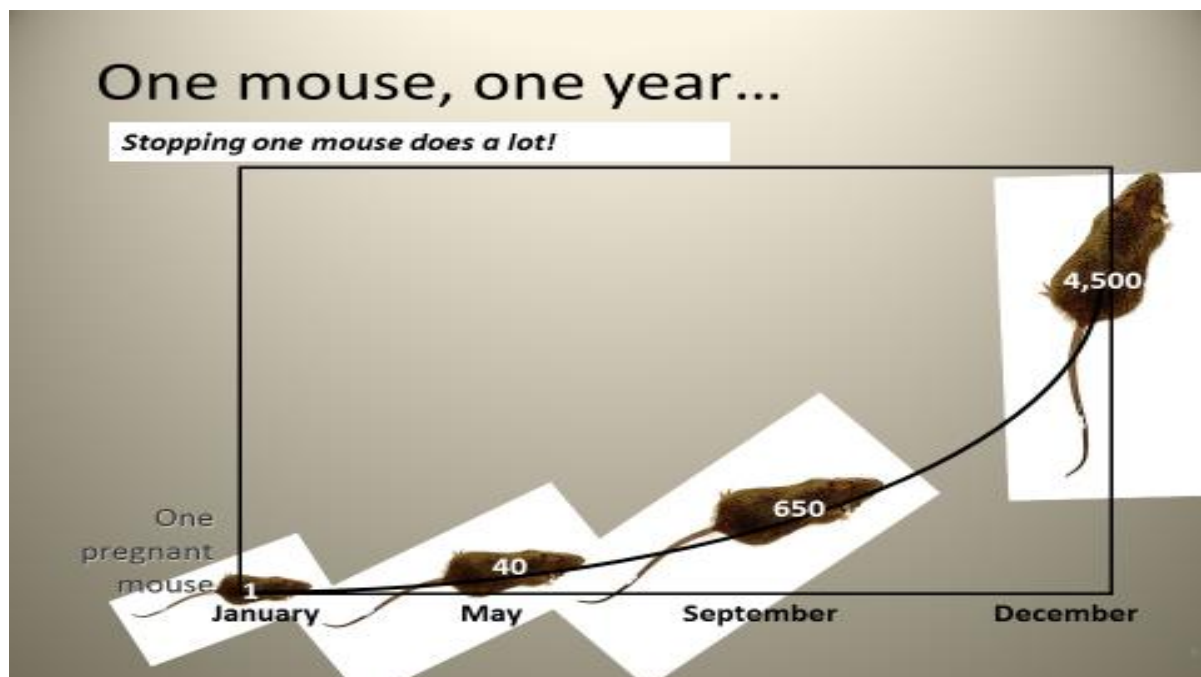
Deer Mice are also common to Colorado, and while they are more commonly found in settings that are rural, they have become more common in urban corridors as well, since urban sprawl into what was traditionally a rural setting is continuing to occur because of the need for more land area to accommodate the population growth in Colorado.

Deer Mice are carriers of hantavirus. Hantavirus pulmonary syndrome is an infectious disease characterized by flu-like symptoms that can progress rapidly to potentially life-threatening breathing problems. Colorado has one of the highest incidence of reported hantavirus in the U.S. When mice invade the school building, there is a potential to have both the common house mice and the deer mice which is native to Colorado.

For more details on the health risk associated with mice populations thriving in building such as schools and homes, see the CDC information provided in the links below;

- <https://www.cdc.gov/hantavirus/surveillance/reporting-state.html>
- <https://www.cdc.gov/rodents/diseases/direct.html>

Implementing an aggressive trapping program to bring the existing mice population under control will be essential. Because of the breeding habits of mice and short gestation periods (the time between breeding and delivery of a brood of mice, about 20 days), an uncontrolled mice population can grow rapidly in a building where food and water is readily available. If one pregnant mice enters the building and is not controlled, or if control measures are ineffective, that single mice can result in a mice population of nearly 4,500 mice over a twelve-month period. Remember, Mice can mate when they are one month old. The gestation period is 19 to 21 days. There are 4 to 8 mouse pups (baby mice) on average per litter, with an average of about eight litters per year, per female mouse.



It should be noted that this mice growth rate is about the same as the growth rate for cockroaches.

While there was some broad-based evidence of cockroach activity at Grand Junction High School during the inspection, the cockroach activity wasn't as consistent throughout the building as was the mice activity. However, in those locations where evidence of cockroach activity was observed, serious consideration should be given to setting out sticky traps to monitor the severity of the cockroach infestations. These locations included Rooms 118, 301, 302, 406, the Main Office and the Library. The cockroach activity in the Library showed the most variation in stages of growth and had both live cockroaches and dead specimens. Which was evidence of ongoing significant cockroach activity.

Recheck these areas to verify whether the storage of shipping boxes is common in these areas. Many cockroach infestations are introduced when cockroaches are brought in, because they can be living and breeding in the spaces commonly found in the corrugated areas of boxes. For that reason, shipping boxes should be emptied of its content, removed from the room and discarded as soon after receiving as possible. While there was readily available food found throughout the building for roaches and mice to feed on, roaches can survive by feeding on the paper and glue found in boxes alone, if there are water sources available nearby.

Utilizing cockroach bait and gel products in the areas where active cockroach populations were observed is the most effective approach to managing this pest. Sticky traps should be placed in the rooms identified above to determine just how active the cockroach activity is, and confirm the identity of the cockroach species in each location. Proper identification is essential to accurately select the bait and gel products that will effectively eliminate existing cockroach populations.

After placing the sticky traps close to the walls in the rooms or near the areas where the cockroach activity or carcasses was observed, the custodial staff should check the traps frequently to note the number and growth stages of the cockroaches that are being trapped. Also, remember to write the date that the sticky traps were placed at each location on the trap. This will be helpful in determining how rapidly the population may be increasing.

Other noticeable health related concerns;

There were a number of classrooms where **scented plug-ins and heated candles** were present. While these components are seen as a general use item in many of the schools that we inspect, consideration should be given to the impact that these items may have on students that may suffer from Asthma or other respiratory or air way diseases. These items may trigger an asthma episode in some asthma suffers. Or at the minimum, make it difficult for students who have compromised respiratory issues to focus on the learning activities because their bodies may be feeling the effects of some breathing difficulties.



Example of heated scented candle found in schools.

Another observation that was made in the Science wing in **Room 402**, was the presence of an indoor composting operation. It is generally not recommended that composting of organic waste be undertaken in a confined building. In addition to providing potential food for pest including mice, flies and cockroaches, composting indoors may also present some health concerns.



Composting is a natural process in which micro-organisms (fungal/mold spores such as the fungus *Aspergillus fumigatus* and certain types of bacteria called actinomycetes) are encouraged to grow to break down waste material, resulting in very large numbers of these micro-organisms being present in the compost. Any handling of the material that generates dust will create a bioaerosol (micro-organisms made airborne). Bioaerosols are particles of microbial, plant or animal origin and may be called organic dust. They can include live or dead bacteria, fungi, viruses, allergens, bacterial endotoxins (components of cell membranes of Gram-negative bacteria), antigens (molecules that can induce an immune response), toxins (toxins produced by microorganisms), mycotoxins (toxins produced by fungi), glucans (components of cell walls of many molds), pollen, plant fibers, etc.

Many bioaerosols are known to cause symptoms and/or illness, including a wide range of adverse health effects and infection. Individuals may become increasingly sensitized to some bioaerosols through repeated exposure. There are no ambient or occupational exposure limits for bioaerosols in the U.S. Therefore, it should be noted that this indoor composting activity, does present some potential health risk for humans who spend some extended time in this classroom.

General Overall Recommendations for improvements and transitioning to basic Integrated Pest Management Principals:

Mechanical Controls:

- Implement an aggressive mice trapping campaign throughout the school, with special emphasis on reducing the mice activity in Rooms 114, 115, 117 and 118. Other rooms that should be monitored closely for mice activity include Rooms 102, 104-H, 107, 109, 205, 209, 210, 218, 221, 223, 224 and the Main Office.

Exclusion Practices:

- Address existing door sweep issues by making adjustment to any salvageable door sweeps to adequately block future pest entry points, and replacing those that have failed or found missing. Mice only need an opening of ¼ inch to enter a building.
- Use copper mesh wiring to pack open spaces under sinks to block out pest access, particularly mice. It is relatively inexpensive and extremely durable once packed tightly around pipes and in other openings in walls.
- Encourage the use of hard plastic containers with seal tight lids or tin containers with seal tight lids in classrooms where edible food items and food items such as beans, pasta or dried vegetables are used in art projects. Storing these items in seal tight plastic or tin containers will reduce food sources for mice and other pest that might enter the building.
- Keep trash containers outside of the cafeteria lids closed, and bag food discard items in tied bags to keep yellow jackets, flies and other insect pest from living near the school grounds.

Sanitation Practices:

- Minimize Clutter, excessive storage of books and empty boxes that are not in use and furniture items and pillows that might serve as harborage areas for pest (i.e. cockroaches, head lice, hitchhiking bed bugs). Remove cardboard boxes from the classrooms and store elsewhere if needed. Pest especially roaches, can feed and survive on the paper and glue in the boxes.
- Pick-up all food items at the end of the day and place in seal tight hard plastic or tin containers with lids.
- Clean floors and carpets where food particles might have dropped daily to eliminate food sources for pest. Encourage the teachers and students to

implement Food Recovery measures and composting options (outside of the classroom) to limit food access for pest.