



IPM Plan for Boston University

The basis for successful IPM coordination between Boston University and All Star Pest Services is dependent on several key factors:

- A thorough inspection to identify specific pests and their harborage as well as conducive structural conditions in the environment that should be addressed.
- Sound sanitation and low impact applications for initial control.
- Follow up inspections and good communication between University Staff and All Star Pest Services.
- All Star Pest Services utilizes a tool box of IPM techniques including, but not limited to, biological, cultural, mechanical/physical, educational, and chemical strategies, and means to maintain pests at or below acceptable levels of abundance and damage.

As your professional pest management contractor, All Star Pest Services will comply with all protocols established by the University Campus Services, the Massachusetts Department of Agricultural Resources Pesticide Bureau, and all other pertinent state and federal regulations pertaining to pesticide applications and specifically applications in and around sensitive areas such as museums, libraries, medical facilities, animal facilities, research labs, and food services.

Our IPM program will emphasize approaches to pest management such as pest exclusion, habitat modification, sanitation, monitoring, and the use of non-toxic and least-toxic products and techniques. When a pesticide must be used, the smallest possible amount of the least-toxic product that meets pest management goals will be used, and all pre-notification requirements to University personnel will be met. All Star Pest Services will not use pesticides in occupied areas unless in an emergency situation such as stinging insects, or other immediate health concern, and only after we have determined that no persons, other than All Star Pest Services technicians are in the immediate area of treatment.

Conventional pesticide sprays shall not be used inside University facilities except in response to an imminent public health threat, or for specific pest control remediation measures as authorized by EH&S. All Star Pest Services will strive to only use general use baits, gels, and traps where appropriate and will also employ the use of FIFRA 25(b) Exempted Minimum Risk Pesticides which contain such ingredients as eugenol, cedar oil, lauryl sulfate, et. al.

An effective IPM program must recognize that IPM is a collaborative effort involving the administration, facilities staff, and pest management operator, and that the gathering and sharing of information and responsibilities is critical to ensuring the success of this IPM initiative.

Pesticide Use Recommendations

Pesticides will be used only when other pest prevention and non-chemical control measures are unavailable, impractical, ineffective, or are likely to fail to reduce pests below tolerance thresholds. All pesticides will be applied by certified applicators in ways that are consistent with label restrictions and use directions. Pesticides should be applied when no occupants are in the treatment area, and when these areas will remain unoccupied for the reentry time span specified on the pesticide label. Building use and occupants will be considered prior to any pesticide application.

Structural Modifications and Recommendations

All Star Pest Services will advise University Campus Service and/or designated staff about any structural, sanitary, or procedural modifications that would reduce pest food, water, harborage, or access.

Use of Pesticides

All Star Pest Services shall be responsible for application of pesticides according to the label. All pesticides must be registered with the U.S. Environmental Protection Agency (EPA) and by the State of Massachusetts, and consistent with University Campus Services protocols. Transport, handling, and use of all pesticides shall be in strict accordance with the manufacturer's label instructions and all applicable federal, state, and local laws and regulations. All Star Pest Services will not store pesticides at the client's facilities.

All Star Pest Services shall adhere to the following rules for pesticide selection and use:

A. Non-pesticide Products and Their Use: The Contractor shall use non-pesticidal methods of control wherever possible. For example:

- Portable vacuums and/or a broom, rather than pesticide sprays, shall be used for initial clean-outs of cockroach infestations when appropriate, for swarming (winged) ants and termites, and for control of spiders in webs wherever appropriate.
- Trapping devices, rather than pesticide sprays, shall be used for indoor fly control wherever appropriate. Trapping devices shall also be the initial form of control for rodent infestations.

B. Application by Need: Pesticide application shall be according to need and not by schedule. Areas of concern will first be scouted with the use of visual inspections and sticky traps. As a general rule, application of pesticides in any inside or outside area shall not occur unless visual inspections or monitoring devices indicate the presence of pests in that specific area. Monitoring devices will generally be glue or other sticky surface traps, and sentinel baits if needed. Preventive pesticide treatment of areas where surveillance indicates a potential insect or rodent infestation is acceptable on a case-by-case basis, in keeping with state laws and University Campus Services protocol.

C. Pesticide Products and Their Use

When it is determined that a pesticide must be used in order to obtain adequate control, All Star Pest Services shall employ the least hazardous material, most precise application technique, and minimum quantity of pesticide necessary to achieve control. When more than one option exists, pesticides and application methods should be chosen that reduce exposure:

- Low volatility formulations will be preferred.
- Application methods that place pesticides into inaccessible locations (tamper-resistant bait stations, void, and crack and crevice treatments) will be preferred over fogging or space spraying.
- Spot treatments will be preferred over area-wide treatments.
- General Use Pesticides, EPA Exempt pesticides, containerized insect baits, and gel baits will be the first choice to control infestations of any pest.

Cultural Management

Cultural pest management methods reflect the ways that pests behave in an ecosystem. They relate to matters of sanitation, recycling, garbage disposal, incoming product inspection procedures, storage practices, and the routing of pest sightings. Cultural controls in IPM entail the modification or implementation of sanitation programs, cleaning schedules, inspection procedures for incoming products, and the systematic routing of sanitation needs, maintenance needs, and pest sightings. All Star Pest Services will strive to notify custodial and other appropriate staff of suggested changes in cultural practices.

Physical Management

The ideal in IPM is to prevent pests from establishing themselves in a given environment. Prevention is accomplished through excluding, repelling, or deterring pests. The choice of physical control is determined by characteristics that are specific to each site.

- Prevention through exclusion begins with the inspection. The inspector is looking to ascertain possible points of entry, potential harborage areas (i.e., where pests live and hide), and sources of food and water. These features are then altered to make it impossible for an unwanted organism to enter, establish itself, or survive in or around a structure. Exclusion measures are accomplished by preventative or remedial maintenance on the exterior and interior of the building. Screening,

caulking, and plastering are a few. All Star Pest Services staff will notify the client and indicate areas where the client's staff should make proper exclusion modifications.

Chemical Management

All Star Pest Services will not rely on chemicals as our first line of defense. Although there will always be pests that cannot be effectively controlled without the use of chemical pesticides, for most pests, All Star Pest Services will reserve chemical controls as a last resort. When necessary, All Star Pest Services will employ crack and crevice treatments, IGRs and low volatility baits and gels.

Evaluation and Follow-up

Effective evaluation and follow-up in an IPM Program depends partly upon the thoroughness of the initial process. All Star Pest Services will establish site-specific thresholds with the client and continue to monitor for pests and to document maintenance and sanitation needs.

Inspection and Monitoring

Monitoring for structural pests combines visual inspection, communication with occupants, and trapping: sticky traps, pheromone traps, mechanical devices such as snap traps, multiple catch traps, and live traps.

Common Pests of Buildings

Cockroaches

Cockroaches can contaminate food and dwellings with droppings, cast skins, and bacteria. They must be controlled to protect public health. Cockroaches tend to congregate in areas that are physically attractive to them; the population declines if such areas are not also close to food and water. Cockroaches tend to seek out "cracks and crevices" for harborage; ideally an area where their backs are in contact with the overhead surface.

Identification, behavior, and biology

The specific type of cockroach (e.g. German, American, Oriental, Brown-banded.) will be identified and appropriate IPM measures will be instituted with a focus on sanitation, exclusion, and cultural control (removal of food sources).

Management

Cultural

Cultural control of the cockroaches involves the elimination of:

- Excess moisture
- Food
- Harborage

All Star Pest Services will note the following areas that should be addressed: repair leaks, insulate pipes, and caulk gaps around sinks and tubs to prevent water from getting behind walls. Repair worn grouting. Plasticize walls behind dishwashers and improve drainage.

Remove standing water. Structural modifications will be the responsibility of University Campus Services.

All Star Pest Services, as part of regular scheduled treatment, will perform minor caulking and employ copper mesh to plug holes where vermin can enter. Larger, more involved structural changes, such as plaster work, sheetrock, and spackling, will be the responsibility of the client, unless a price is negotiated prior to work commencing as to the cost of time and materials.

Physical

Physical control primarily includes the use of vacuuming and exclusion.

Chemical

Only products approved by University Campus Services will be used by All Star Pest Services, and only after other means have been exhausted. All Star Pest Services will employ crack and crevice treatments, IGRs and low volatility baits and gels. Bait formulations will be preferred where possible, and removed once the infestation has been controlled. Follow up will consist of visual inspections and using monitors to detect reinfestations.

Rodents

Commensal rodents, rats and mice, constitute a major pest problem. They can contaminate food with feces and by partial consumption of food. They can harbor bacterial pathogens, such as salmonella, and have been known to contribute to the spread of Hanta virus, bubonic plague, typhus, histoplasmosis, dysentery, and rat bite fever.

Identification, behavior, and biology

The specific type of rodent (e.g. Roof Rat, Norway Rat, House Mouse, White-Footed Deer Mouse, etc.) will be identified and appropriate IPM measures will be instituted with a focus on trapping, exclusion, and cultural control (removal of food sources).

Rodent Control

When baiting is necessary, All Star Pest Services shall adhere to the following rules:

- All bait boxes shall be of a tamper resistant design, and placed out of the general view, in locations where they will not be disturbed by routine operations.
- The lids of all bait boxes shall be securely locked or fastened shut.
- All bait boxes shall be, when necessary, securely attached or anchored to the floor, ground, wall, or other surface, so that the box cannot be picked up or moved.
- Bait shall always be placed in the baffle-protected feeding chamber of the box and never in the runway of the box.
- All such devices will be clearly marked as the property of All Star Pest Services, with a contact phone number, and date installed.
- All Star Pest Services will regularly remove rodent fecal pellets with a HEPA vacuum to aid in monitoring for continued rodent activity.

Bees and Wasps

The insect order Hymenoptera, which includes bees and wasps, is probably the most beneficial of all the insect groups. While some species, such as carpenter bees, are considered pests due to the structural damage they can cause while nesting, the benefits we receive from bees and wasps far outweigh any negative effects they might have. For this reason, bees and wasps should be left alone whenever possible. Control measures should only be undertaken when there is a significant risk to human health or property.

Most problems occur when people share the same space with bees or wasps, and are stung, or fear being stung. Social wasps build nests, have many workers, and will sting to defend the nest. Solitary bees and wasps live independently or in loosely knit groups rather than in colonies. They tend to be much less aggressive, and are usually not a problem.

Management

Successful integrated pest management programs for wasps and bees must be started in the fall, after the first killing frost. The annual workers die in the fall, leaving only the developing queens in the nests. All nests that can be located should be removed at this time. Any wasps that emerge inside during the winter can be assumed to be future queens. They should be crushed and disposed of and the nest removed, if possible.

Control should be done between sundown and dawn when all colony members are in the nest. Wherever possible, All Star Pest Services will perform this work after hours with approved products and remove the nest to discourage errant insects from returning to the location.

Ants

Ants eat many foods, but sweets and grease are preferred. Most species have a winged stage that emerges and disperses once a year. Many ants come in from the outside, but a few species such as the carpenter ant and pharaoh ant will nest in walls.

Identification, behavior, and biology

Each ant species has a specific colony structure and foraging pattern. All Star Pest Services will identify the pest and focus on cultural control (notifying University of food sources) and apply the least toxic method allowed to control this pest.

Management

Management measures will be based on four basic principles:

- 1) Identify the ant and locate the colony.
- 2) Remove or correct conditions contributing to the infestation.
- 3) Establish barriers (exclusion) to prevent the ant from entering the structure.
- 4) Treat the colony if necessary.
- 5) All Star Pest Services will employ crack and crevice treatments, IGRs and low volatility baits and gels.

Successful management of most sometimes species requires finding and treating the colony. The primary method to control ants and limit colony spread is to reduce conditions that are contributing to the infestation, such as cutting back branches of trees and shrubs; sealing cracks and crevices and other possible entry points.

Flies

Flies have had an effect on people and their health for as long as records have been kept. Some of them have a direct effect by sucking blood and injecting disease organisms into the blood stream. Others, such as the house fly, have sponging mouthparts that must feed on liquid food to survive. If a house fly lands on dry, solid food, it will regurgitate liquid food from its previous meal to wet the new food, thus contaminating the new food. Flies have been known to carry the organisms of tapeworm, hookworm, whipworm, roundworm, pinworm, diarrhea, typhoid, and cholera.

Identification, behavior, and biology

The specific type of fly (e.g. drain, house, moth, etc.) will be identified and appropriate IPM measures will be instituted with a focus on cultural control and sanitation (removal of food sources). When necessary, fly light traps and chemicals will be used on a limited basis.

Management

Cultural

All fly infestations can be tracked to cultural problems such as food storage, garbage, and unsanitary breeding sites. All Star Pest Services will note in the pest log and communicate with the appropriate staff areas conducive to fly breeding and harborage. As nearly all fly pest problems can be controlled with cultural and sanitation methods, applying chemicals to control this pest will be the exception and will only be done after all other methods have been exhausted.

Physical

The use of fly lights will be proposed to University Campus Services as a means of controlling and monitoring fly infestations

Sanitation

Fly infestations can often be tracked to a food source. With this in mind, All Star Pest Services will inspect drains and other areas that may need more than the routine cleaning currently performed.

Evaluation and follow-up

Flies, a frequent problem in summer months, invade structures from outdoor sources. Typically, lawns, trash dumpsites, and animal droppings will be the source. All Star Pest Services will communicate these areas of conducive conditions to the client's staff prior to, and during the warm months.

Bedbugs

Identification, behavior, and biology

Bedbugs are flattened insects from mahogany to rust color that feed on mammal or bird blood. The nymphs are translucent and darken as they feed and mature. Sometimes bites are in a row of little dots on the person's body. They are primarily nocturnal but will feed during the day when necessary for survival.

Management

Cultural

Cultural control of bedbugs is limited by the fact that they are not an insect that can be controlled with standard sanitation methods. They are blood feeders and not an indication of cleanliness in an area. However, the more that can be done to reduce clutter in a room, the less places for them to hide.

All Star Pest Services will first identify the location of the bedbugs. Our technicians will inspect all cracks and crevices in furniture, walls and floors and other harborage areas for evidence of live infestation.

Cooperation with the client's staff is imperative for continued control and to reduce future infestations. All Star Pest Services will employ the use of one or more of the following techniques: steaming, vacuuming, mattress encasements (if appropriate), heat (Quest bed bug hydronic systems and Packtite closets for personal and smaller items), and/or apply residual pesticides to all cracks and crevices as per the label. Apply residual EPA exempt dust to wall voids, cracks, and crevices to knock down initial infestations and stop reinfestation. Special attention will be paid to furniture, picture frames, door frames, and areas where people occupy.

After completion of work, a follow up visit with monitoring devices will confirm if all insects are eliminated at that time.

Termites

Identification, behavior, and biology

In the northeast we primarily deal with the eastern subterranean termite (*Reticulitermes flavipes*). In a rare occasion, drywood termites (*Cryptotermes*), and other types of wood-boring insects may require the use of a fumigant. This is rare and unforeseeable, and will be handled on a case by case basis. The eastern subterranean termite is a random and continuous forager, therefore, the use of baits has been found to be highly effective in their control.

Management

Physical

All Star Pest Services will explore methods of exclusion with the client to reduce termite access to the buildings. This is often limited in its scope, as termites are able to tunnel into

very small and inaccessible areas in the substructure. Appropriate recommendations will be made to lower the grade level of soil and reduce moisture and cellulose debris.

Chemical

All Star Pest Services employs the use of the Advance® Termite Bait System for controlling eastern subterranean termites. The active ingredient in this product, diflubenzuron, is a chitin synthesis inhibitor IGR that disrupts the insect's ability to molt, ultimately resulting in death to the colony. Sentinel stations will be initially installed to monitor for termites where appropriate, and then will be replaced with stations containing the active ingredient. Once the colony has been eliminated, the sentinel stations will be used as monitors under an annual contract.

Inspections

All other covered pests will be addressed as needed with a focus on scouting, trapping, physical and cultural controls prior to any pesticide applications.

In keeping with our focus on pest reduction through Integrated Pest Management, All Star Pest Services will strive to work with your facilities and management team to ensure your employees, staff and students are protected against unwanted pests.

Our certified technicians will implement an initial clean out phase that will focus on controlling pests through mechanical, physical, biological, cultural, and chemical means while noting structural and cultural practices within your facility that should be addressed. We will use all appropriate technology and management practices to bring about pest prevention and suppression in an environmentally sound manner. Where pesticides are needed, we will first only use products approved through University Campus Services. If other pesticides, e.g. restricted use products, are deemed necessary, they will only be used with the approval of University Campus Services, and only used for a specific time until the pest is deemed controlled. To a large degree, our team will work with your staff and offer recommendations that will control pests through design and reduce chemical usage.

See Figure 1.

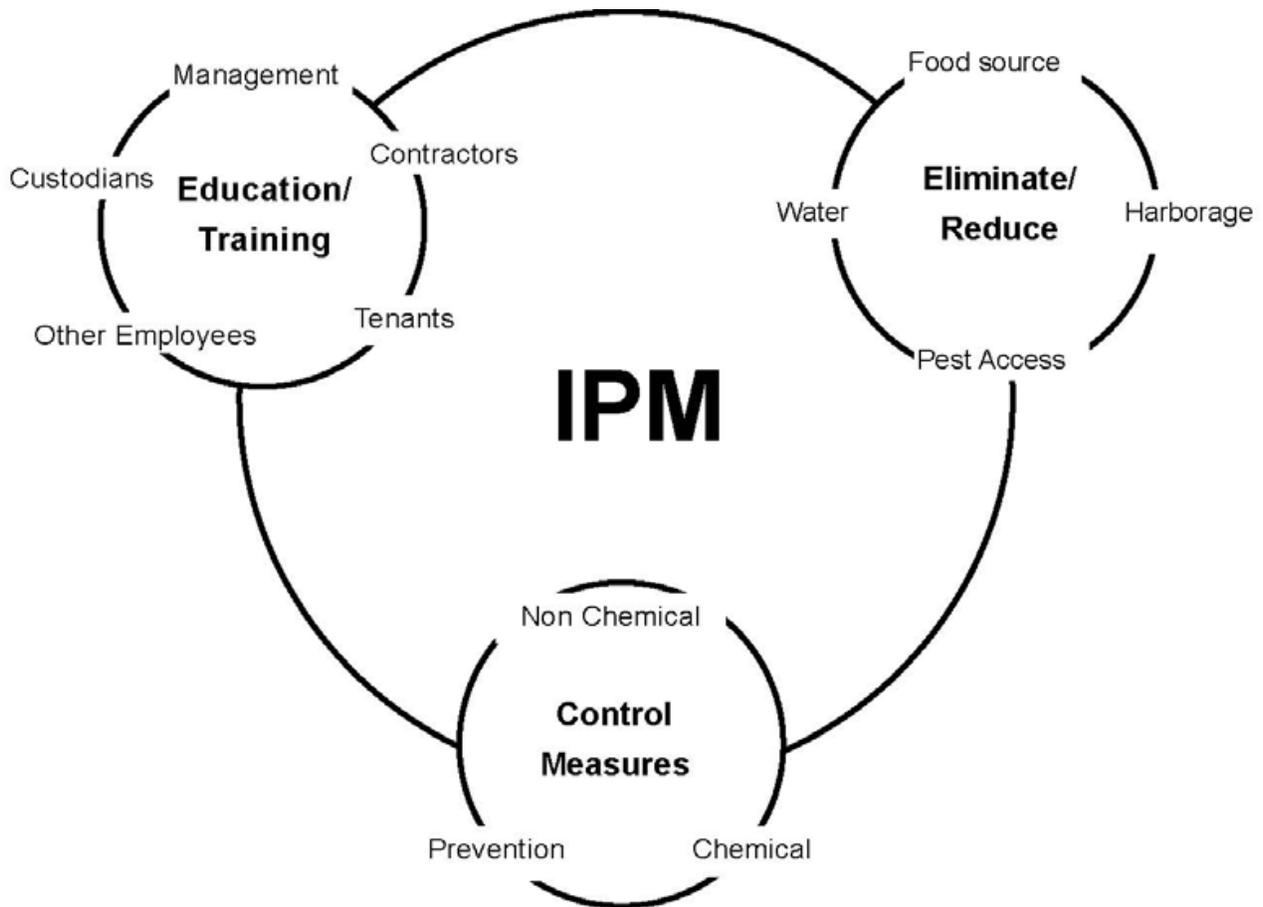


Figure 1.

Chemical pesticides may be part of an IPM program and used as necessary. However, considerable effort is also put towards preventing pest problems by controlling conditions, which may attract and support pests. In structural pest control (pest control in and around buildings), IPM focuses mainly on eliminating or reducing sources of food, water, and harborage that are available to pests, and limiting pest access into and throughout buildings. Control measures such as sanitation, rodent proofing, and building maintenance and modifications are strong elements of a structural IPM program. It is important that your staff be aware of rodent/insect harborage and entry points. Our technician will note these areas of concern in our regularly scheduled services.

Here are some of the areas your staff, and ours, should be aware of when inspecting and making repairs to the facilities.

- a. Check roof areas for standing water and debris.
- b. Vents, louvers, doorways, and holes in walls for pipes and conduits are common entryways. Ensure there is adequate vermin-proofing. Seal all holes in buildings, around conduits, and put door sweeps under all doors leading to the exterior for rodent and insect exclusion.

- c. Remove pallets, containers, lumber, construction materials, old equipment, and other litter.
- d. Store usable item on blocks/racks at least 18 inches off the ground and away from buildings and walls.
- e. Maintain vegetation free zone (at least 3 feet) around the buildings.
- f. Keep water from draining toward your foundation. Water near gutter downspouts, in-ground irrigation systems, and air conditioner condensate lines are conducive to ants and termites, particularly during dry weather.
- g. Loading docks should be free of spilled food, broken boxes, and pallets.
- h. Examine wash stalls and utility storage areas for debris or spilled food.
- i. Ensure that mop heads are cleaned/sanitized and hung upside down for air-drying after each use; slop water should be drained and buckets cleaned after each use; slop sink drains kept clean of any residue accumulation; supply storage in janitor closets should be at least 18 inches off the floor stacked on plastic crates; only store supplies adequate enough for one week so the area can be cleaned on regular basis.
- j. Garbage storage areas should be constructed of concrete or tile and equipped with drains and hoses. Check for leaks in the compactor. If you are dealing with liquid disposal, ensure compactor platform has proper drainage and this area is cleaned/sanitized daily to prevent pest attraction and breeding.
- k. If needed, increase frequency of maintenance service to prevent overflow and decay.
- l. Garbage containers should be regularly and thoroughly cleaned. When replacing plastic bag or liner, ensure that waste container is properly cleaned/sanitized from inside out. Sludge or residue buildup on, in, or around the containers produces odors that may attract pests.
- m. Ensure that employees remove their personal food items from work areas.
- n. Vending machines should be periodically opened to check for pest evidence, leakage in soda machines using syrups, condensation etc
- o. Ensure to promptly clean food spillage in and around microwaves, toasters, coffee shops and kitchens.

Office floor and Individual Office cubicles:

- a. Examine offices for pest evidence.
- b. Trash must be removed at least every two to three days.
- c. Employees should be strongly discouraged from eating at their desks or work spaces as this will encourage cockroaches and mice and other pests to harbor and breed in these areas.
- d. Ensure employees follow best management practices; keep office storage tidy/organized, off the floor, filing cabinets tidy/organized.
- e. Check desk drawers, filing cabinets for food items. Ideally the policy for food storage should be not to store food in offices. Employees should be asked to remove such items. Encourage them to store food in a segregated lunchroom storage area. If they still prefer to store food or snacks then it should be held in tightly sealed glass containers.

Cleanup to reduce vermin in an office environment must focus mainly on the food residue in and around coffee machines, microwave ovens, refrigerators, trashcans, and furniture where exposed food is stored. Occupants concerned about pests in their workplace must understand their own responsibility for storing all food in tightly sealed containers and for cleaning surfaces on which food is prepared or consumed. Daily afternoon trash and food garbage pickup is recommended. Removal of corrugated cardboard is especially important since it provides excellent harborage for cockroaches.

Logbooks

All Star Pest Services will maintain logbooks at each facility agreed upon by the client, and update those logbooks after each service. The logbooks will contain: a rough diagram of the facility (see attached Rodent Schematic) and points of concern regarding vermin, the location of live catch and snap traps used in rodent control, recommended control measures for the client following the service if needed, products applied (quantity and location), description of service, date of service, trends in pest population, MSDS and labels for all materials used at the location, and status of control measures effectiveness.

Responsible Parties

At the commencement of the contract between All Star Pest Services and University Campus Services, primary and secondary contact persons will be assigned to each building for both parties, including standard and emergency phone numbers.

Monitoring

Monitoring will most often be visual inspections by the University and All Star Pest Services staff. Sticky traps and pheromone traps will be introduced as needed. Monitoring is performed before an application or pest control method, and is continuous throughout the IPM program.

Notification

Notification of vermin, or lack thereof, will be noted in the service log as well as through verbal communication between All Star Pest Services and University Campus Services. See attached service log.

Identify Structural or Operational Modification

These modifications will be communicated both verbally and in a site logbook.

Record-keeping System

All Star Pest Services maintains a recordkeeping software that is accessible to University Campus Services on a 24/7 basis. All Star Pest Services shall maintain a list, updated as necessary, of all work sites they service and make it available to EH&S.

Scope of Service

All Star Pest Services shall provide 24-hour coverage of contracted vermin and shall be available for emergency calls, as defined in the MOA, at all times and shall respond to these calls within two hours.

New Construction

All Star Pest Services will work with facility management to highlight and preventively address any impact that changes in facility design may have on the existing IPM plan and/or pest pressure in existing facilities and the surrounding environment. It is desirable that University Campus Services notify All State Pest Services of any planned facility changes or additions.

Modify Landscaping

All Star Pest Services will make recommendations to University to modify landscaping as needed to support the IPM program, for example:

- Trim back vegetation and remove any mulch on the immediate exterior of the facility.
- Consult with landscapers to encourage landscaping plants that do not attract insects.
- Consider removing or relocating any decorative statues or stones near the building.
- Remove bird feeders and baths if birds become a problem. Also consider removing such items in response to rodent or mosquito problems.
- Consult with the current landscaping company, and work with them to ensure that their plan supports IPM program objectives.

As new and innovative methods of pest control are discovered, All Star Pest Services personnel, in conjunction with our Board Certified Urban Entomologist, will strive to keep abreast of these trends and integrate them into our programs whenever practical and prudent.