# Evaluating the Success of US EPA's School IPM Initiative

**Supporting Document for IPM Working Group Discussion**

November 28, 2012

On December 22, 2010, former Assistant Administrator Owens announced an initiative to promote expanded use of School IPM to help meet Administrator Jackson's priority to improve children's health. In 2011, an IPM working group was formed from the EPA Pesticides Policy Dialogue Committee. A subgroup including additional school IPM experts was charged with advising the Agency on metrics to assess the effectiveness of the initiative.

Here, we propose a limited set of metrics based on a comprehensive review of:

a. measures assembled previously by the National IPM Evaluation Group (www.ipm.gov/logicmodels/) which were suggested by Bill Coli, IPM coordinator, University of Massachusetts,
b. metrics currently in use by school IPM experts including surveys recently or currently completed (www.ipminstitute.org/school_ipm_2015/resources.htm#Surveys), and
c. specific commitments made by US EPA and by EPA grantees.

Our proposed metrics were selected to reflect, and to minimize cost and maximize returns. We suggest how each metric might be measured most cost-effectively including suggesting sources of existing baseline data. Note that the majority of metrics apply to both structural and landscape IPM.

Note also that EPA is acting in concert with school IPM efforts funded and implemented by others. Most of the proposed metrics will measure overall progress in school IPM adoption. EPA's contribution can be further refined by evaluating total funding and FTEs compared to EPA's contribution, and through qualitative and quantitative assessment of specific initiatives initiated or led by EPA specified in EPA's strategic plan for school IPM.

**EPA's Strategic Plan for IPM in Schools**

In May of 2012, US EPA released *Strategic and Implementation Plans for School Integrated Pest Management* for public comment. The document outlined EPA's commitment to IPM in schools as a critical opportunity to improve child health and proposed specific actions including establishing a national EPA Center for School IPM. A final version was released on November 19, 2012 (www.epa.gov/pestwise/ipminschools/strategicplan.pdf). EPA's plan includes specific objectives, outputs and outcomes (Appendix A).

In addition, a number of EPA regions have developed or are expected to develop work plans which will provide a basis for evaluation. Once released, specific metrics should be assigned to evaluate the success of those plans and performance reported.

Finally, in 2012, US EPA funded six projects which included specific commitments (Appendix B). Success in achieving those commitments is also appropriate to evaluate as a measure of the effectiveness of EPA's grant program. Interim and final reports should be carefully evaluated against proposed outputs and outcomes, additional data requested from grantees if needed, and a report prepared summarizing overall results. This evaluation will be important to attribute successes specifically to the EPA initiative.

**Proposed Metrics**

The following proposed metrics are grouped by type of impacts and ordered by estimated cost, with lowest cost measures listed first. We did not list short-term knowledge impacts which are least meaningful in terms of indicating actual improvements in children's health.

**Intermediate behavior change by school districts and change agents including state lead agencies**

1. State lead agencies are a primary target audience for US EPA headquarters and regional offices, including for the school IPM initiative. A number of these agencies have been engaged in school IPM efforts in their states and instrumental in gathering the following metrics for 49 states this year. Notes in italics indicate where metrics can be applied to measure the impacts of EPA actions.
    a. Number of states reporting statewide, coordinated school IPM programs with multiple agencies and institutions engaged. *Indicate how many new state agencies are engaged as a direct result of EPA actions and investments as per documentation from EPA including regional office staff.*
    b. Total number of state agency and/or university/extension FTE committed to school IPM. *Indicate how many FTE are added as a direct result of EPA actions and investments.*
    c. Total non-public agency, e.g., non-governmental organization, FTE working on school IPM. *Indicate how many are newly working as a direct result of EPA actions and investments.*
    d. Total dollars spent on school IPM in the past year. *Indicate how many dollars are EPA HQ and regional investments.*
    e. Total number of school districts receiving training and number of attendees in the previous 12 months. *Indicate how many are a direct result of EPA actions and investments.*
    f. Estimated number of school districts provided with on-site training (e.g., compliance assistance, problem resolution) in previous 12 months. *Indicate how many are a direct result of EPA actions and investments.*
    g. Estimated number of school districts providing internal IPM training programs for school staff (e.g., for custodians, food service staff, etc.). *Indicate how many are a direct result of EPA actions and investments.*
    h. Number of different types of IPM communications (e.g., newsletters, listservs or webinars) distributed to school districts in the past calendar year. *Indicate how many are a direct result of EPA actions and investments.*
    i. Total number of school districts receiving these IPM communications. *Indicate how many are a direct result of EPA actions and investments.*

**Measurement:** Baseline and subsequent surveys completed by school IPM lead individuals in each state including state lead agencies. The National School IPM Working Group conducted a paper survey in 2008 and a follow up on-line survey in 2012 (www.ipminstitute.org/school_ipm_2015/resources.htm#Surveys) with 37 and 49 states responding, respectively. The 2012 survey cost approximately $2000 to implement, EPA investments covered a majority of these costs.

2. Number of school districts implementing "verifiable school IPM", including numbers of individual schools, students and staff. Verifiable school IPM is defined by EPA as:
    a. Understanding your pests.
    b. Setting action thresholds for key pests – knowing when to take action against key pests.
    c. Monitoring for pests, their locations and populations.
    d. Removing conditions that allow pest infestation.
    e. Using one or more effective pest control methods including sanitation, structural maintenance, and nonchemical methods in place of or in combination with pesticides.

**Measurement:** Baseline and subsequent on-line, self-assessment surveys of school districts. Verifying a portion of the sample through phone interviews and/or on-site evaluations conducted by experts can provide additional qualitative and quantitative perspective on the self-assessment. The National School IPM Working Group is conducting an on-line survey in 2012 (www.ipminstitute.org/school_ipm_2015/resources.htm#Surveys) of school districts in 41 states at an approximate cost of $20,000 and an estimated response rate of 40% of the districts in each state surveyed. Additional states have been or will be surveyed by others. These surveys capture some but not all of the elements of verifiable school IPM, as well as additional indicators such as number of districts with IPM coordinators, IPM policies and IPM plans.

**IPest Manager© is an on-**line tool developed and used in the Salt Lake City School District to track these and other measures.. IPest Manager is expected to be made available to school districts nationally as part of an EPA-funded cooperative agreement with Dr. Deborah Young, University of Colorado (Appendix B6). A new metric could track the number of school districts effectively using IPest Manager and other electronic systems to manage IPM programs and measures, as well as several of the measures listed above and long-term condition changes below.

**Additional toolss which are are likely more reliable than self-assessment surveys but are also more costly include expert, on-**site evaluation including IPM STAR (www.ipmstar.org) developed by the IPM Institute and the IPM Cost Calculator (www.ipmcalculator.com/) developed by Texas AgriLife Extension. These are likely to be used on a more limited basis than surveys, and can be useful for tracking both intermediate behavior changes and long-term condition changes.

**Long-term condition change**

1. Average percent reduction in pest problems and/or complaints per school district.
2. Average percent reduction in pesticide applications per school district.
3. Average change in pest management costs per school district.
4. Improved ability of designated school grounds features to meet intended purpose, e.g., improved availability of athletic competition and practice fields due to healthier, more resilient turf, improved soil condition.

**Measurement:** Expert-facilitated surveys of a sample of school districts, verifying a portion of the sample. These metrics are currently being measured by an on-line survey implemented with a limited number of school districts participating in coalitions, or groups of key school

district staff which meet regularly to receive and share information to improve their IPM programs. These data are critical measures that school districts should be tracking to evaluate the success of their programs. They are not easy to collect and analyze in a reliable fashion, particularly costs and applications, hence the need for expert-led training, e.g., by university/extension/state lead agency coalition leaders, to facilitate accurate measurement. For example, the number of pest complaints can increase when an IPM program is initiated as a result of communications to school staff encouraging complaint reporting and new staff expectations for resolution of the problem when a complaint is made. Estimated costs: $500 per district. Further refinements could include measuring number of reduced-risk pesticide applications vs. total pesticide applications per EPA's Conventional Reduced-Risk Pesticide Program plus biopesticides. This refinement is not likely needed at this early stage of the initiative but may become important at later stages to discriminate incremental improvements.

5. Change in student and staff absences attributable to asthma.
   **Measurement:** A number of school districts currently track this statistic given asthma is the leading cause of school absences. However, IPM (principally for cockroaches, rodents and dust mites) is only one of many factors impacting asthma incidence and severity, and the state of IPM in student/staff homes also impacts asthma symptoms. Thus this metric is limited in usefulness.

   Measurement of pest-related asthma allergens, and pesticide residues on exposed surfaces have also been reported. However these are more costly to measure and not necessary to assess broadly to document the success of EPA's school IPM initiative. These may continue to be measured on a limited basis under grant-funded projects.

# Appendix A. Logic Model for US EPA's Strategic Plan for IPM in Schools

A. Inputs
    a. Money
    b. People (EPA HQ, Center of Expertise, Regions)
    c. Time
    d. In-kind including infrastructure for information delivery and support, e.g., EPA website.

B. Audiences
    a. Federal, state, local agencies
    b. School district staff
    c. Non-governmental organizations including professional societies serving school staff
    d. Pest management professionals
    e. Consultants
    f. General public

C. Activities
    a. Partnerships with organizations including:
        i. Office of Children's Health Protection
        ii. Office of Air and Radiation's Indoor Environments Division
        iii. Office of Pollution Prevention and Toxics
        iv. EPA's Regional Offices
        v. Other federal agencies
        vi. States
        vii. Local governmental entities
        viii. Tribes
        ix. Universities
        x. Industry
        xi. NGOs dedicated to IPM adoption
        xii. Pesticide Environmental Stewardship Program
        xiii. Stakeholder-led school IPM working groups.
    b. One-on-one consulting, especially with wholesale audiences including state agencies, professional organizations
    c. Research existing tools, identify gaps
    d. Training sessions, workshops
    e. Demonstrations, including using past and current grant outcomes to demonstrate success
    f. Grant making, requests for proposals
    g. Print and electronic communications, websites including communications documenting benefits of IPM.
    h. Evaluations of baseline condition and improvements
    i. Specific activities identified for the Center of Expertise:
        i. Develop/refine national program direction
        ii. Gather data and establishing a national baseline
        iii. Coordinate Regional activities to achieve national goals
        iv. Administer national competitions and assistance agreements
        v. Provide technical support to the Regions and their partners
        vi. Develop/maintain web-based resources

vii. Manage publications and outreach materials while relying on existing materials, to the extent possible, and identifying and filling gaps as necessary
viii. Coordinate with other EPA national programs including OCHP and Environmental Justice

b. Specific activities identified for the Regions:
   i. Increase demand for SIPM programs by drawing upon and expanding the influence of key stakeholders including State Departments of Education, State Departments of Agriculture, State Associations of School Facility Managers, and State Departments of Health and Environments. Regional experience has shown collaborations with these organizations are more likely to provide greater opportunities for rapid expansion of SIPM over the next 3-years in states that do not have current legislative mandates to drive adoption.
   ii. Create partnerships with stakeholders including the state associations of school administrators, state PTAs, state associations of school boards, state structural pest control boards, and the local Service Employees International Unions
   iii. Conduct training sessions, outreach activities, or assessments
   iv. Provide SIPM templates
   v. Participate in SIPM meetings/calls
   vi. Respond to technical assistance calls/requests
   vii. Sponsor SIPM events
   viii. Conduct outreach to pest management professionals
   ix. Coordinate with other school-centered groups
   x. Coordinate outreach opportunities at the Regional level with other EPA school programs for delivery to school districts a range of human health issues in schools and the business case for addressing these issues

D. Intermediate behavior change
   a. New and improved sustainable and verifiable IPM programs in school districts nationwide.
   b. Increased demand for IPM from school districts, state agencies, professional organizations.
   c. Focused EPA national program and clear direction.
   d. More visible, approachable and coordinated Regional programs.
   e. Effective and aligned new and existing partnerships within and outside of the Agency.
   f. Larger and more effective stakeholder working groups.
   g. More availability, awareness and use of technical assistance, tools and informational resources including IPest Manager, IPM Calculator, IPM STAR.
   h. More efficient documentation of interactions with and progress made by key influencers and school districts.

E. Long-term condition change
   a. Fewer pest problems.
   b. Fewer pesticide applications and residues on exposed surfaces in school buildings and on school grounds.
   c. Fewer asthma-related student and staff absences.
   d. Lower or level overall costs.
   e. Improved ability of school buildings and grounds to meet intended purposes without complications from pest activity.

# Appendix B. Deliverables from 2012 US EPA School IPM Competitive Grants

## 1. Foss, Stock (WA, OR)

Outputs

1. Baseline and final data for 60% of Washington school districts collected via an online survey.
2. Pacific Northwest School IPM Consortium created.
3. Change-agent practicum for 60 PNW Consortium members and regional stakeholders.
4. Distribution of National Pesticide Information Center's customized school IPM materials.
5. Calls to NPIC related to pesticide risk reduction in public schools increased by 10%.
6. Curriculum, workbooks and working sessions for 40 Washington school districts to assist them to implement verifiable IPM programs and achieve IPM STAR certification.
7. IPM STAR evaluations conducted at eight new PNW school districts.
8. Two PNW School Rodent Academies for people from 30 school districts.
9. Six new coalition events for school district staff from 40 school districts.
10. Pesticide applicators from 150 WA and OR school districts trained and surveyed in verifiable School IPM through pesticide continuing education training and coalition training events.
11. Twelve "Pacific Northwest Pest Presses" created, distributed, and evaluated by a survey.
12. iPestManager© piloted in two school districts (one in Washington, one in Oregon).
13. A nationwide school IPM webinar for diffusion of lessons learned from the project conducted.

Outcomes

1. 52 school districts (468,000 K-12 students, 30% of the student population) in Washington and Oregon will achieve verifiable IPM.
2. 40 pesticide applicators representing at least 30 school districts will increase their knowledge in verifiable school IPM through pesticide continuing education and coalition training events.
3. 40 pesticide applicators that apply pesticides on school property will modify their application choices and/or practices to reduce risks and reduce their pesticide applications as a result of project activities.
4. Recipients of PNW Pest Presses from 90 school districts will report implementing at least two components of verifiable IPM as a result of the Pest Presses.

## 2. Frank, Bloetscher (IN, OH)

| Project Objectives | Outputs | Outcomes | Evaluation Methods |
|---|---|---|---|
| **1. Expand the existing IPM coalitions in Indiana and Ohio to include critical change agents.** | • No. of coalition members in each state. | • Pre- and post-test results from train-the-trainer events. | • Maintain SIPM contact database for each state<br>• Pre- and post-tests |
| **2. Increase school facility managers' general knowledge of safer pest management practices.** | • No. of workshops held<br>• No. of participants<br>• Schools receiving and distributing Pest Presses | • Pre- and post-test results from educational workshops. | • Tracking of workshops and participants<br>• Annual survey of school members<br>• Pre- and post-tests |
| **3. Successfully pilot IPM in ten demonstration schools in Indiana and Ohio.** | • Number of verified IPM schools and their associated student enrollment, square footage and school property acreage managed through verified IPM<br>• ≥75% reduction in no. of pest complaints (pre- and post-demonstration, on avg.)<br>• ≥70% reduction in amt. of pesticides applied (pre- vs. post-demonstration, on avg.)<br>• Grant money distributed to schools and items purchased | • Initial and final school assessment results.<br>• Number of schools advancing from low- to mid- to high-level IPM.<br>• Number of schools achieving third-party IPM certification. | • Documented School assessments (initial and final)<br>• Tracking of pest complaints and pesticides used<br>• Tracking of grant money to schools<br>• Tracking of IPM certification<br>• Tracking of asthma-related issues |
| **4. Participate in the development of national pest management software, training modules, measurement instruments and standards.** | • Number of schools using iPestManager© and/or the IPM Cost Calculator.<br>• Number of IPM coordinators trained with national training materials<br>• Number of school IPM coordinators receiving nationally developed training | • Projected and actual pest management costs.<br>• Documented reductions in pest sightings, changes in pest management practices, pest management costs and pesticide applications.<br>• Pre- and post-test results using national training modules | • Tracking use of iPestManager© and IPM Cost Calculator by IN and OH schools<br>• Compilation of data from IPestManager© and IPM Cost Calculator to identify accomplishments and trends<br>• Tracking and evaluaiton of pre- and post-test results from training sessions using national training modules |

**3. Oi (FL, GA. AL)**

Outputs

1. Increasing the number of school districts with IPM programs for public schools with support from regulators to ensure compliance.
2. Creation and support of an Alabama-Georgia-Florida consortium with partnerships committed to provide training in K-12 grade schools
3. Use of regional school IPM technology transfer and training such as webinars, Polycom, and distance learning.
4. Provide on-site training to school staff and PMPs providing pest control in schools.
5. Hold an IPM coordinator conference; as well as confirm target audience for IPM implementers in Alabama and publication of project impacts as a method of disseminating our findings and lessons learned.

Outcomes

1. Increasing the number of students and staff in verifiable IPM programs to one million.
2. Providing a measure of pesticide use and pest numbers as direct methods to measure program progress.
3. Surveys to assess satisfaction with the level of pest control received before and after IPM implementation will be used as surrogate measures that should lead to environmental and health changes (outside scope of proposal).
4. Increasing consortia partnerships to advance IPM adoption.
5. Increased pesticide applicator knowledge in school IPM through training programs.

**4. Riegel (New Orleans)**

| Project Outputs | Measures |
|---|---|
| The establishment of a commitment from Orleans Parish administrators followed by the development of a partnership among the school officials, school maintenance and custodial personnel, kitchen staff, participating extension personnel, the contracted pest management professionals (PMP), and other interested parties | Number of schools with signed commitments, number of participants in each school |
| Pest inspections of each project school (inspections will be followed up with an inspection report including detailed action items for improvement) | Number of inspections completed, number of reports completed |
| Pesticide and economic audits conducted at each school | Number of audits conducted |
| The development of a site specific pest management plan for each participating school | Number of pest management plans developed |
| Monitoring activities: tracked in pest logs, data collected from insect monitors, monitoring stations, and traps | Number of pest log entries completed, number of monitoring stations utilized, number of trap nights |
| Hands-on training for school staff, teachers, students, administrators and pest management professionals | Number of trainings held; number of participants |
| Training of designated IPM coordinator to become LDAF certified 7D licensed school employee pesticide applicator | Number of coordinators certified |
| Educational sessions for parents and community members | Number of sessions held |
| Development and dissemination of outreach materials | Number of pamphlets distributed |
| Transfer of knowledge to school staff | Improvements in care and maintenance of the building |
| Establishment and use of monitoring and reporting system of pesticide usage and presence of pests | Date of system establishment, number of schools utilizing system, number of timely reports submitted |
| Evaluation of disease potential from exposure to pests | Number of pests evaluated |
| Assessments of asthmatic children | Number of assessments conducted |
| Assist Orleans Parish schools in writing IPM program model | Number of schools accepting the plan |

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|---|---|
| Final assessments of each participating school | Number of assessments completed and reviewed |
| Written policies created for each school regarding chemical application, storage, disposal | Number of policies completed and shared |
| Findings published and disseminated | Number of publications produced, number of recipients of findings |

| **Project Outcomes** | **Measures** |
|---|---|
| Reduced pesticide usage in schools | Difference in pre- and post-IPM program pesticide amount and types used |
| Reduced cost of pest management programs | Difference in pre- and post-IPM program pest control program costs |
| Improved use, labeling, storage and disposal of chemicals in schools | Difference in pre- and post-IPM program methods of use, labeling, storage and disposal of chemicals |
| Improved indoor air quality | Difference in pre- and post-IPM program air quality measurements |
| Reduced pest populations in schools | Difference in pre- and post-IPM program pest population densities in schools |
| Reduced disease potential due to direct or indirect contact with pests | Difference in pre- and post-IPM program prevalence of disease among pests in schools |
| Reduced asthmatic episodes among students | Difference in pre- and post-IPM program prevalence of asthmatic episodes among students |
| Reduced student and staff absenteeism | Difference in pre- and post-IPM program absentee levels |
| Increased education and awareness of school staff and surrounding community regarding IPM methods | Difference in pre- and post-IPM program levels of knowledge and familiarity of IPM methods, assessed with pre- and post-survey of participants |
| Increased number of schools with functioning and verifiable IPM programs | Difference in pre- and post-IPM program numbers of schools with IPM programs; IPM STAR |

**5. Schroeder (WI)**

Outputs

1. Creation of marketing brochure(s) for various stakeholder groups highlighting the need for IPM and the critical elements of a verifiable IPM program.
2. Information on the importance of implementing verifiable IPM will be shared with school and community stakeholders no less than one time per month for the final 18 months of the project period.
3. Providing IPM information and/or initial training to 84 Wisconsin school districts.

Outcomes

1. Committing no less than 75% of 84 school districts for full IPM project inclusion and verifiable IPM implementation.
2. Documentation and data to be collected for 100% of schools (84) includes: injuries documented with the Department of Commerce related to the application or use of chemicals; workers compensation data, school days missed due to illness and many others.
3. Pesticide application amounts, types, costs, reductions, and their safe disposal will be measured for 100% of participating schools.
4. Environmental--fewer chemicals going into landfills, streams, groundwater.
5. Health--animals and plants humans consume, water humans drink, air humans breathe and surfaces humans contact will be healthier containing fewer chemicals.
6. Economic--hospital/clinic visits/medication costs can be reduced, money spent on commercial pesticide contractors will be reduced and in some cases eliminated.
7. Community– school staff and students will spend more time healthy and in the classroom, improving student achievement scores, and reducing school, work and family disruption due to illness. Community members will have increased knowledge of the importance of IPM and reducing pesticide use.

**6. Young (CO , UT)**

Objectives and Outputs

1. Increase the probability of SIPM adoption through state surveys, targeted interviews, focus groups and one-on-one communication to address school community readiness.
2. Demonstrate and implement verifiable IPM practices in pilot schools through customized IPM strategies based on school audits, instructional workshops, state training and up-to-date, regionally specific and readily available printed and digital IPM educational resources.
3. Evaluate decision-making tools by piloting software (iPestManager©) to track pests, management practices and associated costs.
4. Increase adoption of SIPM within EPA region 8 and beyond through strengthening state SIPM committees, the Region 8 coalition and partnerships with stakeholders, including pest management, landscape and health professionals.