
# 2011

## Quality Assurance - Quality Control Report
### For Data Collected
## STS Program Area
USDA-FS

Denise Dodd

Note:
Numbers highlighted in yellow are instances where the guidelines were not met.

## Executive Summary

The STS project completed the 2011 trapping season with overall project compliance to the protocols established in 1999 and agreed upon by the cooperating agencies of the project. In summary, the database generated 83,857 trap sites within the STS project area for the 2011 season and traps were deployed at over 96% of the planned sites (80,962 traps were placed).

The trapping protocols are designed to insure a high degree of data integrity, which is necessary because the data dictates all decisions made within the project. This year the project met or exceeded the standards on most measures. The protocol for trap location is that 90% of the traps will be placed within a defined distance (30% of the intertrap distance) of the grid node. This measure, known as the target circle, is intended to maintain the spatial integrity of the trapping. With 85.71% of traps within the target circle, the project did not meet the target. In many cases, a choice must be made between omitting a site and placing the trap outside the target circle. It is almost always better to place a trap outside the target than to omit that trap.

| **Standard / Protocol** | **Measure** | **Target** | **2011** |
|---|---|---|---|
| Spatial integrity of the trapping grids | 100% of the grid nodes are accounted for in the database as deleted, omitted or placed | 100% | 99.89% |
| | % of the nodes with placed traps | >95% | 96.55% |
| Trap location | % of the traps placed within a defined distance of the grid node | > 90% | 85.71% |
| Field inspections | % of the trap sites checked | > 10% | 14.45% |
| | % of the checked sites that passed | NA | 99.17% |
| Trap placement and removal dates | Evaluated against model predictions based on current year weather data | NA | 99% |
| Compliance with decision algorithm recommendations | DA recommends treatments | NA | 80.88% |
| | DA recommends delimits | NA | 82.46% |

With the implementation of newer GPS technology and the goal of implementing the “trapper gadget” project wide in the future, the trapping data are becoming less of an issue each trapping season. The numbers in this report indicate that there is essentially no risk that faulty decisions will be made based upon data quality. This is particularly gratifying in a project that includes multiple government agencies covering a broad geographic range, and is the result of excellent cooperation among all parties involved.

# Standards for Quality Control and Quality Assurance in STS

Table 1 displays the standards for field collected data, and the associated quality assurance or quality control measures that were developed for use in the STS Program.

Table 1: Standards for field collected data in the STS Program.

| Category | Standard | QA/QC Checks and Measures |
|---|---|---|
| **Trap spacing** | **For all states except WI and IL**<br>Action Zone<br>• Delimiting grid ≈ 0.5 km or 1 km spacing<br>• Detection grid ≈ 2 km spacing<br>Monitoring Zone<br>• 3 km spacing in a band ≈ 20 km deep located adjacent to the Action Zone<br>• 8 km spacing elsewhere<br>**For WI and IL**<br>Action Zone<br>• Delimiting grid = 9 t/sm or 4 t/sm<br>• Detection grid = 1 mi or 1 x 2 mi<br>Monitoring Zone<br>• 2 mi spacing in a narrow band adjacent to the action zone<br>• 5 mi spacing everywhere else | Grid nodes are generated program wide by the GIS at the master database<br>• Grid nodes are reviewed and approved by the agency project managers<br>• All traps placed using handheld GPS units or "trapper gadget" data collection devices |
| **Integrity of the trapping grids** | • 100% of the grid nodes are accounted for in the database as deleted, omitted or deployed<br>• 90% of the grid nodes are associated with a deployed trap, adjacent omits avoided | • Deleted and omitted sites are approved by agency project managers<br>• Web-based, real-time database reports<br>• 10% of the trap sites field checked<br>• Annual database summary |
| **Trap location** | • 90% of the deployed traps are placed within a defined distance of the grid node (± 30% of the inter-trap distance) | • Positional data are collected using GPS units as data recorders<br>• Database validation routines, reports<br>• 10% of the trap sites field checked |
| **Trap style** | Action Zone<br>• Delta traps in the detection grid<br>• Delta traps in delimit grids when moth capture in the previous year was <5<br>• Milk-carton traps in delimit grids when moth capture in previous year was = or >5<br>Monitoring Zone<br>• Milk-carton traps throughout | • Database validation routines, error reports<br>• 10% of the trap sites are field checked for accuracy |
| **Trap placement and removal schedules** | • Schedules for completion of trap deployment and initiation of trap removal are set based on phenology<br>• Target dates are set for zones of similar elevation and latitude using best available local knowledge | • Project provides zone map based on the variables (30 year average weather, elevation and latitude) used to run the phenology model (GMPHEN and BioSim)<br>• Annually, the master database runs the phenology model with current year weather data to check for areas where trap set and remove dates are out of sync with phenology; results documented in an annual report |

| | | |
|---|---|---|
| **Personnel skills** | • Implementing agencies document the procedures used to assure that individuals collecting and processing data have demonstrated qualifications. | • Certification of annual training provided to field personnel covering:<br>Use of GPS and other field equipment<br>Trap assembly and moth identification<br>Map reading and field navigation<br>Safety and public relations<br>• Trapping manuals that address protocols for data collection and processing.<br>• Safety action plans that include methods used to address identified hazards. |

Wherever possible the standards are embedded in the STS Decision Support System and quality control checks are embedded in the database validation routines. Both the database and Decision Support System are accessible on the STS Operations website (http://www.gmsts.org/operations.html).

## Quality Assurance

**Data Flow:** Data are collected with either handheld GPS units or with GPS-enabled PDAs with custom designed STS software (Trapper Gadget). The collected GPS data are downloaded into STS specific software and posted to the STS database, where validations are run on the data for quality control. Reports documenting errors are immediately available at the web site where they can be retrieved by. Custom software screens data for errors before the data file loads. This has proven to prevent many of the errors from reaching the database and has significantly reduced the person hours devoted to error correction. Database errors can be corrected online as part of the STS web portal. Static maps are no longer posted on the web site showing trapping status. Real time information can be accessed using the STS Mapserver from the STS Webpage at www.gmsts.org**.** All aspects of trap placement through final trap capture can be viewed including quality control field inspection, final inspection and omitted sites.

STS maintains two trapping databases with the master database at Virginia Tech and a node at Michigan State University (MSU). These nodes are synched in real-time with Oracle Streams. There is no longer a delay while waiting for the nightly updates. Project and agency level reports posted on the web site during trapping season now include real-time data gathered when the report is requested.

This process provides assurance that all cooperators are striving to meet the minimum project standards and insures that we can share the field collected data project-wide on a timely basis for planning purposes. Excellent communication among the cooperators and the Project, and the willingness of the cooperators to share resources, make it possible to identify some problems early enough in the season that resources were shifted and the problem(s) corrected in the same season.

**Project Boundaries and Trap Spacing**: In 2011, as in previous years, boundaries for the action and monitoring areas were set program wide relative to the 10-moth boundary line as recommended by the STS Decision Support System. Trap spacing and the location of delimiting grids were also set following the above standards, although field managers delineated actual boundaries for delimiting grids. The GIS at Virginia Tech generated the grid nodes and site IDs for the entire project, which was the basis for the plan of work for trapping activities in 2011.

**Personnel Skills**: Each cooperator provided STS Project Management at USDA FS, FHP in Asheville, NC (Project) with documentation that provides assurance that all cooperators are striving to meet the minimum project standards for personnel skills. Documentation includes the following information:

1. Safety Action Plan
2. Trapper Training Manual
3. Certification that trappers and supervisors had demonstrated the skills necessary to perform assigned duties. These may include skills such as: reading and understanding trapping maps, measuring and recording UTM coordinates from maps, identification of male gypsy moths in traps, trap assembly, and data collection using GPS.
4. List of trappers

# Quality Control

## Integrity of the Grids and Trap Location

**Trap Placement**: During 2011, the STS Program Area placed traps at 96.55% of the proposed sites project wide and omitted traps at 3.34% of the proposed sites (Table 2). This meets our target standard to deploy 95% of the proposed trap sites and is an improvement over last year when we failed to meet this target. Ninety-three sites in Minnesota were left unaddressed this year. Statistics for trap placement by grid type in the STS Action or Monitoring Areas are presented for each cooperator in Tables 3 and 4.

Table 2: 2011 Summary of Gypsy Moth Trap Placement in the STS Project Action and Monitoring areas.

| STS Project | # Proposed Trap Sites | # Placed Traps | % Traps Placed | Omitted Sites | % Sites Omitted | Unaddressed Trap Sites | % Unaddressed Trap Sites |
|---|---|---|---|---|---|---|---|
| **Grand Totals** | **83,857** | **80,962** | **96.55** | **2,802** | **3.34** | **93** | **0.11** |

Table 3: 2011 Trap Placement in the STS Project Action Area - (STS Target < 5% omitted)

| Agency | Grid Type | Proposed Trap Sites | Placed Traps | % Traps Placed | Omitted Sites | % Sites Omitted | Unaddressed Nodes | % Unaddressed Nodes |
|---|---|---|---|---|---|---|---|---|
| IADNR | 500M | 1,119 | 1,049 | 93.74 | 70 | 6.26 | 0 | 0 |
| | 1K | 669 | 657 | 98.21 | 12 | 1.79 | 0 | 0 |
| | 2K | 2,570 | 2,561 | 99.65 | 9 | 0.35 | 0 | 0 |
| | Regulatory | 94 | 93 | 98.94 | 1 | 1.06 | 0 | 0 |
| **Total** | | **4,452** | **4,360** | **97.93** | **92** | **2.07** | **0** | **0** |
| IDA | 9/MI | 544 | 525 | 96.51 | 19 | 3.49 | 0 | 0 |
| | 4/MI | 653 | 648 | 99.23 | 5 | 0.77 | 0 | 0 |
| | 1X2MI | 5,376 | 5,375 | 99.98 | 1 | 0.02 | 0 | 0 |
| | Random | 5 | 5 | 100 | 0 | 0 | 0 | 0 |
| **Total** | | **6,578** | **6,553** | **99.62** | **25** | **0.38** | **0** | **0** |
| IN_DNR | 500M | 538 | 378 | 70.26 | 160 | 29.74 | 0 | 0 |
| | 1K | 1,426 | 1,229 | 86.19 | 197 | 13.81 | 0 | 0 |
| | 2K | 5,619 | 5,558 | 98.91 | 61 | 1.19 | 0 | 0 |
| | Random | 5 | 5 | 100 | 0 | 0 | 0 | 0 |
| **Total** | | **7,588** | **7,170** | **94.49** | **418** | **5.51** | **0** | **0** |
| KDA | 2K | 678 | 640 | 94.40 | 38 | 5.60 | 0 | 0 |
| **Total** | | **678** | **640** | **94.40** | **38** | **5.60** | **0** | **0** |
| MNDA | 500M | 99 | 91 | 91.92 | 8 | 8.08 | 0 | 0 |
| | 1K | 2,239 | 2,048 | 91.47 | 172 | 7.68 | 19 | 0.85 |
| | 2K | 4,986 | 4,547 | 91.20 | 365 | 7.32 | 74 | 1.48 |
| | Regulatory | 257 | 253 | 98.44 | 4 | 1.56 | 0 | 0 |
| | Random | 33 | 33 | 100 | 0 | 0 | 0 | 0 |
| **Total** | | **7,614** | **6,972** | **91.57** | **549** | **7.21** | **93** | **1.22** |
| NCDACS | 500M | 253 | 252 | 99.60 | 1 | 0.40 | 0 | 0 |
| | 1K | 264 | 236 | 89.39 | 28 | 10.61 | 0 | 0 |
| | 2K | 8,744 | 8,700 | 99.50 | 44 | 0.50 | 0 | 0 |
| | Regulatory | 152 | 95 | 62.50 | 57 | 37.50 | 0 | 0 |
| | Random | 10 | 10 | 100 | 0 | 0 | 0 | 0 |
| **Total** | | **9,423** | **9,293** | **98.62** | **130** | **1.38** | **0** | **0** |
| ODA | 250M | 175 | 148 | 84.57 | 27 | 15.43 | 0 | 0 |
| | 500M | 877 | 850 | 96.92 | 27 | 3.08 | 0 | 0 |
| | 1K | 1,416 | 1,401 | 98.94 | 15 | 1.06 | 0 | 0 |
| | 2K | 7,669 | 7,644 | 99.67 | 25 | 0.33 | 0 | 0 |
| | Random | 49 | 49 | 100 | 0 | 0 | 0 | 0 |
| **Total** | | **10,186** | **10,092** | **99.08** | **94** | **0.92** | **0** | **0** |
| VDACS | 500M | 872 | 856 | 98.17 | 16 | 1.83 | 0 | 0 |
| | 1K | 93 | 88 | 94.62 | 5 | 5.38 | 0 | 0 |
| | 2K | 3,891 | 3,841 | 98.71 | 50 | 1.29 | 0 | 0 |
| | Random | 1 | 1 | 100 | 0 | 0 | 0 | 0 |
| **Total** | | **4,857** | **4,786** | **98.54** | **71** | **1.46** | **0** | **0** |
| WIDATCP | 9/MI | 56 | 56 | 100 | 0 | 0 | 0 | 0 |
| | 4/MI | 3,637 | 3,405 | 93.62 | 232 | 6.38 | 0 | 0 |
| | 1MI | 14,793 | 13,802 | 93.30 | 991 | 6.70 | 0 | 0 |
| | Random | 21 | 21 | 100 | 0 | 0 | 0 | 0 |
| **Total** | | **18,507** | **17,284** | **93.39** | **1223** | **6.61** | **0** | **0** |

Table 3 continued: 2011 Trap Placement in the STS Project Action Area - (STS Target < 5% omitted)

| Agency | Grid Type | Proposed Trap Sites | Placed Traps | % Traps Placed | Omitted Sites | % Sites Omitted | Unaddressed Nodes | % Unaddressed Nodes |
|---|---|---|---|---|---|---|---|---|
| WVDA | 500M | 131 | 124 | 94.66 | 7 | 5.34 | 0 | 0 |
| | 1K | 251 | 243 | 96.81 | 8 | 3.19 | 0 | 0 |
| | 2K | 4,079 | 4,067 | 99.71 | 12 | 0.29 | 0 | 0 |
| **Total** | | **4,461** | **4,434** | **99.39** | **27** | **0.61** | **0** | **0** |
| **Grand Total** | | **74,344** | **71,584** | **96.29** | **2,667** | **3.59** | **93** | **0.13** |

Table 4: 2011 Trap Placement in the STS Project Monitoring Areas

| Agency | Grid Type | Proposed # Traps | Placed # Traps | % Traps Placed | Omitted Sites | % Sites Omitted | Unaddressed Nodes | % Unaddressed Nodes |
|---|---|---|---|---|---|---|---|---|
| IDA | 4/MI | 101 | 101 | 100 | 0 | 0 | 0 | 0 |
| | 2MI | 361 | 361 | 100 | 0 | 0 | 0 | 0 |
| | 3MI | 115 | 115 | 100 | 0 | 0 | 0 | 0 |
| | Random | 144 | 144 | 100 | 0 | 0 | 0 | 0 |
| **Total** | | **721** | **721** | **100** | **0** | **0** | **0** | **0** |
| IN_DNR | 500m | 185 | 127 | 68.65 | 58 | 31.35 | 0 | 0 |
| | 1K | 142 | 124 | 87.32 | 18 | 12.68 | 0 | 0 |
| | 3K | 670 | 666 | 99.40 | 4 | 0.60 | 0 | 0 |
| | 5K | 154 | 153 | 99.35 | 1 | 0.65 | 0 | 0 |
| | Random | 1 | 1 | 100 | 0 | 0 | 0 | 0 |
| **Total** | | **1,152** | **1,071** | **92.97** | **81** | **7.03** | **0** | **0** |
| MDA | 8K | 20 | 19 | 95.00 | 1 | 5.00 | 0 | 0 |
| **Total** | | **20** | **19** | **95.00** | **1** | **5.00** | **0** | **0** |
| ODA | 3K | 1,302 | 1,302 | 100 | 0 | 0 | 0 | 0 |
| | 8K | 302 | 302 | 100 | 0 | 0 | 0 | 0 |
| | Random | 46 | 46 | 100 | 0 | 0 | 0 | 0 |
| **Total** | | **1,650** | **1,650** | **100** | **0** | **0** | **0** | **0** |
| VDACS | 3K | 1,515 | 1,497 | 98.81 | 18 | 1.19 | 0 | 0 |
| | 8K | 339 | 339 | 100 | 0 | 0 | 0 | 0 |
| | Random | 4 | 4 | 100 | 0 | 0 | 0 | 0 |
| **Total** | | **1,858** | **1,840** | **99.03** | **18** | **0.97** | **0** | **0** |
| WIDATCP | 4/MI | 469 | 443 | 95.46 | 26 | 4.54 | 0 | 0 |
| | 2MI | 1,428 | 1,419 | 99.37 | 9 | 0.63 | 0 | 0 |
| | 3MI | 1,118 | 1,118 | 100 | 0 | 0 | 0 | 0 |
| | Random | 1 | 1 | 100 | 0 | 0 | 0 | 0 |
| **Total** | | **3,016** | **2,981** | **98.84** | **35** | **1.16** | **0** | **0** |
| WVDA | 3K | 888 | 888 | 100 | 0 | 0 | 0 | 0 |
| | 8K | 208 | 208 | 100 | 0 | 0 | 0 | 0 |
| **Total** | | **1,096** | **1,096** | **100** | **0** | **0** | **0** | **0** |
| **Grand Total** | | **9,513** | **9,378** | **98.58** | **135** | **1.42** | **0** | **0** |

**Omitted Trap Sites:** Again this year, the most common reasons for omitting a trap were terrain related. These categories accounted for more than two-thirds of all omitted sites (Table 5). 'No structure to hang trap' also accounted for 13.45% of the omitted trap sites. Only 2.03% of proposed trap sites were omitted for safety reasons.

Table 5: Reason for omitting sites for the Action and Monitoring Areas – 2011 data

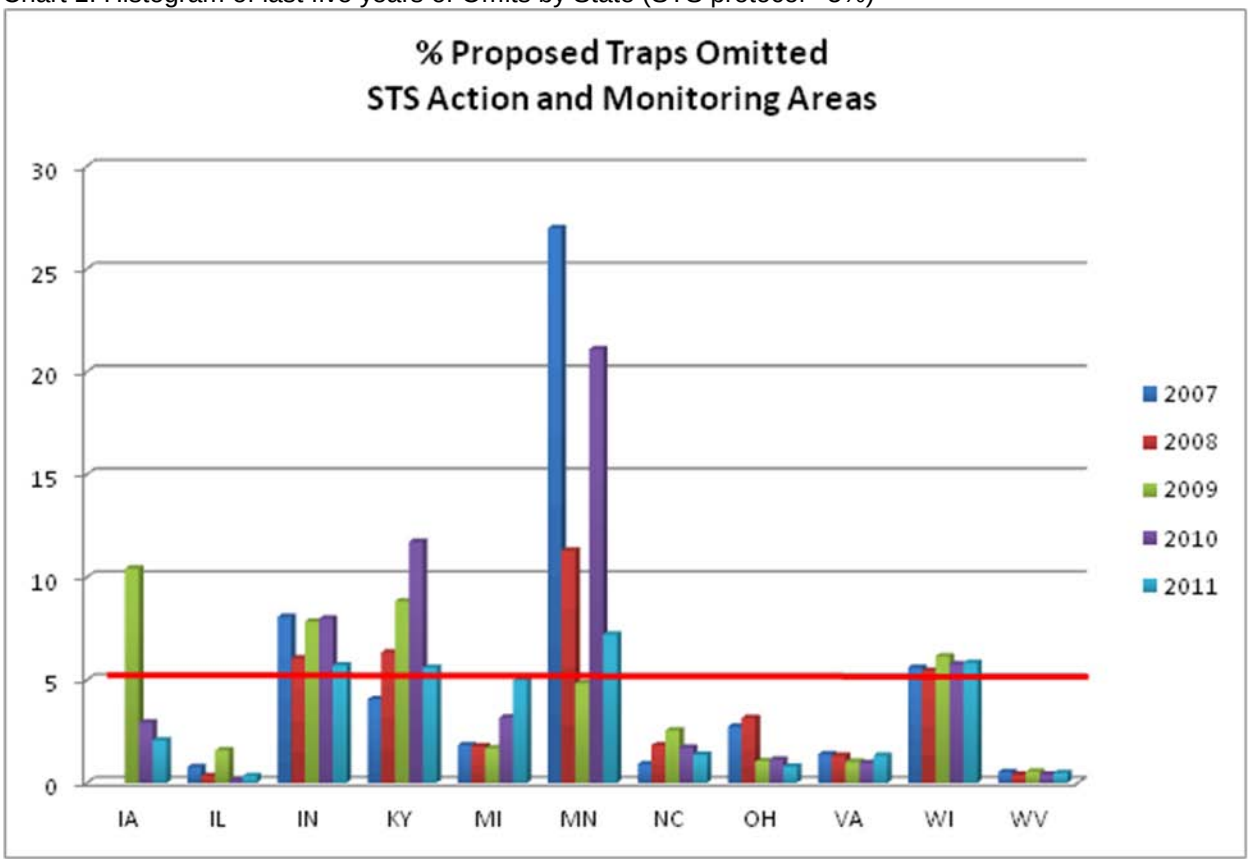
| **Reason for Omitted Sites** | **IADNR (# traps)** | | **IDA (#traps)** | | **IN_DNR (# traps)** | | **UKY (# traps)** | | **MDA (# traps)** | | **MNDA (# traps)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Action | Monitor | Action | Monitor | Action | Monitor | Action | Monitor | Action | Monitor | Action | Monitor |
| Landowner denied access | 16 | | 11 | | | | 2 | | | | 10 | |
| Obstacle prohibited access | 46 | | 3 | | 144 | 7 | 11 | | 1 | | 18 | |
| Inaccessible terrain - too wet | 6 | | 4 | | 3 | 1 | | | | | 280 | |
| Inaccessible terrain - rough, steep | | | 2 | | 18 | | 25 | | | | 154 | |
| Inaccessible terrain - thick vegetation | | | 3 | | 3 | | | | | | 84 | |
| Safety hazard | 2 | | | | 22 | 1 | | | | | 3 | |
| No structure for trap | 21 | | 2 | | 228 | 72 | | | | | | |
| Other | 1 | | | | | | | | | | | |
| **Total** | **92** | **0** | **25** | **0** | **418** | **81** | **38** | **0** | **1** | **0** | **549** | **0** |
| **Grand Total** | **92** | | **25** | | **499** | | **38** | | **1** | | **549** | |

Table 5 continued: Reason for omitting sites for the Action and Monitoring Areas – 2011 data

| **Reason for Omitted Sites** | **NCDACS (# traps)** | | **ODA (#traps)** | | **VDACS (# traps)** | | **WIDATCP (# traps)** | | **WVDA (# traps)** | | **Total** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Action | Monitor | Action | Monitor | Action | Monitor | Action | Monitor | Action | Monitor | # | % |
| Landowner denied access | 3 | | 17 | | 12 | 2 | 29 | 5 | | | **107** | **3.82** |
| Obstacle prohibited access | 68 | | 12 | | | | 23 | | | | **333** | **11.88** |
| Inaccessible terrain - too wet | 53 | | 4 | | 26 | 8 | 761 | 7 | | | **1,153** | **41.15** |
| Inaccessible terrain - rough, steep | | | 8 | | 20 | 6 | 351 | 15 | 14 | | **613** | **21.88** |
| Inaccessible terrain - thick vegetation | 2 | | 4 | | 3 | | 54 | 8 | | | **161** | **5.75** |
| Safety hazard | 4 | | 11 | | 10 | 2 | 2 | | | | **57** | **2.03** |
| No structure for trap | | | 38 | | | | 3 | | 13 | | **377** | **13.45** |
| Other | | | | | | | | | | | **1** | **0.04** |
| **Total** | **130** | **0** | **94** | **0** | **71** | **18** | **1,223** | **35** | **27** | **0** | | |
| **Grand Total** | **130** | | **94** | | **89** | | **1,258** | | **27** | | **2,802** | |

Chart 1 shows the five year trend of omits per state. STS protocols require a trap be placed on 95% of all nodes in the database. The STS project area as a whole improved over last year and met this goal.

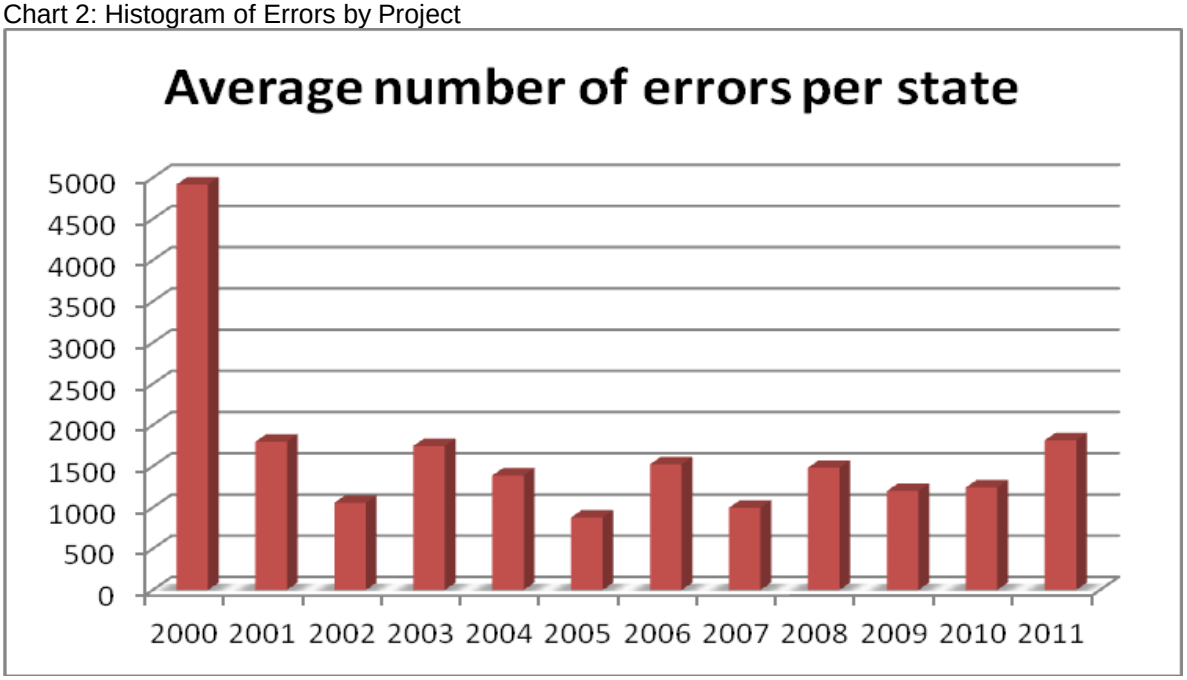
Chart 1: Histogram of last five years of Omits by State (STS protocol <5%)




**Trap Location and GPS**: There were a total of 80,962 traps placed in the STS project area in 2011 of which 71,584 traps were in the action area. Our target was to use handheld GPS units or trapper gadget PDAs to record the coordinates of the trap location, as well as the data associated with that trap, at 100% of the trap sites.

Chart 2 portrays the number of errors for the project. In 2011, there were 19,965 errors recorded for 13,322 unique data records. This represents a less than 4% error rate among the more than 335 thousand records sent to the database.

Chart 2: Histogram of Errors by Project



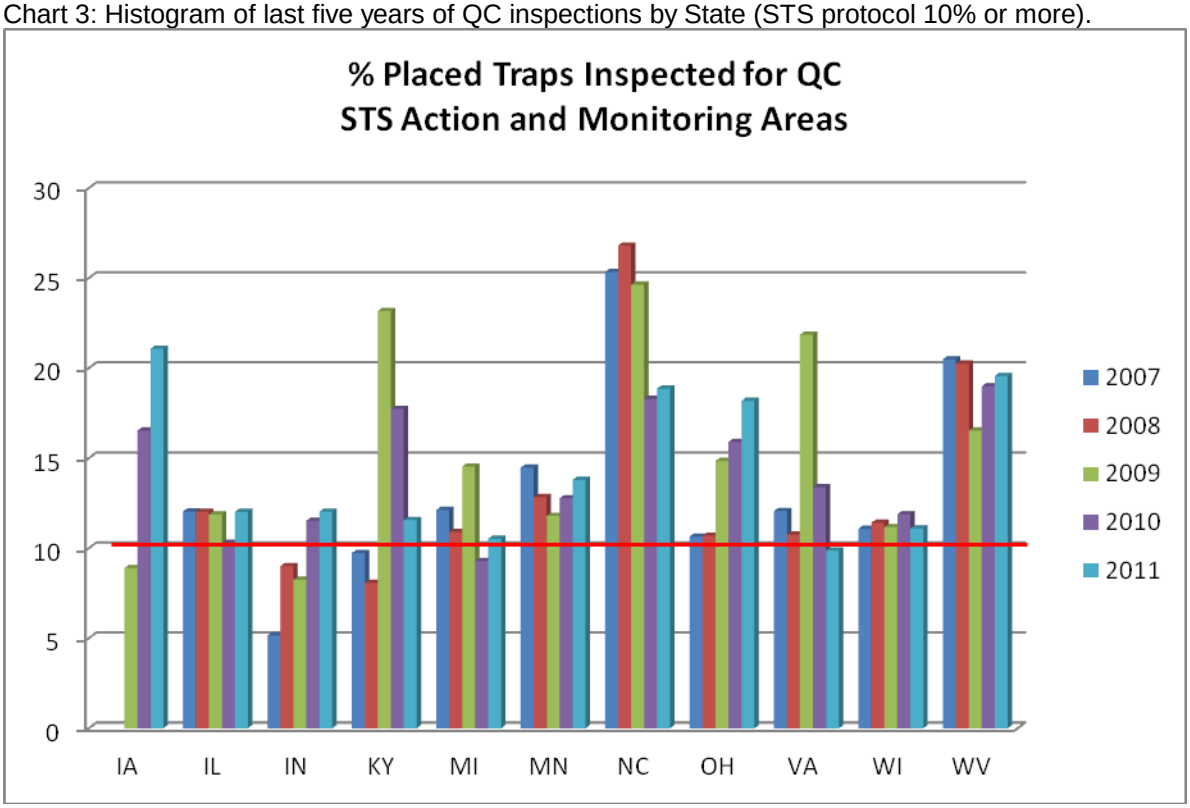

**Field Inspections:** This year the project achieved our protocol target to field check 10% of the trap sites for accuracy. Project wide, 14.45% of the trap sites were visited for quality control inspections; 99.17% of the inspected sites passed and 0.83% failed (Table 6). This failure rate translates to a total of only 98 improperly deployed traps out of the 11,696 traps inspected.

Table 6: Summary of the field inspections for quality control in the STS Project, 2011.

| STS Project | # Traps Placed | # Sites Checked | % Checked | # QC Inspections | # Passed | % Passed | # Failed | % Failed |
|---|---|---|---|---|---|---|---|---|
| **Grand Totals** | **80,962** | **11,696** | **14.45** | **11,744** | **11,646** | **99.17** | **98** | **0.83** |

Chart 3 depicts historical trends for states implementing the STS protocols on trap inspections.

Chart 3: Histogram of last five years of QC inspections by State (STS protocol 10% or more).




This season the overall project failure rate was 0.83%, a slight improvement over last year's 0.88%. This number should represent a higher than average failure rate due to quality control inspectors targeting areas where problems are suspected. For instance, during trap placement a database validation routine may document that a trapper has a high rate of errors in recording. These errors could mean that the GPS unit is malfunctioning or that the trapper could use some additional training. Whatever the cause of error may be, an agency can target field inspections where errors occur most frequently. Furthermore, when problems are discovered early in the season additional training can be given to the trapper to solve the problem or, in extreme cases, the trapper may be fired. Statistics for quality control inspections in the STS Action or Monitoring Areas are presented for each cooperator in Tables 7 and 8. Inspection failure reasons are listed in Table 9.

Table 7: Quality control inspections in the STS Action Areas, 2011.

| Agency | # Traps Placed | # Sites Checked | % Checked | # QC Inspections | # Passed | % Passed | # Failed | % Failed |
|---|---|---|---|---|---|---|---|---|
| IADNR | 4,360 | 919 | 21.08 | 920 | 920 | 100 | 0 | 0 |
| IDA | 6,553 | 781 | 11.92 | 784 | 783 | 99.87 | 1 | 0.13 |
| IN_DNR | 7,170 | 855 | 11.92 | 855 | 855 | 100 | 0 | 0 |
| KDA | 640 | 74 | 11.56 | 74 | 74 | 100 | 0 | 0 |
| MNDA | 6,972 | 962 | 13.80 | 962 | 961 | 99.90 | 1 | 0.10 |
| NCDACS | 9,293 | 1,753 | 18.86 | 1,755 | 1,730 | 98.58 | 25 | 1.42 |
| ODA | 10,092 | 1,891 | 18.74 | 1,911 | 1,909 | 99.90 | 2 | 0.10 |
| VDACS | 4,786 | 493 | 10.30 | 498 | 486 | 97.59 | 12 | 2.41 |
| WIDATCP | 17,284 | 1,777 | 10.28 | 1,779 | 1,731 | 97.30 | 48 | 2.70 |
| WVDA | 4,434 | 796 | 17.95 | 796 | 796 | 100 | 0 | 0 |
| **Total** | **71,584** | **10,301** | **14.39** | **10,334** | **10,245** | **99.14** | **89** | **0.86** |

Note: The number of QC inspections listed may include multiple inspections for some sites.

Table 8: Quality control inspections in the STS Monitoring Areas, 2011.

| Agency | # Traps Placed | # Sites Checked | % Checked | # QC Inspections | # Passed | % Passed | # Failed | % Failed |
|---|---|---|---|---|---|---|---|---|
| IDA | 721 | 93 | 12.90 | 93 | 93 | 100 | 0 | 0 |
| IN_DNR | 1,071 | 136 | 12.70 | 136 | 136 | 100 | 0 | 0 |
| MDA | 19 | 2 | 10.53 | 2 | 2 | 100 | 0 | 0 |
| ODA | 1,650 | 244 | 14.79 | 244 | 244 | 100 | 0 | 0 |
| VDACS | 1,840 | 161 | 8.75 | 161 | 156 | 96.89 | 5 | 3.11 |
| WIDATCP | 2,981 | 473 | 15.87 | 487 | 483 | 99.18 | 4 | 0.82 |
| WVDA | 1,096 | 286 | 26.09 | 287 | 287 | 100 | 0 | 0 |
| **Total** | **9,378** | **1,395** | **14.88** | **1,410** | **1,401** | **99.36** | **9** | **0.64** |

Note: The number of QC inspections listed may include multiple inspections for some sites.

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Table 9: Summary by Agency and reason for failure of the sites that failed quality control measures in the STS Project Area, 2011.

| Reason for Failure | IDA | MNDA | NCDACS | ODA | VDACS | | WI DATCP | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A | A | A | A | A | M | A | M | # | % |
| Trap not assembled correctly | 1 | 1 | 13 | | 1 | 1 | 6 | | **23** | **23.47** |
| Trap outside target circle | | | 1 | 2 | | | 27 | 2 | **32** | **32.65** |
| Directions to site are incorrect or incomplete | | | 1 | | 4 | 1 | 6 | 1 | **13** | **13.27** |
| Grid set at wrong spacing | | | | | | | | | **0** | **0** |
| Trap info not recorded correctly on trap | | | 8 | | 1 | 1 | 6 | 1 | **17** | **17.35** |
| Record filled out where no trap was set (bogus data) | | | | | 2 | | 3 | | **5** | **5.10** |
| Delta trap set where milk carton indicated | | | | | | | | | **0** | **0** |
| UTMs recorded incorrectly on data sheet | | | 1 | | 1 | | | | **2** | **2.04** |
| Trapper did not remove trap | | | | | | | | | **0** | **0** |
| Multiple traps set at one site | | | | | | | | | **0** | **0** |
| Trap set too low to ground | | | 1 | | 2 | 1 | | | **4** | **4.08** |
| Incorrect Inspection | | | | | 1 | 1 | | | **2** | **2.04** |
| **Total** | **1** | **1** | **25** | **2** | **12** | **5** | **48** | **4** | **98** | |

A- Action area
M- Monitoring area

Table 10 shows traps placed outside their target circle in 2011. Chart 4 depicts the state trends of traps being placed outside the target circle. In 2003, the database discontinued the identification of out of target traps as an error. Some states have instructed trappers to deliberately set a given trap outside the target circle if the proposed site has no suitable host type. Even though the condition is not an error inside the database, it should be of concern to cooperators for survey integrity. 2009 was the first year that “regulatory sites” were introduced as a grid type. The decision was made to give them a small target for mapping purposes, but exclude them from target circle analysis. The number of traps “too far from grid node” in the action area increased for a second year to 16.29%.

Table 10. Number and percent of traps placed outside target circle in the STS Action Area during 2011.

| Agency | Base grid | | | Delimiting grid | | |
|---|---|---|---|---|---|---|
| | Total # traps | # too far from node | % too far from node | Total # traps | # too far from node | % too far from node |
| IADNR | 2,561 | 832 | 32.49 | 1,706 | 759 | 44.49 |
| IDA | 5,375 | 375 | 6.98 | 1,173 | 133 | 11.34 |
| IN_DNR | 5,558 | 627 | 11.28 | 1,607 | 439 | 27.32 |
| UKY | 640 | 74 | 11.56 | 0 | 0 | 0 |
| MNDA | 4,547 | 1,173 | 25.80 | 2,139 | 909 | 42.50 |
| NCDACS | 8,700 | 376 | 4.32 | 488 | 66 | 13.52 |
| ODA | 7,644 | 478 | 6.25 | 2,399 | 306 | 12.76 |
| VDACS | 3,841 | 123 | 3.20 | 844 | 176 | 20.85 |
| WIDATCP | 13,802 | 3,302 | 23.92 | 3,461 | 1,365 | 39.44 |
| WVDA | 4,067 | 30 | 0.74 | 367 | 8 | 2.18 |
| **Total** | **56,735** | **7,390** | **13.03** | **14,184** | **4,161** | **29.34** |

Note: Does not include random sites since they cannot be out of target. Also does not include regulatory sites as they do not influence grid integrity.

Chart 4: Histogram of last five years of trap placement outside target circle by state (STS protocol <10%).

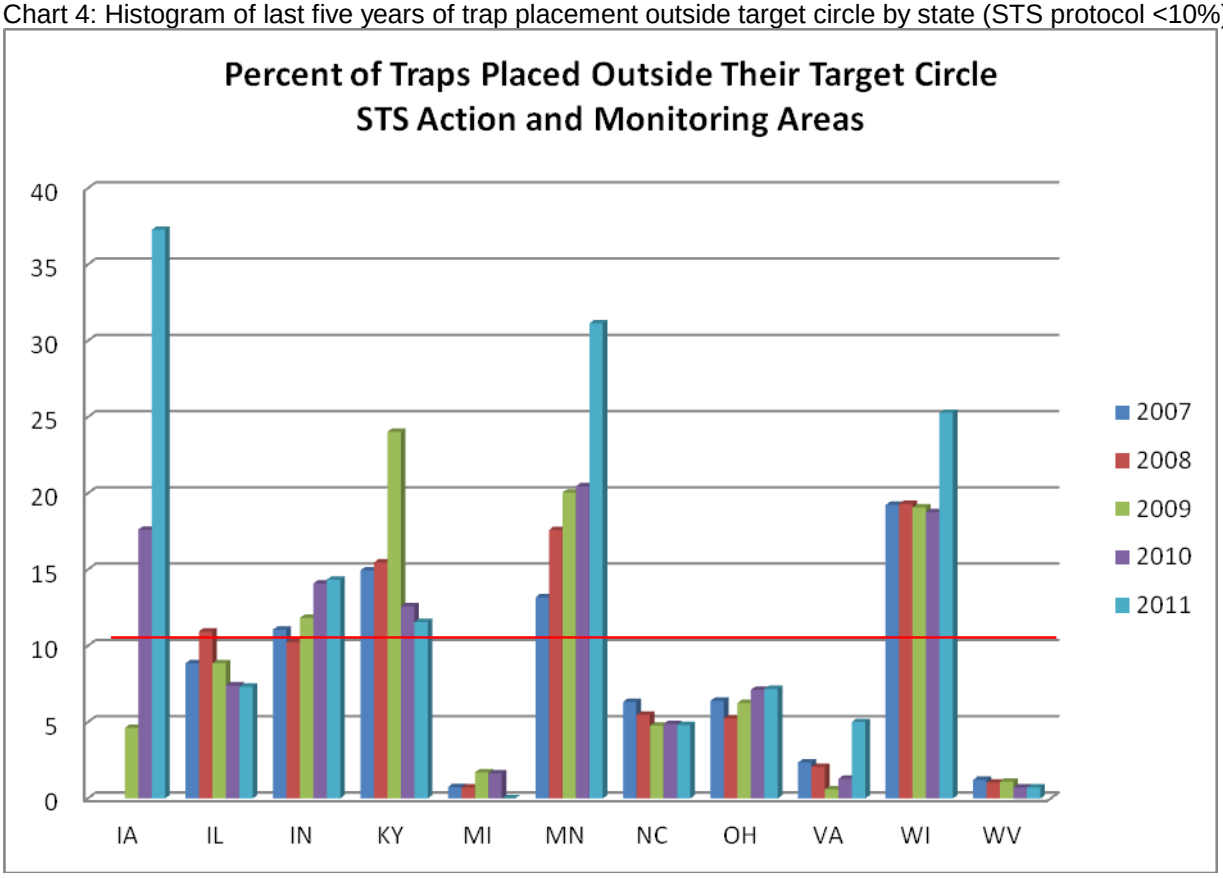
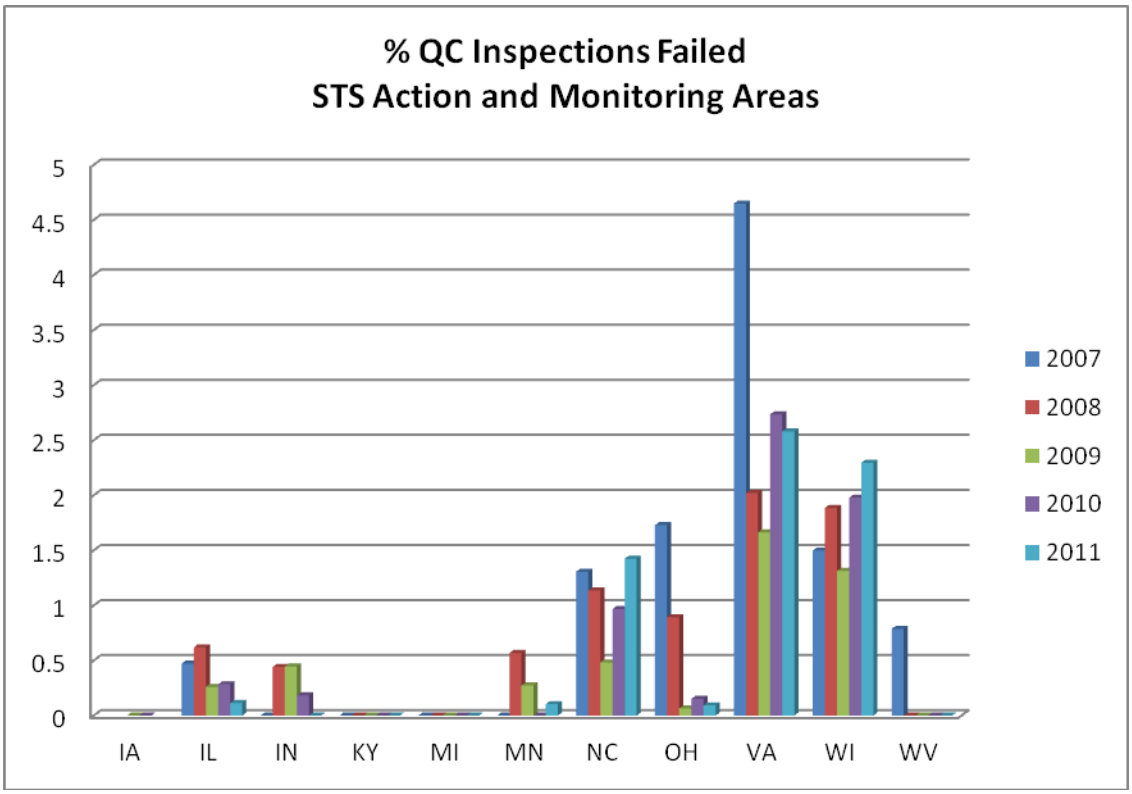


Chart 5: Histogram of last five years of QC inspections failed by state (No standard set by STS).




## Trap Placement and Removal Schedules

Gypsy moth phenology maps developed in BioSIM (Regniere and Saint-Amant, 2008*) using updated (1981-2010) 30-yr temperature data are posted on the STS web site (http://da.ento.vt.edu/phen0.html) and serve as a general guide in determining trap placement and removal schedules. Because flight periods can vary by a week or more from year to year depending on weather, agency field managers are responsible for choosing the specific trap set and removal dates that are used for targets in the different gypsy moth phenology areas in their respective management locations annually. They use the web site map as a starting point, plus their local experience and the current year's weather conditions to set the specific target dates for trap set and removal each year.

**Regniere, J. and R. Saint-Amant. 2008. BioSIM 9 User's manual. Information Report LAU-X-134. Natural Resources Canada, Canadian Forestry Service, Laurentian Forestry Center. 68pp.*

Once weather data for the current year are available, BioSIM is run again using current year weather data. The predicted dates for flight can be compared to the dates when the traps were set and removed at each trap site as recorded and downloaded from the GPS unit/trapper gadget. These data are then displayed on a map that highlights areas where traps may have been set too late or removed too early per the phenology model (see maps below). Data from state APHIS trapping programs in states that have elected to follow STS protocols statewide (NC, VA, KY, OH, IN, IL, WI and MN) are also displayed on the maps as a service to these states.

In 2011, from a total of 668 traps in the STS database that were placed late, 209 traps (0.26% of total placed) were in the STS project area leaving 99.74% of traps placed within the biological window for first flight (Table 11, Fig. 1).

| Placed Late | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project | IL | IN | KY | MN | NC | OH | VA | WI | Total |
| 1 | | | | | | | | | |
| STS | | 1 | 3 | 2 | | 3 | 113 | 6 | 128 |
| State | 2 | 59 | 74 | 11 | 128 | 1 | 41 | | 316 |
| 2 | | | | | | | | | |
| STS | | | | 13 | | 4 | 5 | 1 | 23 |
| State | | 65 | 9 | 7 | 36 | | 2 | | 119 |
| 3+ | | | | | | | | | |
| STS | | | | 39 | | | 2 | 17 | 58 |
| State | | 2 | | 17 | | | | 5 | 24 |
| **Total** | **2** | **127** | **86** | **89** | **164** | **8** | **163** | **29** | **668** |

Table 11. Traps in the STS and State/APHIS program area that were placed late in 2011 compared to the phenology model predictions using current year temperature data.

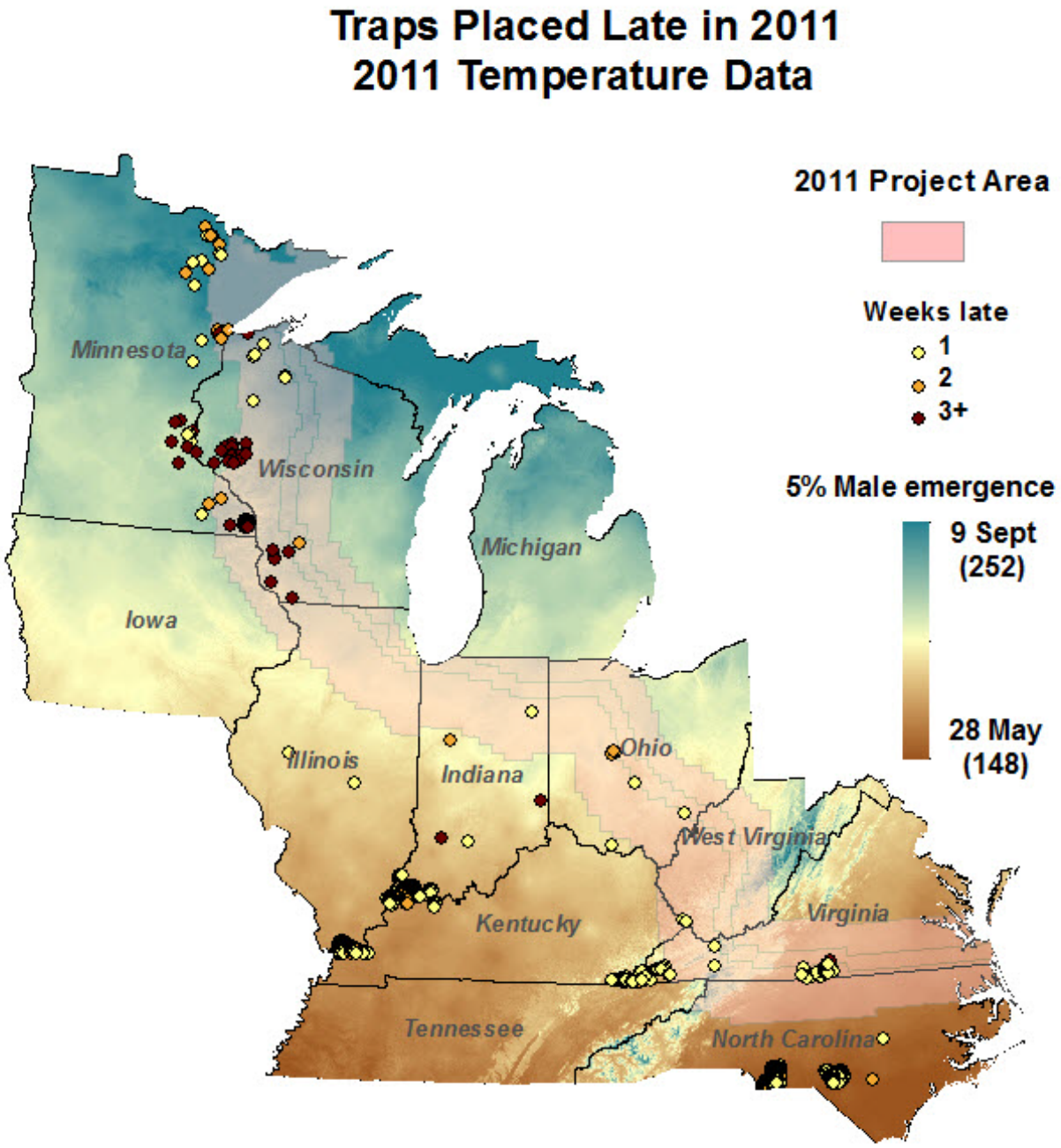



Figure 1. 5% male moth emergence and trap placement

Of the 696 traps designated as removed early in 2011 677 (0.84% of total placed) were in the STS project area yielding a removal of 99.16% within the emergence window (Fig. 2, Table 12). The majority of these early removals were in the MN arrowhead where we have less confidence in the phenology model than we do in southern and other Midwestern regions. However, the phenology in this region for 2011 looks more reasonable than in past years with a mean 95% emergence for these removed early sites of 18 October (day 291) and range of 13 Aug. (day 225) to 8 Nov. (day 312).

| Rem Early | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project | IN | KY | MN | NC | OH | TN | WI | WV | Total |
| 1 | | | | | | | | | |
| STS | 1 | | 204 | 4 | | | 45 | 1 | 255 |
| State | | | 1 | 12 | | | | | 13 |
| 2 | | | | | | | | | |
| STS | 3 | | 151 | | | | | | 154 |
| State | | | 1 | 1 | | 1 | | | 3 |
| 3+ | | | | | | | | | |
| STS | 2 | | 252 | | 13 | | 1 | | 268 |
| State | 1 | 1 | | 1 | | | | | 3 |
| **Total** | **7** | **1** | **609** | **18** | **13** | **1** | **46** | **1** | **696** |

Table 12. Traps in the STS and State/APHIS program area that were pulled early in 2011 compared to the phenology model predictions using current year temperature data.

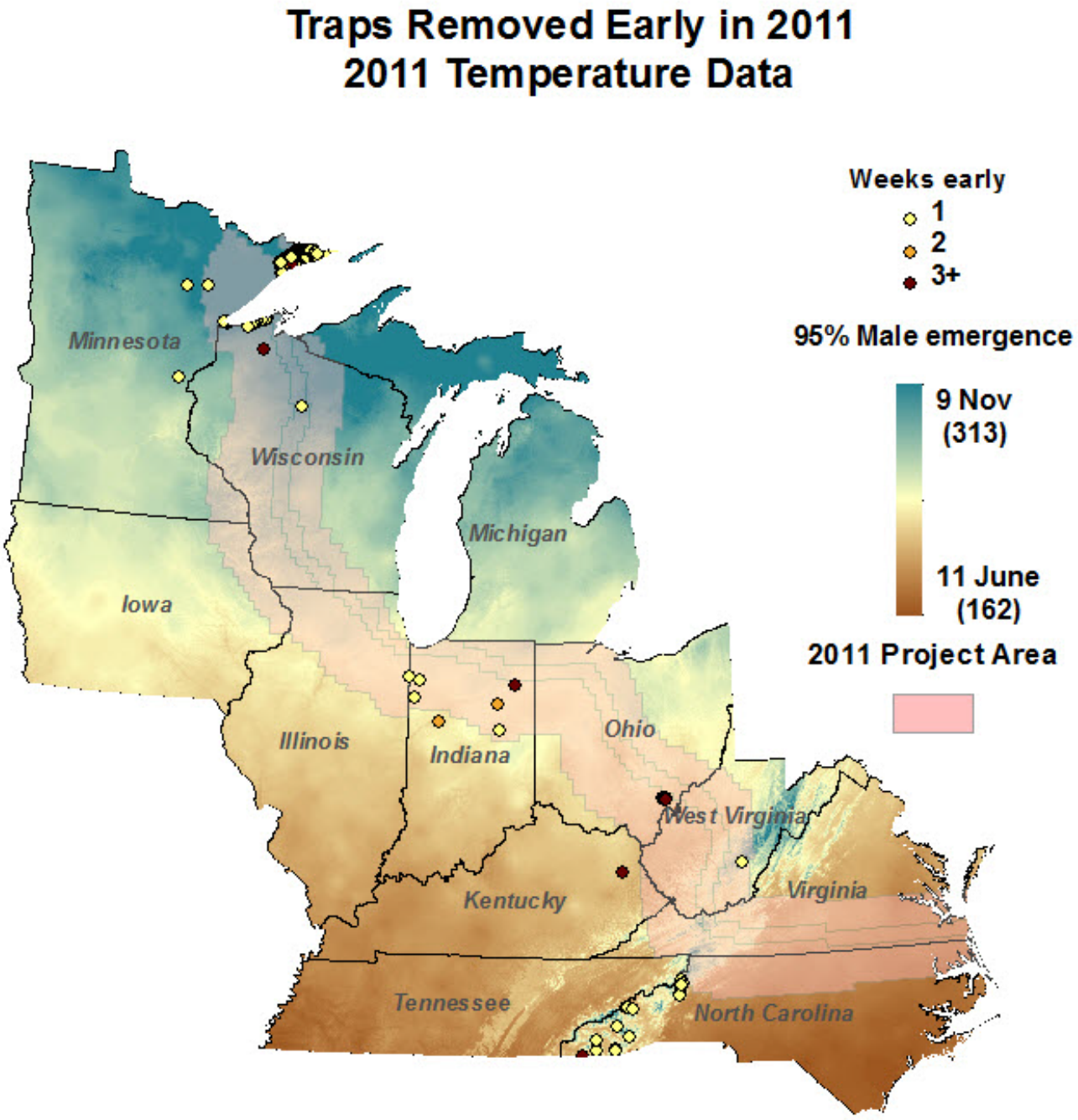



Figure 2. 95% male moth emergence and trap removal

## Conclusions

This report documents the trapping data collected for the STS project during the 2011 season. Although the overall project complied with QC inspections, some states did fall short. It is our opinion that quality control is occurring in each state, but is not being fully documented. Since each state has dedicated supervisory personnel to assure the QA/QC of the trapper data, we feel data integrity still remains high. Otherwise, the numbers in this report indicate that there is essentially no risk that the Project is making faulty decisions based upon the quality of data. This is particularly gratifying in a project that includes multiple government agencies and a broad geographic range, and is the result of excellent cooperation among all parties involved.