

**Pathogen Analysis of NYSDOT Road-killed Deer
Carcass Compost Facilities**

Final Progress Report

07/01/08 – 09/30/08

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Transportation Infrastructure Research Consortium (TIRC)

CWMI Quarterly Progress Report: 07/01/08 – 09/30/08

Pathogen Analysis of NYSDOT Road-killed Deer Carcass Compost Facilities

Task 1: Select Pathogens for Study – task 1 is complete

Subtask 1.1

- This subtask has been completed (see Quarterly report #1) having selected the following pathogens for study:
 - ❖ *Escherichia coli*/Fecal coliforms
 - ❖ Fecal Streptococcus/Enterococci
 - ❖ *Salmonella* spp.
 - ❖ *Mycobacterium avian paratuberculosis* (MAP)

Subtask 1.2

- This subtask has been completed.
- Reports titled “Summary of Rationale of Bacteria Studied” and “Prevalence of Pathogens in Roadkill Summary” are complete (see Quarterly report numbers 1 and 2).

Task 2: Establish Compost Piles – task 2 is complete

Subtask 2.1

- Location of sites for establishing 3 pilot demonstration piles is complete (see Quarterly Report #1).

Subtask 2.2

- Pilot piles were built in October in Watertown, Cortland and Highland, NY.
- Three replicate research piles were built in November at the Cornell University compost site
- This subtask is complete (see Quarterly Report #1).

Task 3: Investigate Pathogen Concentrations and Compost Characteristics – task 3 is complete

Subtask 3.1 – subtask 3.1 is complete

- Woods End Research Laboratory (WERL) in Maine was selected to perform the indicator bacteria and bacterial pathogen analyses.
- The Johnes laboratory at the Cornell College of Veterinary Medicine was selected to analyze the manure for *Mycobacterium avian paratuberculosis*.

Subtask 3.2 – subtask 3.2 is complete

- Research and Pilot piles were sampled and analyzed for pathogens and compost parameters at the specified intervals of 0, 3, 6, 9 and 12 months. Temperature of each pile was monitored throughout with data loggers.
- The inoculated “deer goo” in the research piles were sampled and analyzed for pathogens at the specified intervals of 0, 3, 6, 9, 17 and 36 weeks.

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- The inoculated Johnes manure in the research piles was sampled and analyzed for *Mycobacterium avian paratuberculosis* at the specified intervals of 0, 3, 6, 9, 12 and 36 weeks.
- Compost samples were taken on May 21, 2007 at 3 sites where static road kill compost piles have been in existence for a year or more for pathogens and parameter analysis. This sampling should provide additional information on the quality of road kill compost piles.

Subtask 3.3 – subtask 3.3 is complete

- All data collected thus far (temperature, composition and pathogen data) has been entered into Microsoft excel to be analyzed using statistical measures when all data has been collected.
- Compost pathogen and deer goo pathogen data have been analyzed statistically using ANOVA in the S-Plus operating system.
- Temperature data has been summarized to average daily temperatures and number of days above 44 and 55°C have been calculated for each pile.
- Statistical analysis on all data has been completed using the S-Plus and JMP operating systems

Task 4: Outreach and Guidance to Facilitate Implementation of Composting Road Kill Deer – **task 4 is complete**

Subtask 4.1

- The revised draft of Guidance to Address Worker Health and Safety for Biological Hazards Associated with Composting Road-Killed Deer in New York was written by Nellie Brown, Director, Workplace Health and Safety Program, Cornell University. As a result of the May meeting of the technical working group (TWG), the guidance above has been reworked into 2 draft safety bulletins on carcass handling and carcass composting. They are currently under review by members of the TWG and other appropriate personnel.
- A first draft of the DVD by Insights productions has been completed. This video was viewed at the May meeting of the TWG and is being reviewed further by DOT.
- The DVD is complete and has been reproduced and distributed at 3 roadkill workshops throughout the state. Free download available at: <http://hdl.handle.net/1813/11250>
- A first draft of a CWMI fact sheet on composting roadkill has been completed. This fact sheet was discussed at the May meeting of the TWG and is back out for review with comments requested by July 1.
- The fact sheet has been completed and has been reproduced and distributed at 3 roadkill workshops throughout the state. It is also available at <http://cwmi.css.cornell.edu/roadkillfs.pdf>
- A poster entitled “Composting Roadkill” has been completed and reproduced and distributed at 3 roadkill workshops throughout the state. It is also available at <http://cwmi.css.cornell.edu/roadkillposter11x17.pdf>
- Information about the project has been posted on the Cornell Waste Management Institute website at <http://cwmi.css.cornell.edu/tirc.htm>

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- CWMI has sent out an e-mail to its 5000+ mailing list giving information on the workshops and available materials resulting from this project.

Subtask 4.2

- Jean Bonhotal set up demonstration piles for workshops to be held around the state
 - ❖ May 3, 2007: Riverhead, LI – Darrel Koss
 - ❖ May 10, 2007: Voorheesville – Peter Howard
 - ❖ May 21, 2007: Clarence – David R. Tackly, Jr.
 - ❖ Syracuse:– Tim Baker has piles already set up
- The following workshops have been scheduled:
 - ❖ Voorheesville, NY – July 24, 2007
 - ❖ Riverhead, Long Island, NY – September 11, 2007
 - ❖ Clarence, NY – September 13, 2007
 - ❖ Highland, NY – October 11, 2007
 - ❖ Syracuse, NY – date still to be determined
- Information about the workshops has been posted on the Cornell Waste Management Institute website at <http://cwmi.css.cornell.edu/roadkillworkshops.htm>
- Workshops were held in Voorheesville (18 in attendance), Riverhead (28 in attendance), and Clarence (15 in attendance).
- The Syracuse workshop has been scheduled for November 13, 2007.
- Workshops were held in Highland (39 in attendance), and Syracuse (14 in attendance).
- CWMI has received numerous phone calls requesting the guidance materials (DVD, poster and fact sheets) for use by town, county and state highway departments.
- In cooperation with the NYSDOT Riverhead Residency, using NYSDOT's Blue/Green Highways Environmental Stewardship funds allocated to Riverhead, CWMI set up 2 research piles to investigate leachate quality on September 11, 2007. Due to lack of rain, those piles were dismantled. This research is scheduled to be started again at Riverhead DOT on Long Island on April 9, 2008.

Subtask 4.3

- Jean Bonhotal spoke at the National Carcass Disposal Symposium 2006 on December 5 in Beltsville, Maryland about the project. Her session was entitled "Pathogen Assessment of Passively Aerated Composting of Road Kill."
- Nellie Brown also spoke at the same conference on the same day, presenting "Hazard Reduction for Workers Collecting and Composting Road-Killed Carcasses."
- A poster has been created that was displayed at the above symposium.
- Jean Bonhotal and Will Brinton spoke at the US Composting Council Conference on January 21, 2007 in Orlando, Florida about the project. Will prepared some new charts showing changes in organic matter and nitrogen content, and the relationship to C:N and particle size, for all the piles during the composting. Elisabeth Kolb attended the conference.

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- Jean Bonhotal spoke at the Solid Waste Association of North America (SWANA) conference on June 13, 2007 in Delhi, NY about the project.
- Jean Bonhotal presented at the poster session of the NYS Association of Towns Highway Superintendents meeting in Saratoga, NY on 9/26/07.
- Jean Bonhotal and Elisabeth Kolb attended a DOT manager's meeting in Corning, NY on November 15 where they discussed the results of this project and other projects that may occur in relation to this.
- Jean Bonhotal and Elisabeth Kolb attended a poster session at DOT headquarters in Albany on December 12, 2007.
- Jean Bonhotal will be speaking at the US Composting Council Conference on February 9, 2008 in Oakland, CA about the project.
- January 16 Jean Bonhotal and Elisabeth Kolb presented information on composting deer carcasses to 35 people that work on or set policy for disposal of road-killed animals in the Adirondack Park. There was concern that this method might not be protective enough in the park. After the presentation there was good discussion and the NYSDOT and the Adirondack Park Agency decide on their best course of action.
- Jean Bonhotal spoke at the US Composting Council Conference on February 9, 2008 in Oakland, CA about the project to an audience of approximately 60 people.
- Jean Bonhotal spoke at the National SARE Conference in Kansas City, MO to an audience of approximately 100 people on March 26, 2008.
- Jean Bonhotal spoke at the Kansas State Solid Waste Conference (WORKS) in Kansas City, KS to an audience of approximately 60 people on March 27, 2008.
- Jean Bonhotal spoke at AIHce Conference as requested by Elisabeth Kolb in Minneapolis, MN 75 people June 3-5, 2008

Subtask 4.4

- An article was published in the November 2006 issue of BioCycle (p.49), entitled "Evaluating Pathogen Destruction in Road Kill Composting".
- An article was published in the Fall 2007 issue (volume 26, number 4, page 10) of "Nuggets and Nibbles", a publication put out to highway departments by the Cornell Local Roads Program, entitled "Follow-up, Roadkill Composting".

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Task 5: Progress and Final Reports – **task 5 is complete**

Subtask 5.1

- Two of the three required meetings have been held (see Quarterly report numbers 1 and 2).
- A third meeting was held on May 15 at Cornell University that discussed:
 - ❖ Guidance to Address Worker Health and Safety for Biological Hazards Associated with Composting Road-Killed Deer in New York draft written by Nellie Brown.
 - ❖ Outreach materials and plans: Draft fact sheet, DVD, demonstrations
 - ❖ Compost End Use
 - ❖ Final Report

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- A fourth meeting was held on May 17 at Cornell University and via phone and web that discussed the results of the pathogen analysis.

Subtask 5.2

- **All quarterly reports have been submitted**

Subtask 5.3

- **A report entitled “Pathogen Analysis of NYSDOT Road-killed Deer Carcass Compost Facilities – Temperature and Pathogen Final Report” has been written and is attached.**