

Update on Septage Management

Ontario East Municipal Conference

Septage Seminar

September 11, 2008

Eileen Smith
Ontario Ministry of the Environment

Protecting our environment.



Ontario

OUTLINE

- Septage management
- Developing septage standards
- Technology evaluation studies
- Septage study
- Update on the General Nutrient Management Regulation

MANAGEMENT OF SEPTAGE

- In order to successfully end the practice of spreading untreated septage, there must be sufficient capacity to treat septage at municipal sewage treatment plants or with alternative viable treatment options.
- The ministry is working closely with stakeholders to develop treatment standards and new technologies to manage septage in Ontario.
- There is a role for provincial and municipal government, the private sector and the public to play in finding solutions, which includes the development of partnerships.

SEPTAGE TREATMENT GUIDES

- Science-based standards are essential to those who want to develop effective septage treatment.
- The ministry has worked to develop draft septage guides, which outline standards for the treatment of septage including:
 - Land Application
 - Alkaline Stabilization
 - Dewatering Trenches
- These draft guides are currently posted on the Environmental Registry for comment.

LAND APPLICATION

- The guide for land application of treated domestic septage considers several treatment processes, (e.g., alkaline stabilization, composting, geotubes, anaerobic digestion) with a goal to set out standards for safe use of treated septage on agricultural land.
- The guide was developed using results of analysis of approximately 400 samples of Ontario septage.
- Draft standards include:
 - Maximum application rates,
 - metals concentrations,
 - pathogen criteria and
 - screening.
- Industrial and commercial septage are more variable than domestic septage so are not included in the guide.

ALKALINE STABILIZATION

- Alkaline stabilization is the addition of alkali (lime) to septage, which kills pathogens and reduces odour.
- This is the lowest cost treatment options available.
- The process is relatively easy, and can be done in-truck or on-site.
- Draft standards include:
 - Types of alkali, duration of treatment, pH measurement, monitoring
 - Screening
 - Reporting requirements
 - Application rate
- In 2005, a pilot study with University of Guelph and septage haulers was undertaken and was found to be a feasible treatment option for septage haulers.

DEWATERING TRENCHES

- Dewatering trenches are long narrow trenches excavated in permeable soils – prior to final disposal.
- They are mainly used in Northern Ontario where treatment, pre-treatment or other disposal methods are not readily available.
- The primary purpose is to reduce septage volume by controlled exfiltration.
- Draft standards include:
 - o Location
 - o Operation
 - o Types of septage that can be managed

SEPTAGE TREATMENT GUIDES

The draft Septage Treatment Guides are currently posted on the Environmental Registry for public comment. Comments can be submitted until October 23, 2008.

Website:

www.ontario.ca/environmentalregistry EBR Registry #: 010-0366

Contact:

Nina Koskenoja
Engineering Specialist
Ministry of the Environment
Waste Management Policy Branch
135 St Clair Avenue W. 7th Floor
Toronto Ontario
M4V 1P5
Phone: (416) 314-5780
Fax: (416) 325-4437

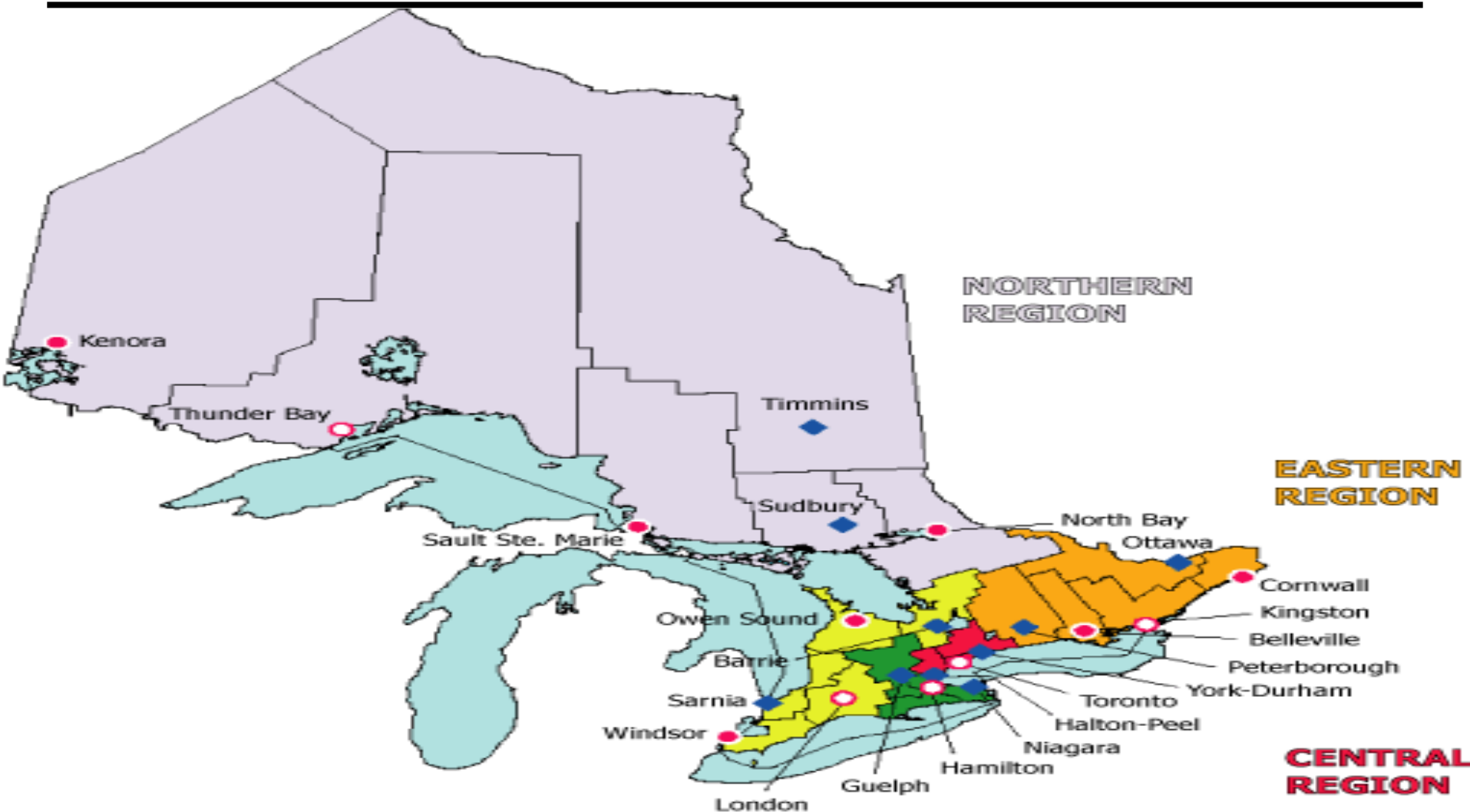
PROVINCIAL POLICY STATEMENT, 2005

- States that lot creation on private communal or individual septage services is only permitted if there is confirmation of *reserve sewage system capacity*.
- Reserve sewage system capacity is sufficient if the septage from the development can be treated or disposed of at sites approved under the *Environmental Protection Act* or the *Ontario Water Resources Act*.
- There is a need to have capacity for the septage by the time the development is completed. Capacity does not include management by land-applying untreated septage.
- Training for planners included in Ministry of Municipal Affairs and Housing One Window Training, completed in March 2008

MOE SURVEY

- In 2007, MOE conducted a survey of Ontario haulers and sewage treatment plants.
- It was our goal to gain a better understanding of what was happening with septage in the province.
- Questions for haulers asked where they took their septage, and how much they manage.
- Questions for sewage treatment plants asked whether they accepted septage, and future plans to accept septage.
- Staff are continuing to analyze results, and gather additional information.

MOE REGIONS



OFFICES

- Regional & District
- District
- Area

MOE SURVEY

Haulers: 28% responded

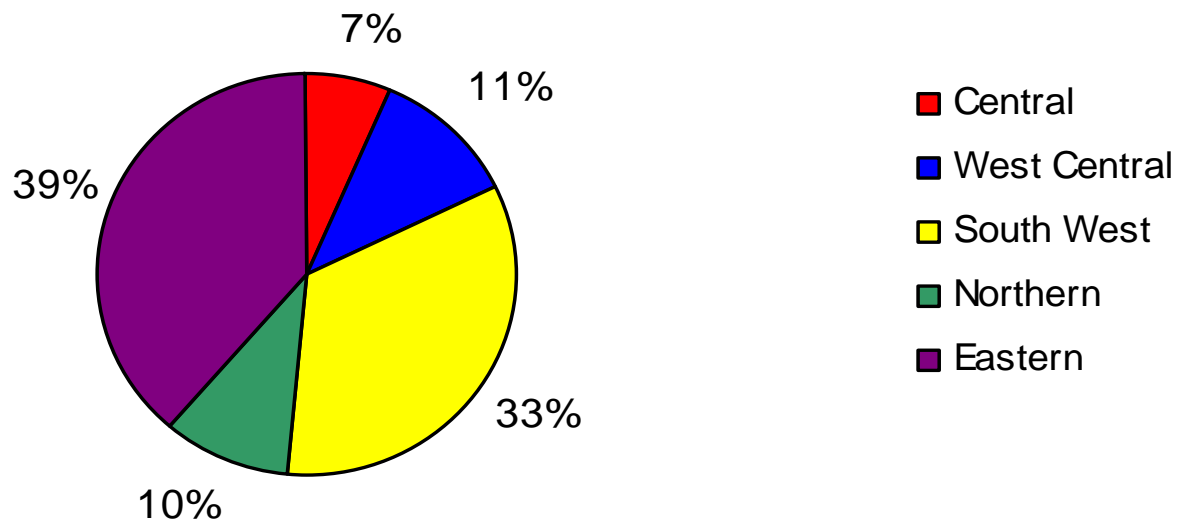
- 70% said they use an STP to dispose of septage at least some of the time; 44% of haulers exclusively use STPs to dispose of septage.
- 36% said they land apply septage –17% exclusively use land application.

Sewage Treatment Plants (STPs): 53% responded

- 33% of the plants accept septage at least some of the time.
- Almost half of STPs in west central Ontario and south west Ontario stated they accept septage while 22% of STPs in eastern Ontario and 17% in northern Ontario stated they accept septage.
- 10 more STPs plan to accept septage in the next 3 years (7 in eastern region) and 2 others are investigating the possibility.

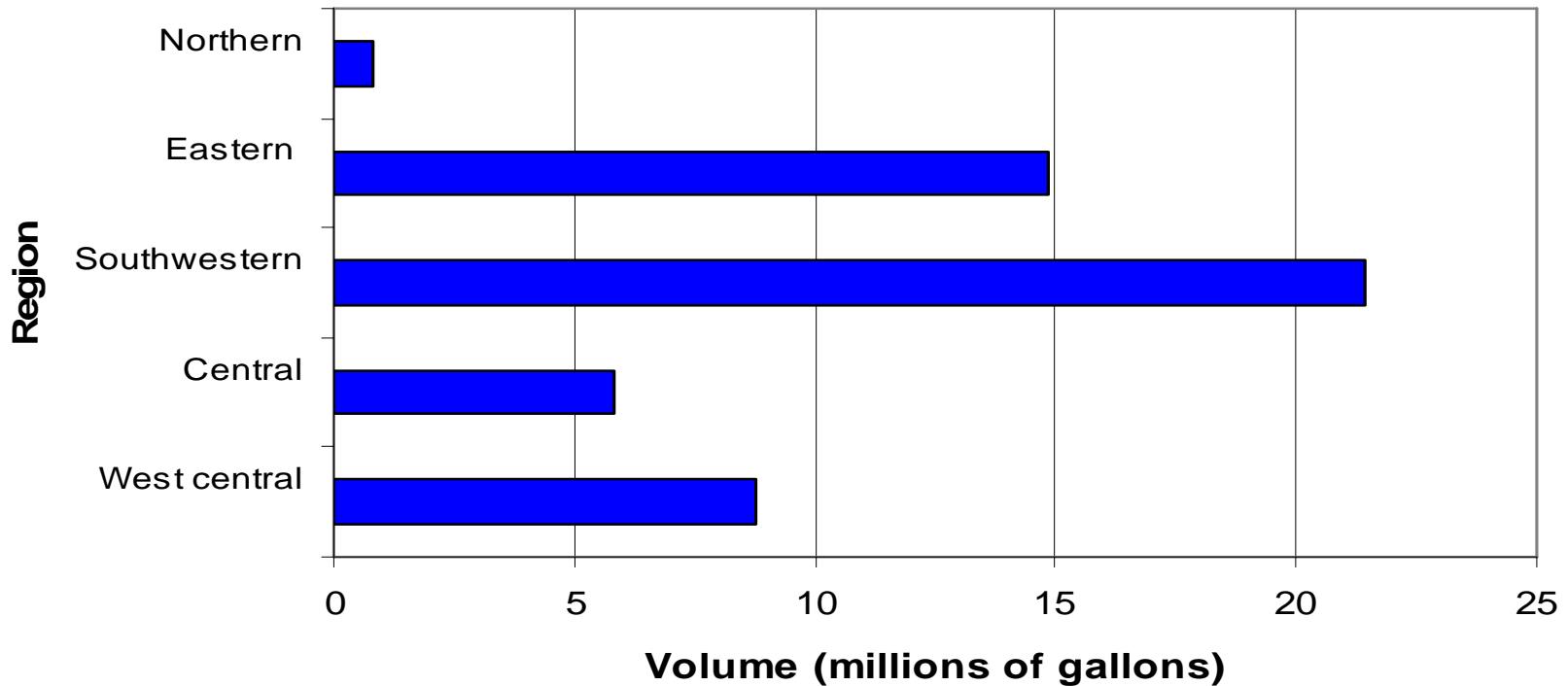
MOE SURVEY

Septage Generation in the Province



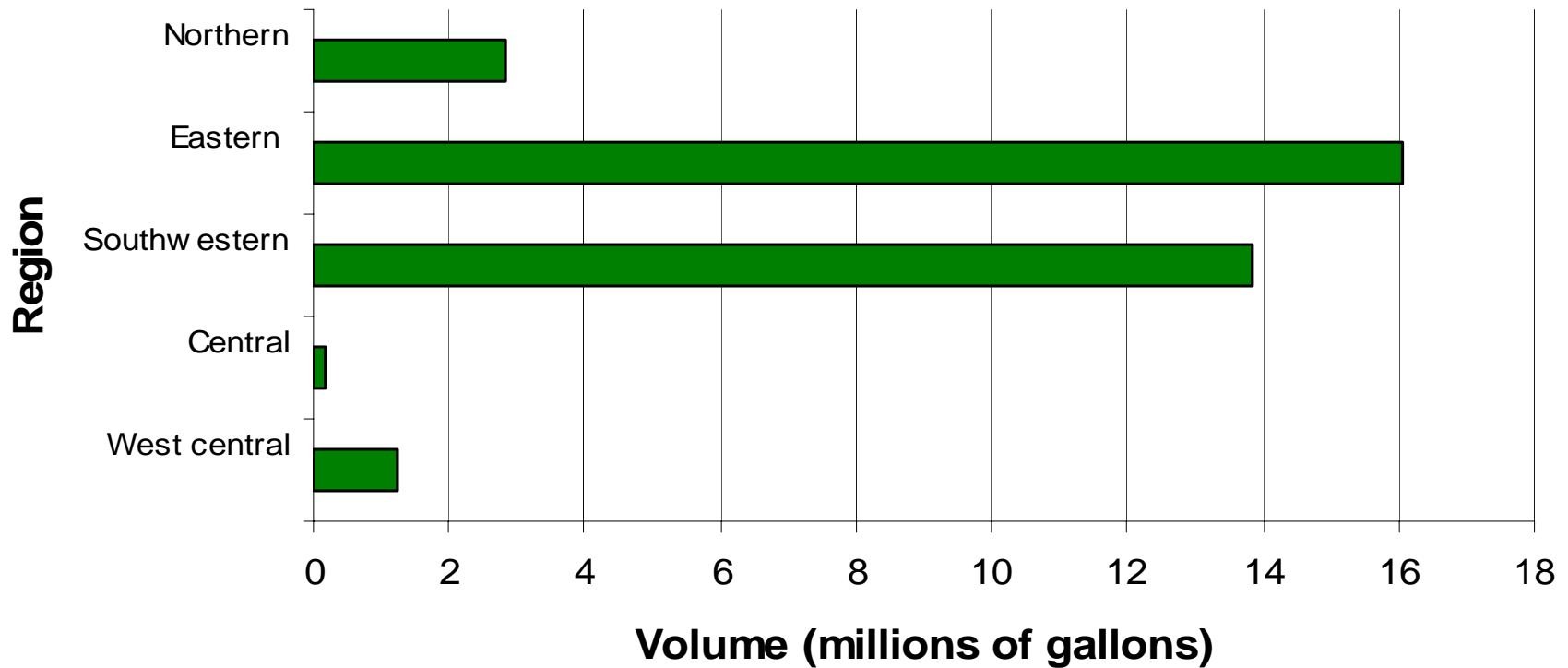
MOE SURVEY

**Volume of Septage Sent to STPs
(as reported by Haulers)**



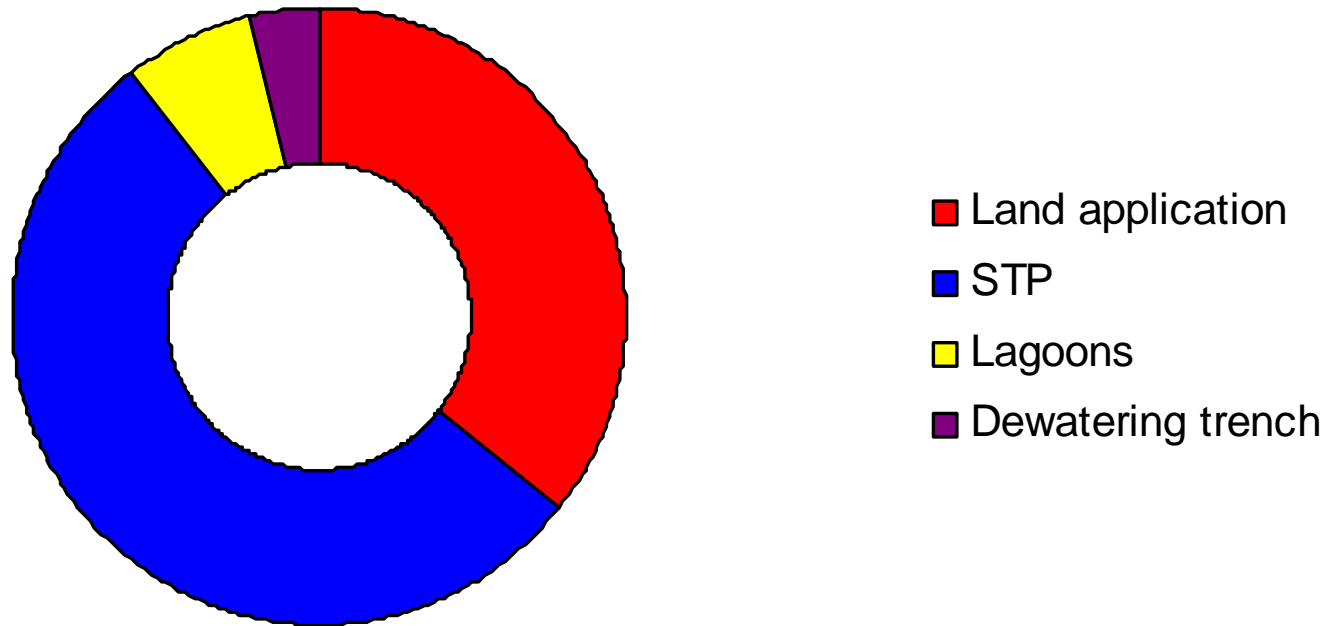
MOE SURVEY

**Volume of Septage Land Applied
(as reported by Haulers)**



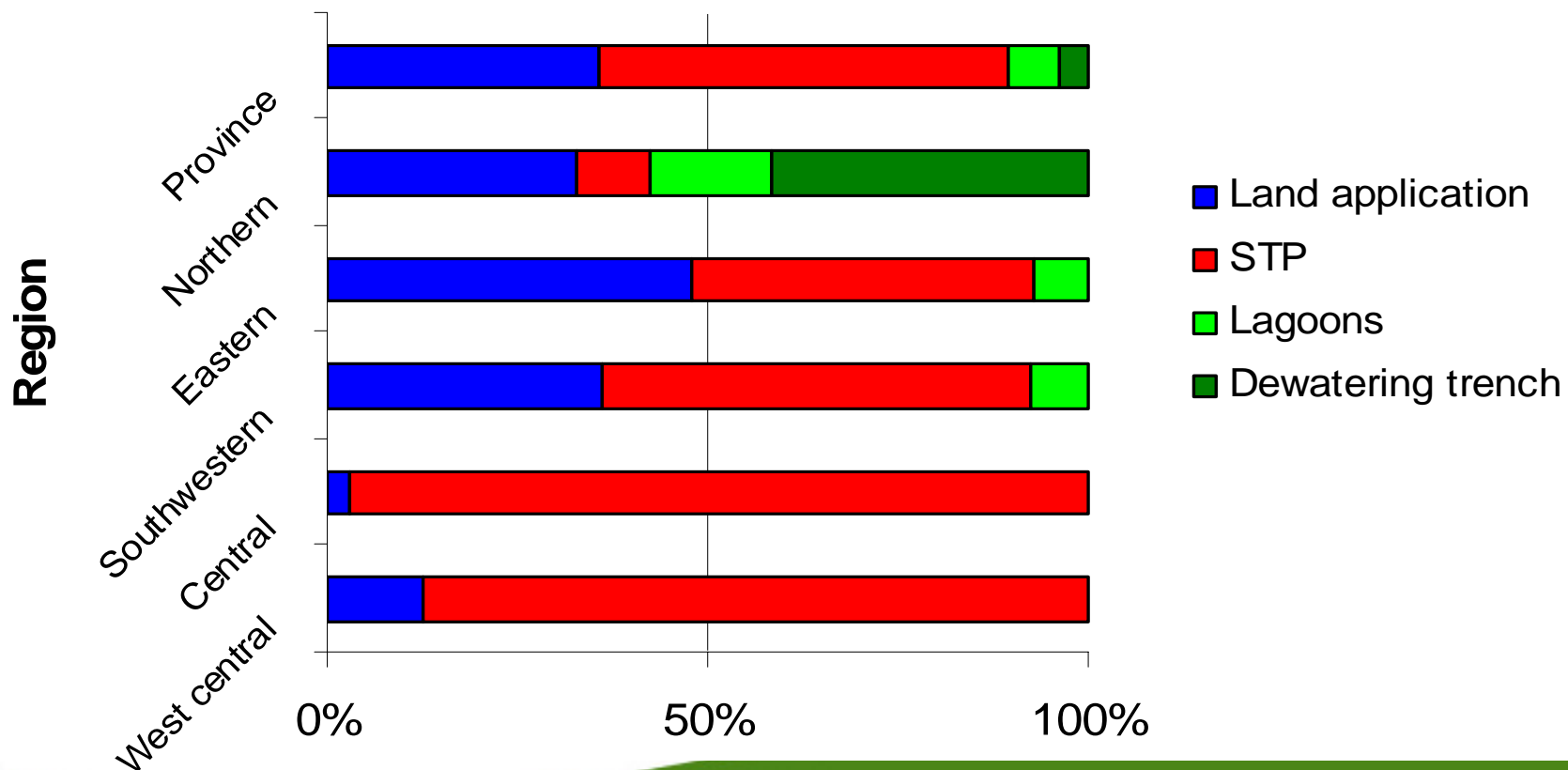
MOE SURVEY

Disposal Method - by volume



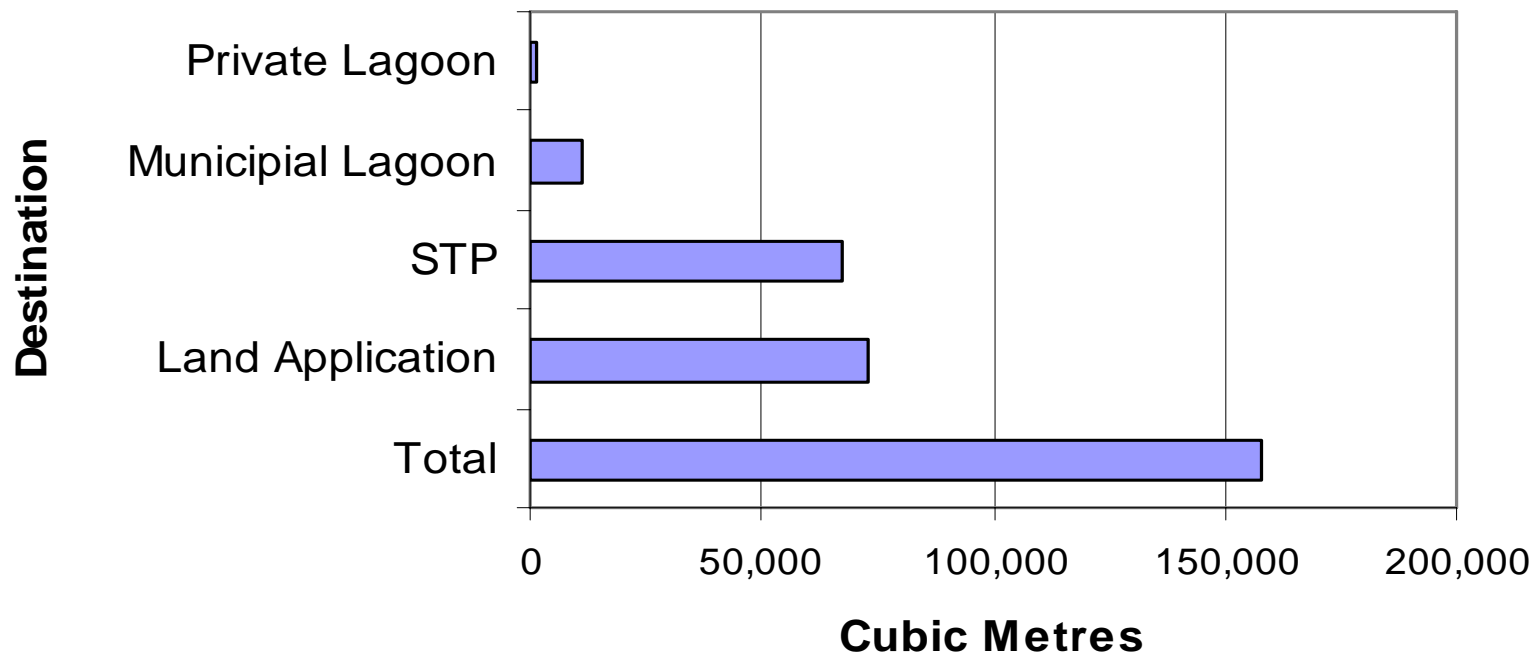
MOE SURVEY

Septage destination by volume



MOE SURVEY

Septage Management - Eastern Region



RESEARCH AND TECHNICAL PROJECTS

1. Alkaline Stabilization and Screening Pilot
2. Alkaline Stabilization – Horton Township
3. Geotubes – Bonnechere Valley
4. Composting & Lagoon Treatment – District of Muskoka
5. Storage Lagoons – laboratory scale
6. Vertical Reed Bed and Sand Bed Filters
7. Hydrogen Peroxide Treatment – laboratory scale
8. Additional Alkaline Stabilization Studies under consideration

ALKALINE STABILIZATION AND SCREENING

- In 2005, MOE financed a pilot study of alkaline stabilization of domestic septage in Ontario with the University of Guelph and Ontario septage haulers. The report is available on the University of Guelph website:
<http://www.orwc.uoguelph.ca/Research/research.htm>
- Training course for septage haulers was delivered by the Ontario Rural Wastewater Centre (ORWC) at OASIS conference in Kingston in November 2005 and at ORWC conference in Kitchener in March 2006.
- Additional studies on agricultural benefits are under review.

COUNTY OF RENFREW PILOT PROJECTS

- MOE grant of \$205,000 to Renfrew County to evaluate and demonstrate alkaline stabilization (Horton Township) and geotube dewatering technologies (Township of Bonnechere Valley) – completion 2008; report in 2009.
- 65% of the County's population is currently serviced with septic systems.
- Will evaluate how 17 small municipalities, their local haulers and the MOE District Office can best work together to implement new methods and to co-ordinate alternative septage treatment on a large scale;
- Will serve as a model for other rural municipalities in Ontario.

HORTON TOWNSHIP - RENFREW

- Demonstration of alkaline stabilization and application of alkaline stabilized septage on agricultural land.
- Building a full scale septage receiving, storage and treatment facility.
- Includes training for Horton Township staff on alkaline stabilization and land application.
- Construction and first runs Fall 2008; final report expected in 2009.

BONNECHERE VALLEY - RENFREW

- Demonstration of the use of Geotubes to dewater/ treat septage.
- The geotube treats the septage both physically and biologically:
 - mixed with polymer; assists in separating solids and liquids;
 - geotube sits on a drainage bed designed to direct the effluent to wherever the application demands (e.g., lagoon);
 - solid fraction remains in the geotube bag where it undergoes biological stabilization over time.
- Provides a full scale geotube treatment process for septage and biosolids.
- Official opening of Bonnechere Valley Septage/Biosolids Dewatering Facility in June 2008; final report expected in 2009.

COMPOSTING AND LAGOON TREATMENT

- Prepared by MOE, OASIS, Municipalities, TSH Consultants.
- Provides information on engineering design, operation, performance, cost and regulatory issues collected from full scale operating facilities in Canada and the U.S.
- Facultative, aerated and anaerobic lagoons are discussed.
- Two types of composting processes are reviewed: non-reactor and in-vessel.
- Components required to compost septage: dewatering facility, effluent treatment facility, composting facility.
- Report is under review.

USE OF STORAGE LAGOONS TO TREAT SEPTAGE

- *Lab-scale* study by the University of Guelph/Ontario Rural Wastewater Centre.
- Lab-scale study evaluated the feasibility of converting septage storage lagoons to treatment lagoons.
- Pathogen reduction was evaluated at:
 - 25°C (representing summer) for 2 weeks;
 - 4°C (representing winter) for 8 weeks.
- Results demonstrated that the *E. coli* was reduced to below the MOE pathogen standard.

REED BED AND SAND BED FILTERS

- Ministry of the Environment, Ontario Association of Sewage Industry Services, Alfred College (University of Guelph) in Eastern Ontario.
- Use of reed bed and sand bed filters: two pilot scale vertical reed filter beds and one sand filter bed will be monitored for performance to dewater and treat septage.
- How the beds work:
 - septage beds are dewatered by gravity drainage and evaporation;
 - effluent is collected and transported by an under-drain system of pipes.
- Effluent quality is improved through filtration, may still require a polishing.
- Further treatment of dewatered septage may be necessary for pathogen removal depending on the final disposal method.
- Monitoring to be conducted in 2008; final report expected in 2009.

USE OF HYDROGEN PEROXIDE

- University of Guelph/Ontario Rural Wastewater Centre.
- Literature Review will be completed.
- Treatment is similar to lime stabilization - peroxide kills pathogens, but unlike lime stabilization it does not raise the pH of the septage.
- Laboratory Study to determine dosage required and pathogen reduction.
- Final report is expected in late 2009.

UPDATE ON NUTRIENT MANAGEMENT – NASM FRAMEWORK

- Non-agricultural source materials (NASM) include residual materials from municipal sewage treatment plants, pulp and paper mills, septage treated to meet standards and off-farm food processing. These are a source of nutrients and can be used as a valuable fertilizer.
- The initiative is intended to address overlapping approval requirements under the EPA and NMA.
 - o Stage 1 (completed) – extended phase-in date for NASM generators and receivers required to have nutrient management strategies and plans by two years to December 31, 2008 and December 31, 2009. Decision notice was posted on the EBR in October 2006.
 - o Stage 2 –The revised regulatory framework was posted on Environmental Registry for a 120-day comment period which closed January 5, 2008. It outlined proposed standards for the application of these materials based on the quality of the material.

UPDATE ON NUTRIENT MANAGEMENT – NASM FRAMEWORK cont'd

- Currently, in cases where NASM is considered a waste (such as sewage biosolids), there are overlapping approval requirements under the *Nutrient Management Act, 2002* and the *Environmental Protection Act*.
- The goal of the proposed framework is to eliminate the overlap and develop and revise existing standards for NASM to include greater detail and a wider range of alternatives.
- The proposed framework would cover application of all nutrients on all the agricultural land in the province.
- The following overview is based on the plain language proposed framework, which was posted on the Environmental Registry in September 2007. Staff are considering comments received on this posting and as a result standards may be subject to change.

UPDATE ON NUTRIENT MANAGEMENT – NASM FRAMEWORK cont'd

- The proposed framework (as posted on the Environmental Registry in September) would create 6 categories of NASM (e.g. sewage biosolids are classified in Category 5, treated septage would be either Category 5 or Category 6).
- Each proposed category determines the level of approval required for nutrient management strategies and plans for the materials in the category. For instance, Categories 5 and 6 would require an approved nutrient management strategy and approved nutrient management plan.
- In addition to the basic categorization, NASM is also sub-categorized based on the concentration of metals, pathogen content and odour annoyance potential. The standards for land application and storage of NASM are based on these characterizations.
- The framework also introduces the requirement for a field nutrient management plan prepared by a certified person. The plans will identify all farm fields that will receive NASM and will provide details on how the NASM is to be applied to optimize the nutrient benefit and minimize adverse environmental impact.

UPDATE ON NUTRIENT MANAGEMENT – NASM FRAMEWORK cont'd

Proposed Requirements for Category 5 material

- Sampling and analysis would be required to determine the level of metals and pathogens.
- Other parameters such as ammonia, nitrates and total volatile solids would also have to be tested.
- In addition, determination of the odour annoyance potential would be required (for liquid/solids) which relates to the amount of dissolved oxygen and how solids have been dewatered, respectively.
- Requirements for setbacks from surface water and wells, minimum depth to bedrock, winter application, depth of unsaturated soil, pre-harvest grazing and separation distances are dependent on the outcomes of the analysis of metals, pathogens and odour annoyance potential.

UPDATE ON NUTRIENT MANAGEMENT – NASM FRAMEWORK cont'd

Proposed Requirements for Category 6 material

- Category 6 captures materials not specifically listed in other categories or where materials from different categories are mixed together.
- Land application standards of these materials can be addressed through the technical requirements of an OMAFRA approved nutrient management strategy and an OMAFRA approved nutrient management plan.
- The OMAFRA director would set parameters and sampling and analysis requirements which would be represented in the nutrient management strategy.
- The maximum application rate would be based on the maximum application rate of the material calculated for nitrogen, phosphorous and metals, and depending on the NASM, sodium, boron and fat, oil and grease.

UPDATE ON NUTRIENT MANAGEMENT – NASM FRAMEWORK

- A proposal to further extend the phase-in dates for some generators and receivers of NASM is currently posted on the Environmental Registry for comment. The posting proposes to do the following:
 - A. Extend the phase-in date by one year to December 31, 2009 for some NASM generators who would currently have to comply with the requirements of the regulation and have nutrient management strategies by December 31, 2008; and
 - B. Extend the period to December 31, 2009, during which phased-in farms, (i.e., farms that are required to have a nutrient management strategy) that are between 5 and 300 nutrient units, are able to apply NASM to agricultural lands under a Certificate of Approval without the need to have a separate nutrient management plan under the General Nutrient Management Regulation.

UPDATE ON NUTRIENT MANAGEMENT – NASM FRAMEWORK cont'd

The proposed date extension is currently posted on the Environmental Registry for public comment. Comments can be received until September 19, 2008.

Website:

www.ontario.ca/environmentalregistry EBR Registry #: 010-3404

Contact:

Kara Wells
Senior Policy Advisor
Ministry of the Environment
Waste Management Policy Branch
135 St Clair Avenue West, 7th floor
Toronto Ontario
M4V 1P5
Phone: (416) 212-4316
Fax: (416) 325-4437

CONCLUDING REMARKS

- To successfully end the practice of spreading untreated septage, there must be capacity to treat septage, either at municipal sewage treatment plants or with viable alternative treatment options. That capacity does not yet exist across the province. This is why an incremental approach is required.
- The ministry is working closely with stakeholders to develop treatment capacity, treatment standards and new technologies to manage septage in Ontario.