

Environmental Sustainable Compost Markets

Presentation for CCC Moncton Workshop, Apr 2010



Rodney J. Fry, P.Eng.
Web: www.envirem.com
Email: rodff@envirem.com
Ph: (506) 459-3464

Envirem Summary

- One of Canada's leading environmental companies
 - Largest volume compost company (> 500,000 tons / year)
 - Eight facilities in Maritime Provinces
 - Packaging in excess of 8 million bags / year
- Exporter of bulk and bagged horticultural growing mixes, manufactured topsoils, organic fertilizers, mulches and aggregates (Recipient of CME Export Award)
- Envirem are advancing R&D of composting science and associated organic processing technologies/end-products to open-up new professional markets



Value-Added Horticulture Growing Medias and Organic Bio-Fertilizers

- Envirem to invest in NB infrastructure to produce Bio-Products (i.e. value-added horticulture growing medias and organic Bio-Fertilizers)
- Awarded Atlantic Innovation Fund award to conduct a 4Yr R&D Project in 2009.



GRANULAR FERTILIZER PLANT - SHELTON, NH

Growing Media Value-Added Components for Peat Mixes

- **New Brunswick Peat Mining Policy January 2007 includes no expansions to peat mining leases without “value-added” production**
- **Bans on Methyl-Bromide drive professional peat mix producers to utilize bark fines and compost additives to obtain equivalent fungus protection**
- **Envirem installing additional large scale dryer capacities to dehydrate compost and reduce density to 9 lbs/cu.ft. to be consistent with peat moss**



Organic Bio-Fertilizers



Composts as Organic Bio-Fertilizers taking on increased interest from Agriculture (especially in light of recent price increases in chemical fertilizers):

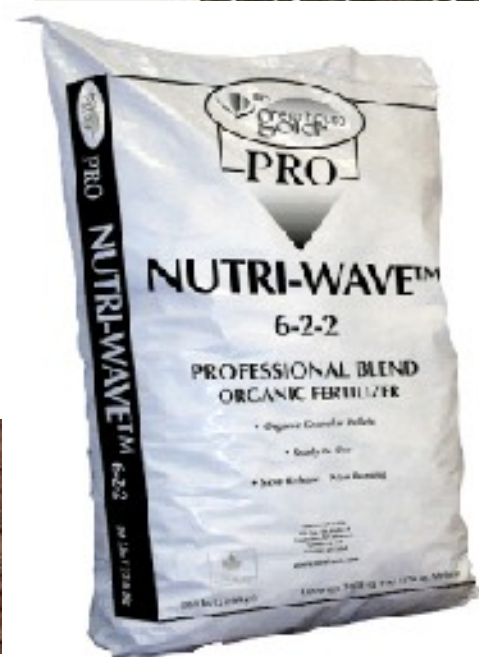
- Research on-going at NSAC, Fredericton Research Station, Cavendish and McCain's Field Research Stations all provide confirmation of increased crop yields from organic inputs
- High-Value Crops in Potato, Blueberry, Cranberry, Orchard and Vegetable production transitioning to organic production



Value-Added Horticultural Professional Mixes

Envirem have existing capacity and are prepared to invest in additional capacity to support growth plans in Value-Added Peat Professional Mixes:

- Peat Substitutes
- Pine Bark Substitutes
- Perlite/Vermiculite Substitutes
- Organic Substitutes for Control Release Fertilizers



Innovative Specialty Organic Products

Envirem is a leader in the production of innovative specialty organic products for retail, horticulture, turf and organic agriculture including:

- Dehydrated and screened composts to value-add horticultural mixes
- Pelletized, granulated and dehydrated composts and manures for topdressing and retails markets (may be with seed mixtures)
- Value-added blends of specialty pellets and granulation of peat, seafood blends, etc.
- Organic certified inputs (Canadian Organic and USDA-NOP via ProCert, OMRI Listed) for agriculture and consumer products



Expanded NB Facility Infrastructure

Envirem have access to NB facilities and infrastructure to expand value-added products, consumer product line and specialty products

Envirem produce high volumes of consistent quality bark and forestry compost at Clarendon and Miramichi

– Envirem continuing research with Dr. D. Lynch, at NSAC and Dr. Jean Yves Daigle, at CZRI on the use of forestry compost to value-add horticultural mixes

– Envirem have years of experience producing economical dehydrated compost (various sizes) and pelletized compost through economical drying processes (biomass burners)



GRANULAR FERTILIZER PLANT - SILE KANUDU, NB

Innovative Specialty Organic Products

Envirem working together with Filtrex to advance growing medias (dehydrated compost + fertilizer + seed) for erosion



Envirem Sponsored R&D



	<u>Compost</u>	<u>Poultry Manure</u>
Ttl N (g kg ⁻¹)	11.3	44.4
NH ₄ -N (g kg ⁻¹)	1.7	6.1
Ttl P (g kg ⁻¹)	3.4	14.7
Ttl K (g kg ⁻¹)	0.4	18.9
C:N	21.6	8.7
DM (g kg ⁻¹)	33.0	97.6



Envirem Sponsored R&D

- **Assessing CPB Control Options and N Fertility in Organic Potato Production**
The project, undertaken in 2004 on a transitional organic site at AAFC Fredericton, had three objectives:
 - Compare the efficacy of a potential organic insecticide (Entrust) to a bacterial insecticide (Novador) and to no insecticide,
 - Test the hypothesis that healthy, vigorous (well fertilized) plants have a better tolerance of insect pests such as the CPB
 - Compare the effect of three levels (0, 150, 300 kg total N ha⁻¹) of organic fertilization (Nutriwave 4-1-2, Envirem Technologies, Fredericton, NB) on potato yield and plant biomass.
- **Researchers**
Gilles Boiteau, Agriculture and Agri-Food Canada, Fredericton, NB
Derek Lynch, OACC, Department of Plant and Animal Sciences, NSAC
Claude Berthélemé, NB Department of Agriculture, Fisheries and Aquaculture
- **Funding Sources**
Funding for this project was provided by the NB Department of Agriculture, Fisheries and Aquaculture, with additional project support provided by Envirem Technologies Inc., Fredericton, NB.

Introduction

Novel Technology (dehydration) to process compost as an ideal substitute for peat and pine bark in growing media.

Objectives

- **Quantifying and characterizing, the physio-chemical properties and the horticultural suitability of compost, peat and/ or pine bark growing media blends**
- **Assess media performance by characterizing vegetable transplant response in green house trials**

Methodology

- 1. The physio-chemical properties (stability, pH, water holding capacity, EC, nutrient content) will be tested.**
- 2. A series of greenhouse pot studies at NSAC (each a RCBD with 4 replicates) will be conducted.**



Acknowledgments



Nova Scotia
Agricultural
College

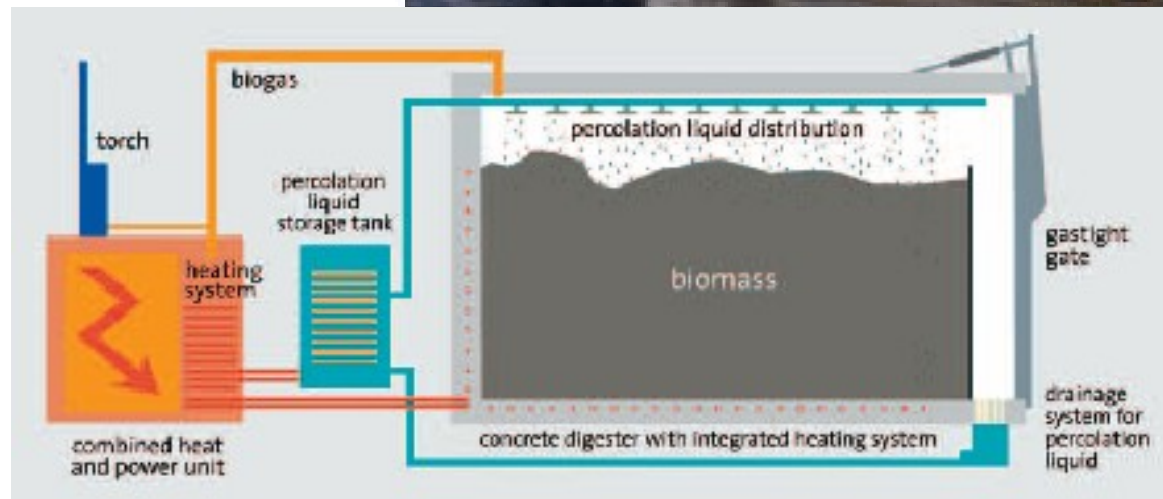


DALHOUSIE
UNIVERSITY
Inspiring Minds

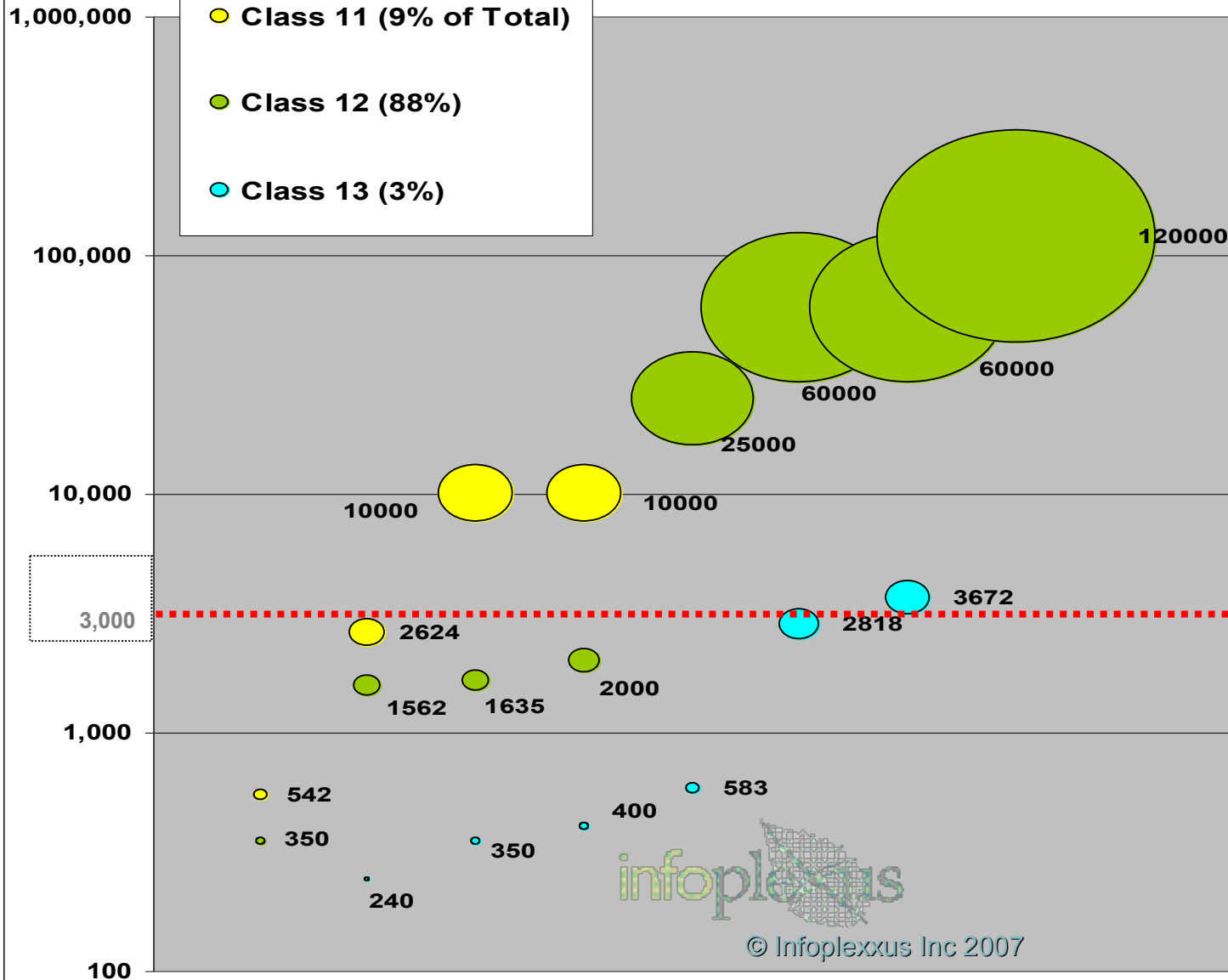
Capturing the Biogas Potential from Organic Residues

Envirem partnering with Harvest Power to install BEKON dry-fermentation technology

Biogas collection from initial phase processing presents opportunities for energy conversion and also heat supply for bio-fertilizer process



Volume of Feedstock - Data from 18 Facilities

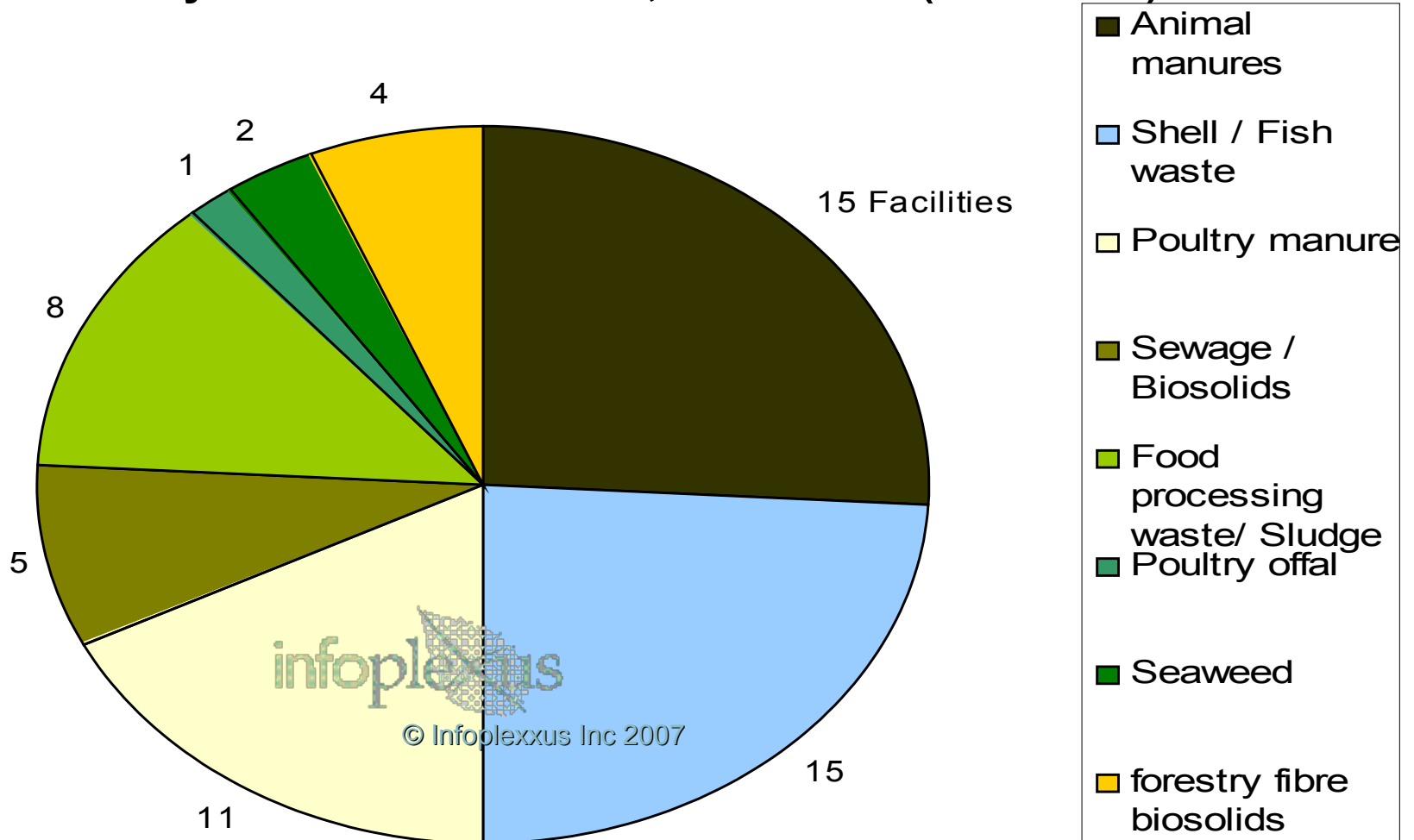


33 licensed facilities in NB

- 314,000 tonnes (Class 11) = 9% of total volume
- 6 MSW or biosolid facilities (Class 12) = 88%
- 10 at > 3,000 t/y (Class 13) = 3%
- 16 < 3,000 t/y (Class 13)

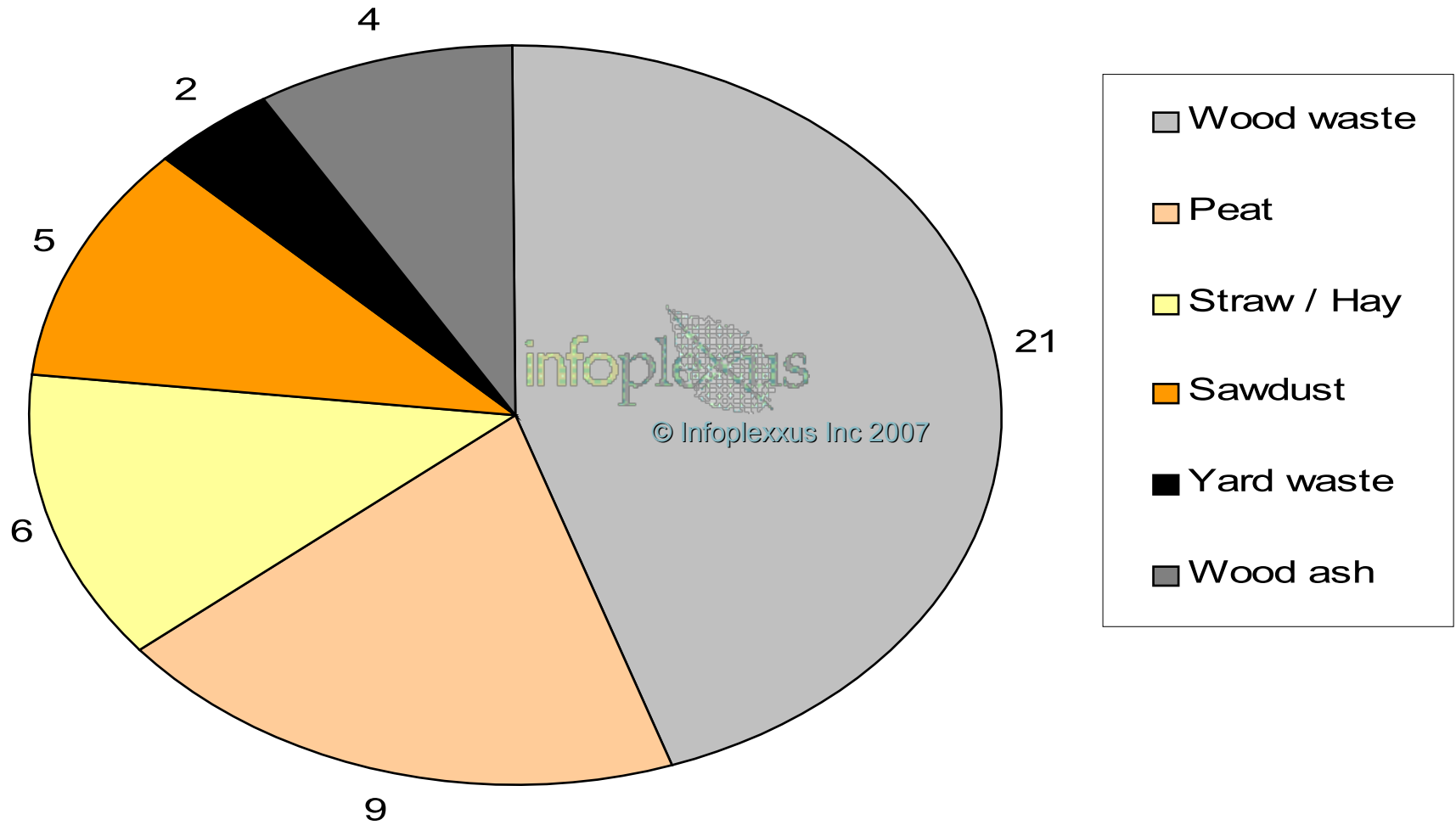
Non-MSW Composting in NB

**Nutrient Feedstocks Composted in NB
by Number of Facilities, All Classes (Total =33)**



Non-MSW Composting in NB

**Carbon Feedstocks Composted in NB
by Number of Facilities, All Classes (Total =33)**



Wood Wastes from Sawmills, Forest Product Mills

<ol style="list-style-type: none">1) wood-yard scrapings,2) sawdust,3) chips,4) fines,5) kiln-dried shavings6) tops & ends,7) stumps, or logs8) knots,9) cedar slab waste10) shingle hair waste11) wood-ash from biomass boiler12) waste manufactured board or wood products,13) mining of current or historical industrial-owned wood-waste landfills			<p>Current disposal options include:</p> <ul style="list-style-type: none">- use as biomass within cogeneration boiler facilities,- as feedstock in mulch production,- production of wood pellet fuel,- barn litter,- production of secondary pulp/paper or wood products- disposed in industrial landfill- feedstock for composting
--	--	--	---

Bark Wastes from Sawmills, Forest Products Mills

- 1) wood-yard scrapings
- 2) bark from wet/dry debarkers,
- 3) hot-ponds bark waste,
- 4) hogfuel or chipper waste
- 5) green biomass waste from woodlands operations,
- 6) mining of current or historical industrial-owned bark waste landfills

Current disposal options include:

- use as biomass within cogeneration boiler facilities,
- as feedstock in mulch production,
- disposed in industrial landfill
- feedstock for composting

Pulp and Paper Mill Residues

- 1) biosolids from settling ponds and lagoons
- 2) primary clarifier biosolids
- 3) secondary wwtp biosolids
- 4) anaerobic digestate biosolids
- 5) waste paper carbon fibre,
- 6) waste clay-fibre,
- 7) pin-chips,
- 8) chip fines,
- 9) screening rejects and knots
- 10) wood-ash, fly-ash and bottom-ash
- 11) precipitated lime,
- 12) grits and dregs
- 13) bio-sulphur slurry
- 14) mining of current or historical industrial-owned landfills

Current disposal options include:

- disposed in industrial landfills or lagoons,
- land spreading as soil amendment,
- placed in noise berms,
- feedstock for Anaerobic Digestion
- feedstock for composting

Livestock and Feedlot Residues

- 1) manures and bedding
- 2) poultry layer manure
- 3) poultry broiler manure bedding
- 4) beef manure,
- 5) horse manures
- 6) swine manure
- 7) sheep manure
- 8) swine lagoon DAF solids
- 9) Race track manure
- 10) zoo or park animals manure and bedding

Current disposal options include:

- land spreading as fertilizer
- disposed in landfill or lagoons,
- feedstock for Anaerobic Digestion
- feedstock for composting
- CFIA restricting re-use back into animal feeds

Livestock Processing, Slaughterhouse and Rendering Residues

- 1) **dead or diseased cull animals**
- 2) **SRM diseased materials**
- 3) **slaughterhouse wastes**
- 4) **paunch manure,**
- 5) **feathers,**
- 6) **hides, skins**
- 7) **blood-water**
- 8) **carcasses from fur-bearing animals
mink, fox, or seal**
- 9) **other animal processing wastes**
- 10) **bone-meals,**
- 11) **blood meals**
- 12) **feather-meals**
- 13) **waste from animal feed production
plants,**
- 14) **wastes from rendering plants**

Current disposal options include:

- **land spreading as fertilizer**
- **disposed in landfill or lagoons,**
- **feedstock for Anaerobic Digestion**
- **feedstock for composting**
- **CFIA restricting re-use back into
animal feeds**

Salmon and Fin-Fish Aquaculture and Fish Processing Residues

- 1) fish processing residues,
- 2) DAF solids from fish processing plant
- 3) mortalities,
- 4) viscera,
- 5) heads and racks,
- 6) blood-water
- 7) net-cleaning wastes
- 8) fish feces,
- 9) aquaculture cage bottom cleaning wastes,
- 10) waste from seaweed or kelp harvesting/processing operations,
- 11) algae bloom wastes,
- 12) shoreline clean-up wastes,
- 13) off-shore fishery wastes from boats,
- 14) fishing ship bilge clean-out wastes

Current disposal options include:

- re-use within rendering industries,
- land spreading as fertilizer
- disposed in landfill or lagoons,
- feedstock for Anaerobic Digestion
- feedstock for composting

Shellfish Aquaculture and Shellfish Processing Residues

- 1) lobster & shells,
- 2) clam & shells,
- 3) mussel and shells,
- 4) shrimp and shells
- 5) oyster and shells,
- 6) cooked shellfish processing waste

Current disposal options include:

- re-use within rendering industries,
- land spreading as fertilizer
- disposed in landfill or lagoons,
- feedstock for composting

Agriculture Food Processing Residues

- 1) potato skins and peels,
- 2) lagoon biosolids
- 3) digester cake
- 4) blueberry screenings
- 5) cranberry screenings
- 6) spent mushroom wastes,
- 7) pharmaceutical/ nutraceutical wastes
- 8) dredge material from lagoon of food processing plants

Current disposal options include:

- re-use within rendering or feed industries,
- land spreading as fertilizer
- disposed in landfill or lagoons,
- feedstock for Anaerobic Digestion,
- feedstock for composting

Municipal Wastewater Treatment Biosolids

- 1) lime stabilized sewage biosolids,
- 2) sewage lagoon dredging wastes
- 3) dried or dewatered sewage biosolids
- 4) septage tank wastes and dewatered septage biosolids,
- 5) anaerobic digestate from sewage wwtp,
- 6) sewage biosolids from drying beds

Current disposal options include:

- disposed in municipal landfills or lagoons,
- land spreading as soil amendment,
- dried or pelletized as a fertilizer
- feedstock for Anaerobic Digestion
- feedstock for composting