

NR 538 Overview

**First TAC Meeting
March 24, 2016**

Ruth O'Donnell, Waste Management Specialist
Bureau of Waste and Materials Management



- **Established January 1, 1998**
- **Goal**
 - encourage beneficial use of industrial byproducts in a nuisance-free and environmentally sound manner

- **NR 538.03(4) Specific high-volume industrial byproducts:**
 - Paper mill sludge
 - Coal ash
 - Flue gas desulfurization material (FGD)
 - Foundry sand & slag
 - Lime kiln dust
 - Other non-hazardous solid waste with similar characteristics

- Specific uses of industrial byproduct allowed based on byproduct Category
 - **Category 1** = few restrictions on use
 - **Category 5** = most restrictions on use & placement

- **Use representative sample**
- **RCRA non-hazardous**
- **Lab analysis**
 - ASTM Water Leach Test mg/L (neutral)
 - Total Elemental Analysis mg/kg
- **NR 538 category standards based on:**
 - NR 140 (drinking water)
 - NR 105 (surface water quality)
 - NR 720 (soil cleanup)



Beneficial Uses Projects		Industrial Byproduct Category				
		5	4	3	2	1
NR 538.10						
(1)	Raw Material for Manufacturing a Product	X	X	X	X	X
(2)	Waste Stabilization / Solidification	X	X	X	X	X
(3)	Supplemental Fuel Source / Energy Recovery	X	X	X	X	X
(4)	Landfill Daily Cover / Internal Structures at landfills having a leachate collection system	X	X	X	X	X
(5)	Confined Geotechnical Fill (a) commercial, industrial or institutional building subbase (b) paved lot base, subbase & subgrade fill (c) paved roadway base, subbase & subgrade fill (d) utility trench backfill (e) bridge abutment backfill (f) tank, vault or tunnel abandonment (g) slabjacking material (h) soil and pavement base stabilization for structural improvements listed in (5)(a) - (c) (i) controlled low strength material (flowable) fill for structural improvements listed in (5)(a), (d), (e) and (f)					
(6)	Encapsulated Transportation Facility Embankment		X	X	X	X
(7)	Capped Transportation Facility Embankment			X	X	X
(8)	Unconfined Geotechnical Fill			X	X	X
(9)	Unbonded Surface Course				X	X
(10)	Bonded Surface Course				X	X
(11)	Bonded Surface Course (Federal, state or municipal roadways)			X	X	X
(12)	Decorative Stone				X	X
(13)	Cold Weather Abrasive				X	X

NR 538.04 No person may store, handle or beneficially use an industrial byproduct in a manner that may cause any of the following:

- (1) A significant adverse impact on wetlands.
- (2) A take of an endangered or threatened species or other activity prohibited under s. 29.604, Stats.
- (3) A detrimental effect on any surface water.
- (4) A detrimental effect on groundwater quality or will cause or exacerbate an attainment or exceedance of any preventive action limit or enforcement standard at a point of standards application as defined in ch. NR 140
- (5) The migration and concentration of explosive gases in any structures, or in the soils or air at or beyond the project property boundary in excess of 25% of the lower explosive limit for the gases at any time.
- (6) The emissions of any hazardous air contaminant exceeding the limitations for those substances contained in s. NR 445.03

ADDITIONAL REQUIREMENTS

- Byproducts and uses need to meet structural and physical specifications and generally accepted engineering practices for their use. Demonstrates legitimate recycling.
- Some projects require byproduct to meet DOT specifications
- Some projects prohibit use of byproduct in residential areas

PROJECT SPEC EXAMPLE

- ***NR 538.10(8) Unconfined geotechnical fill material used as fill material for sight, sound and structural berms, reclamation of nonmetallic mines, public recreational trails, construction of sporting venues, limited use parking areas, access lanes, utility trenches or other beneficial uses demonstrated to be acceptable by the department.***
- Category 1, 2,3
- Any area where industrial byproducts are beneficially used as unconfined geotechnical fill shall be sloped to prevent ponding of water, covered with 2 feet of native soils including topsoil, or other cover approved by the department, and seeded as soon as practical after placement of the industrial byproducts.....
- The beneficial use of industrial byproducts as an unconfined geotechnical fill is prohibited in residential areas.

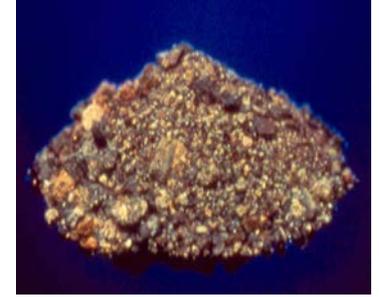
PLACEMENT RESTRICTIONS

- **NR 538.12(2) General criteria for uses.**
- **(b)** Materials that are not category 1 industrial byproducts and that are utilized for any of the uses under s. NR538.10(5) to (13) may not be placed below the water table, into permanent standing water or areas that need to be dewatered prior to placement. For those beneficial uses listed in s. NR 537.10(5)(a) and (b) that exceed 5000 cubic yards, there shall be a minimum separation distance of 3 feet between the industrial byproducts and the groundwater table at the time the material is placed. Prior written notification in accordance with s. NR 538.14(4) and concurrence by the department are needed for separation distances less than 5 feet. Concurrence by the department will be based on specific site conditions and good engineering practice.
- **(br)** Materials that are not category 1 industrial byproducts and used for the beneficial uses listed in s. NR 538.10(5)(a) and (b) and exceed 5000 cubic yards shall be placed no closer than 200 feet from a private or public water well without the written consent of the property owners located within this separation distance. A consent form shall be provided by the department.

Regulatory Requirements

- Initial & annual certifications
- Byproduct re-testing
- Storage & transportation requirements
- General performance standards & project-specific specifications
- Placement restrictions
- Public participation requirements for large projects
- Submittal of notification to DNR requesting project concurrence with some projects
- Property owner notification
- Environmental monitoring with large volume DOT embankment projects

- **Bottom Ash** – Structural fills, road bases and sub-bases, aggregate for concrete, asphalt and masonry
- **Fly Ash** - Concrete, structural fills, asphalt, soil stabilization
- **Flue Gas Desulfurization Gypsum (FGD)**
Agricultural amendment, source of plant nutrient, cement manufacturing, wallboard



FOUNDRY BYPRODUCTS

- **Spent sand from mold process**

Geotechnical & structural fills, paved roadway base, sub-base, DOT embankments, non-metallic mine reclamation



- **Slag**

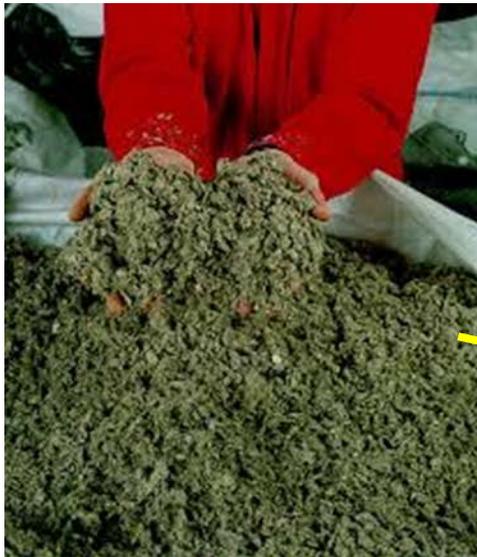
Cement manufacturing, aggregate replacement

Category 2
allowed by NR
538.10(9)



- **Pulping sludge**

- raw material to make “soil” as allowed by NR 538.08(7)
- Mine reclamation, on landfills for fill purposes or to establish rooting zone for final grass cover



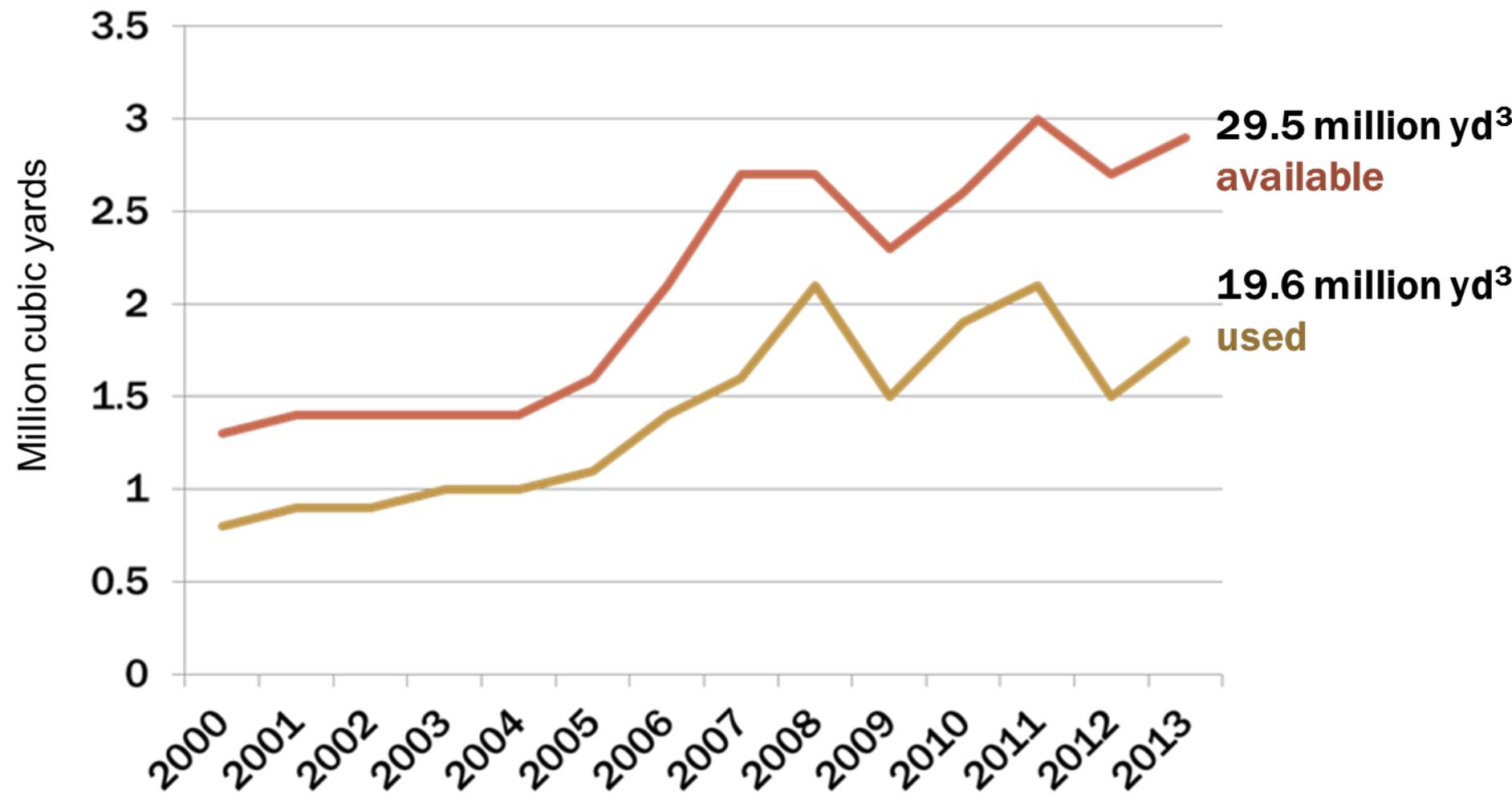
Allows DNR to:

- 1) assign a category to a high-volume solid waste not included in definition of industrial byproduct, **or**
- 2) Conditionally approve a use not specified in NR 538.10

Examples:

- Crushed toilets to be used for fill material
- FGD, lime kiln dust used for agricultural soil amendment
- Paper mill sludge used for animal bedding and manufactured soil

ESTIMATE OF BYPRODUCTS 2000 - 2013

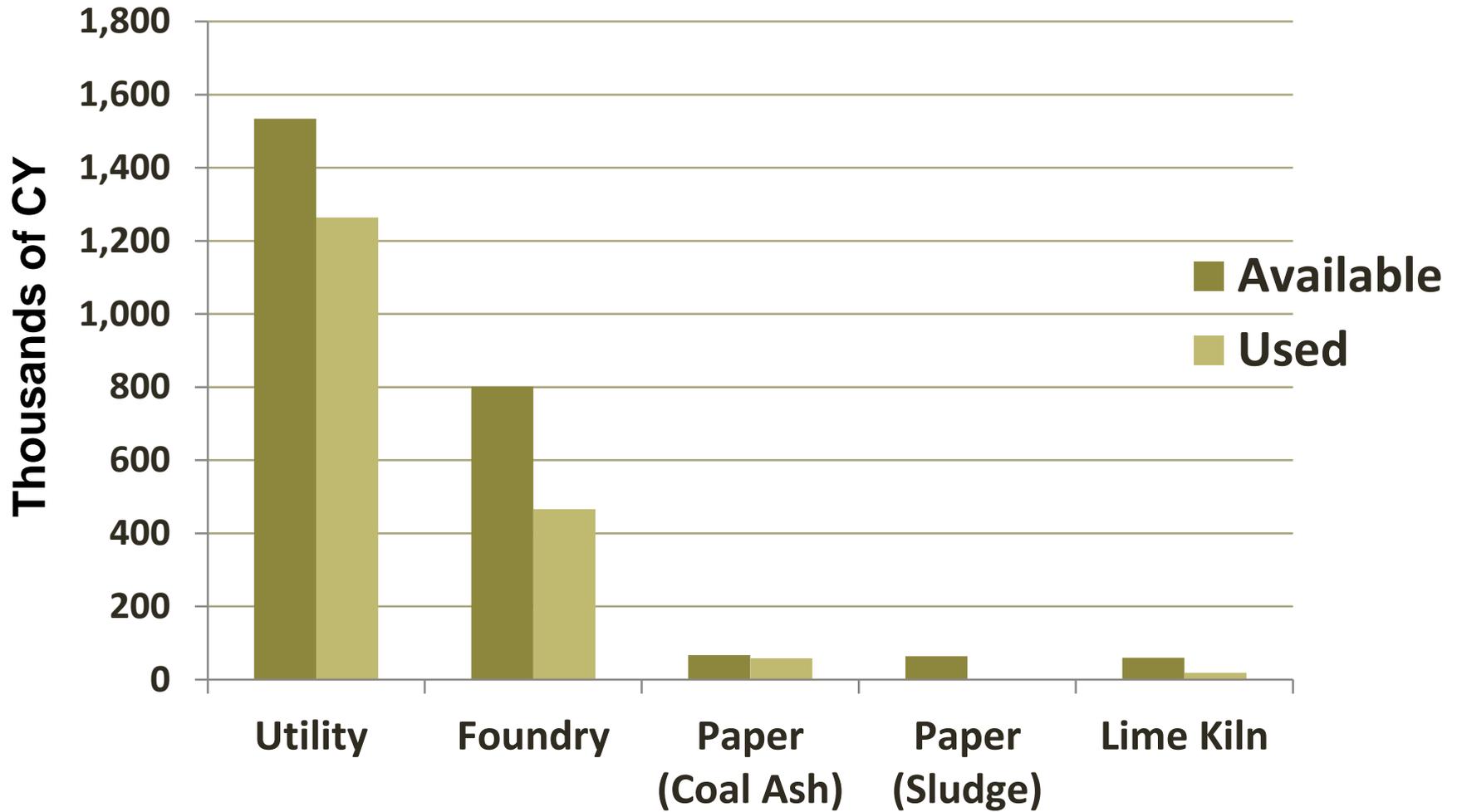


ESTIMATE OF BYPRODUCT BY INDUSTRY 2014

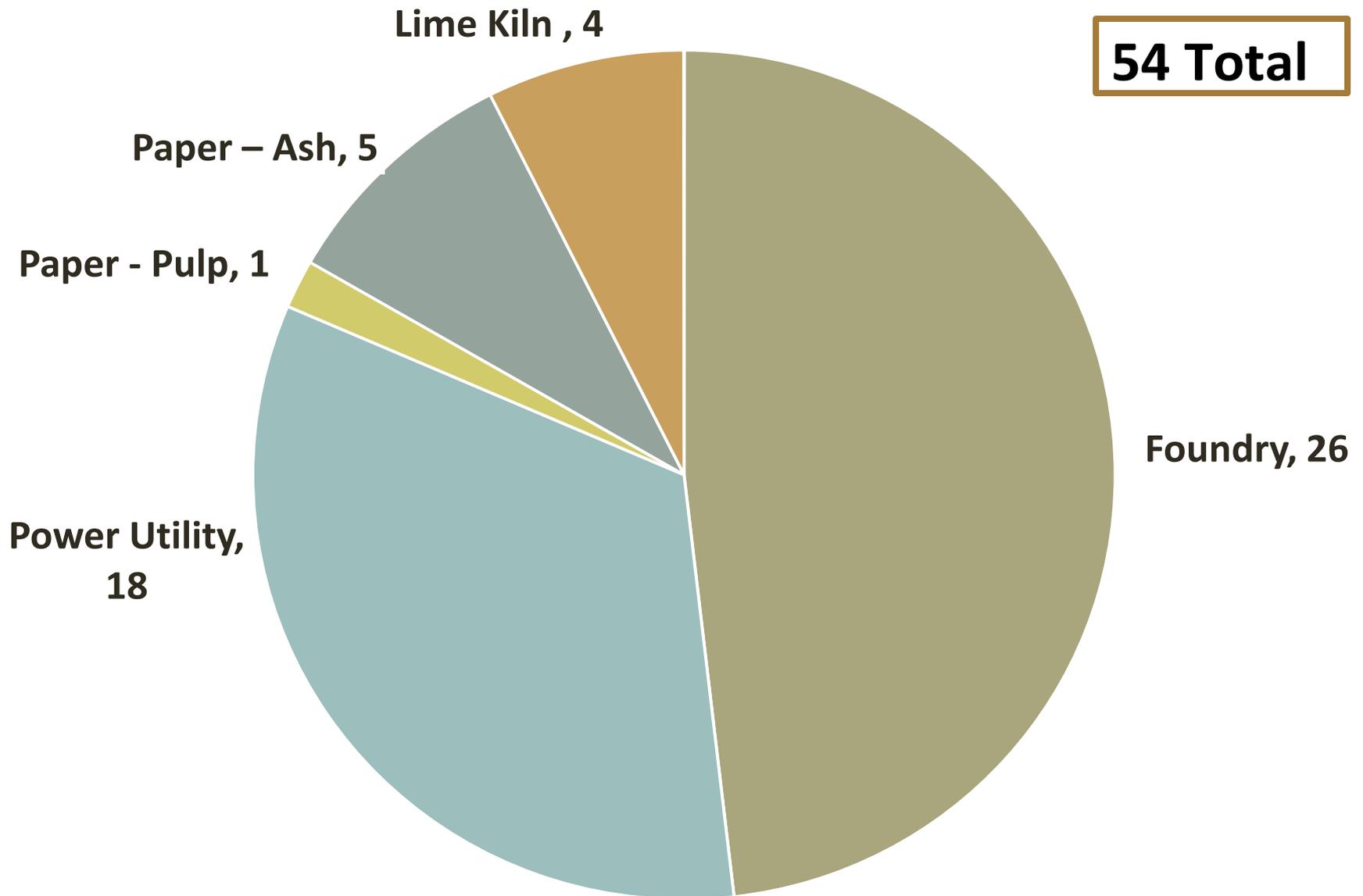
Industry	Byproduct Available* CY	Byproduct Used* CY	% Byproduct Used
Coal burning utility	1,530,000	1,260,000	82%
Foundry	800,000	470,000	59%
Paper (coal ash)	70,000	60,000	86%
Paper (sludge)	60,000	0	0%
Lime Kiln	60,000	20,000	33%
TOTAL	2,520,000	1,810,700	72%

*As reported by industrial byproduct generators on NR 538 annual certifications, rounded to nearest ten thousand

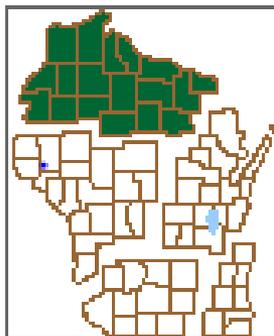
ESTIMATE OF BYPRODUCT BY INDUSTRY 2014



INDUSTRIAL BYPRODUCT FACILITIES 2014



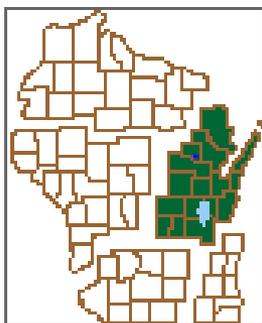
VOLUME OF BYPRODUCT BY REGION 2014



Northern NO

113,811 CY

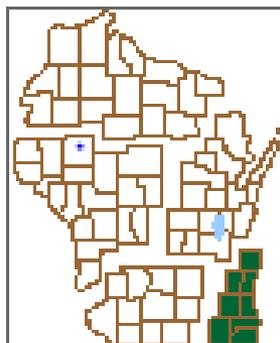
78% used



Northeast NE

667,061 CY

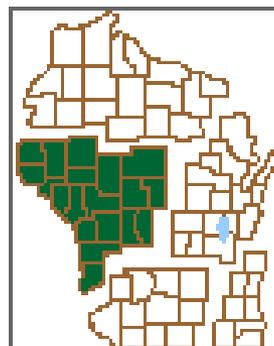
64% used



Southeast SE

1,070,872 CY

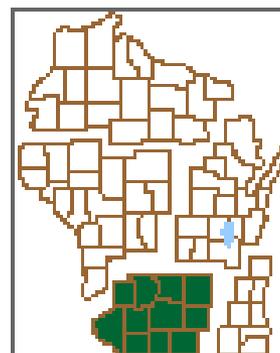
84% used



West Central WC

344,513 CY

48% used



South Central SC

264,959 CY

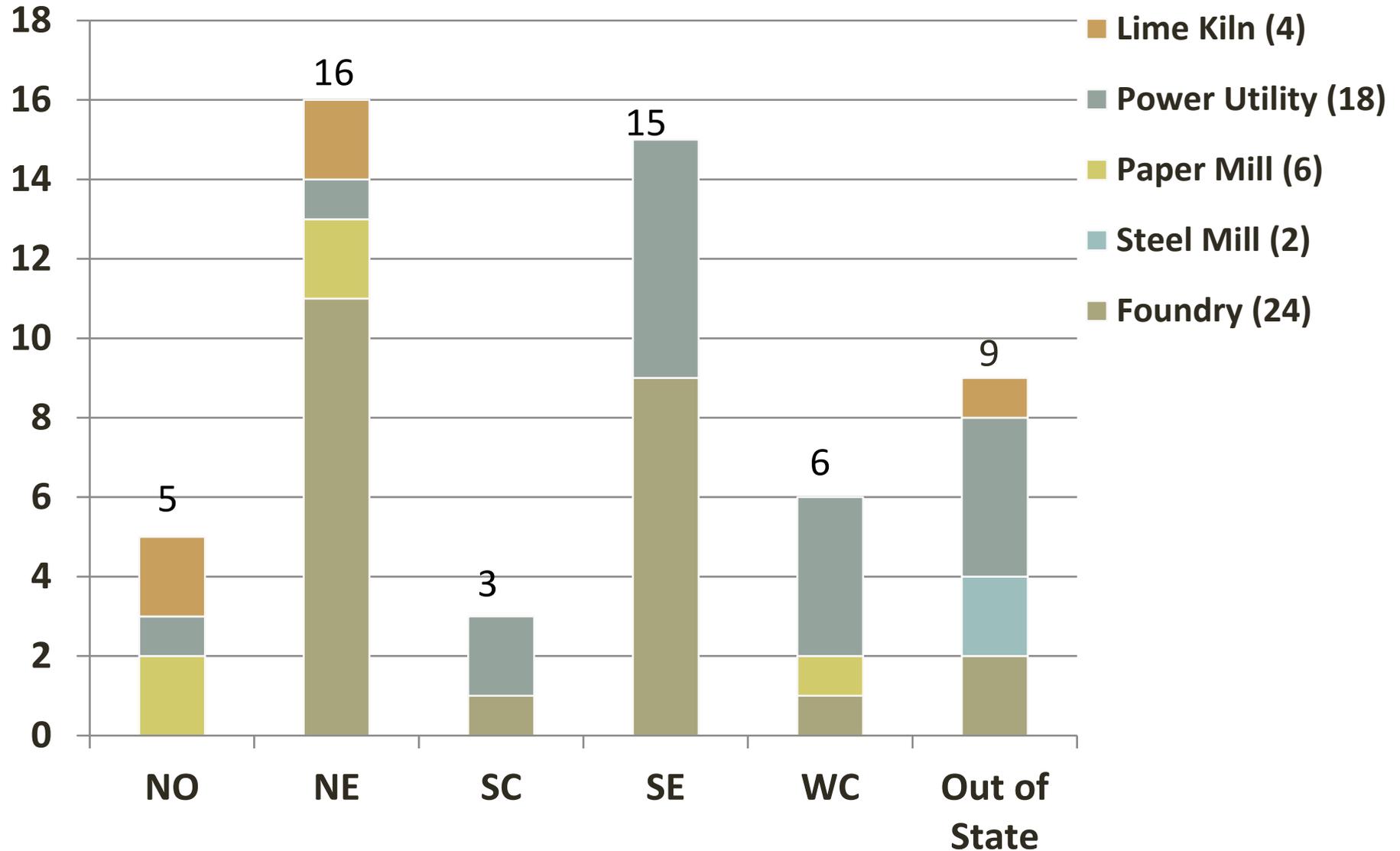
63% used

Out of State

96,423 CY

84% used

GENERATORS BY DNR REGION 2014



Director, Bureau of Waste & Materials Management –
Ann Coakley

Section Chief, Hazardous Waste & Non-Metallic Mining –
Ed Lynch

State Beneficial Use Coordinator –
Phil Fauble

Beneficial Use Team Members

Brenda Halminiak

Ruth O'Donnell

Bizhan Sheikholeslami (retiring April 2016)