

Conducting a Municipal Litter Audit

&

**Results of Litter Audits in
4 GTA Municipalities**

What is Litter ?

- **Litter is packaging & materials that are disposed of inappropriately**
- **This can be:**
 - **Accidental**
 - **Blown from recycling bins**
 - **Blow out of moving vehicle**
 - **Material that missed disposal bins**
 - **Intentional**
 - **Persons that just throw it**

Litter Audit

- **We do three things when doing an audit:**
 - **Count large litter on the ground**
(14 Categories ; 84 sub-categories of large litter are described)
 - (Accumulated litter)
 - **Count small litter on the ground** (15 categories)
 - **Identifying brand names of products**
 - Who made products that were then littered?
 - Examine types of places littering occurs?

AND analyze / archive all data producing a final report & a BRAND Report as an Appendix

Why conduct an audit?

- **Benchmark your current litter situation for future comparison**
- **Document the status of your Municipality vs. other jurisdictions**
- **Audit litter with an unbiased methodology**
- **Statistically valid & reproducible method**
- **Observe problem categories/ practices**
 - **development of cost effective solutions**
 - **Reducing littering saves municipalities \$\$\$**
- **Identify branded items – discuss solutions with stakeholders**
- **Potential to work with other municipalities**

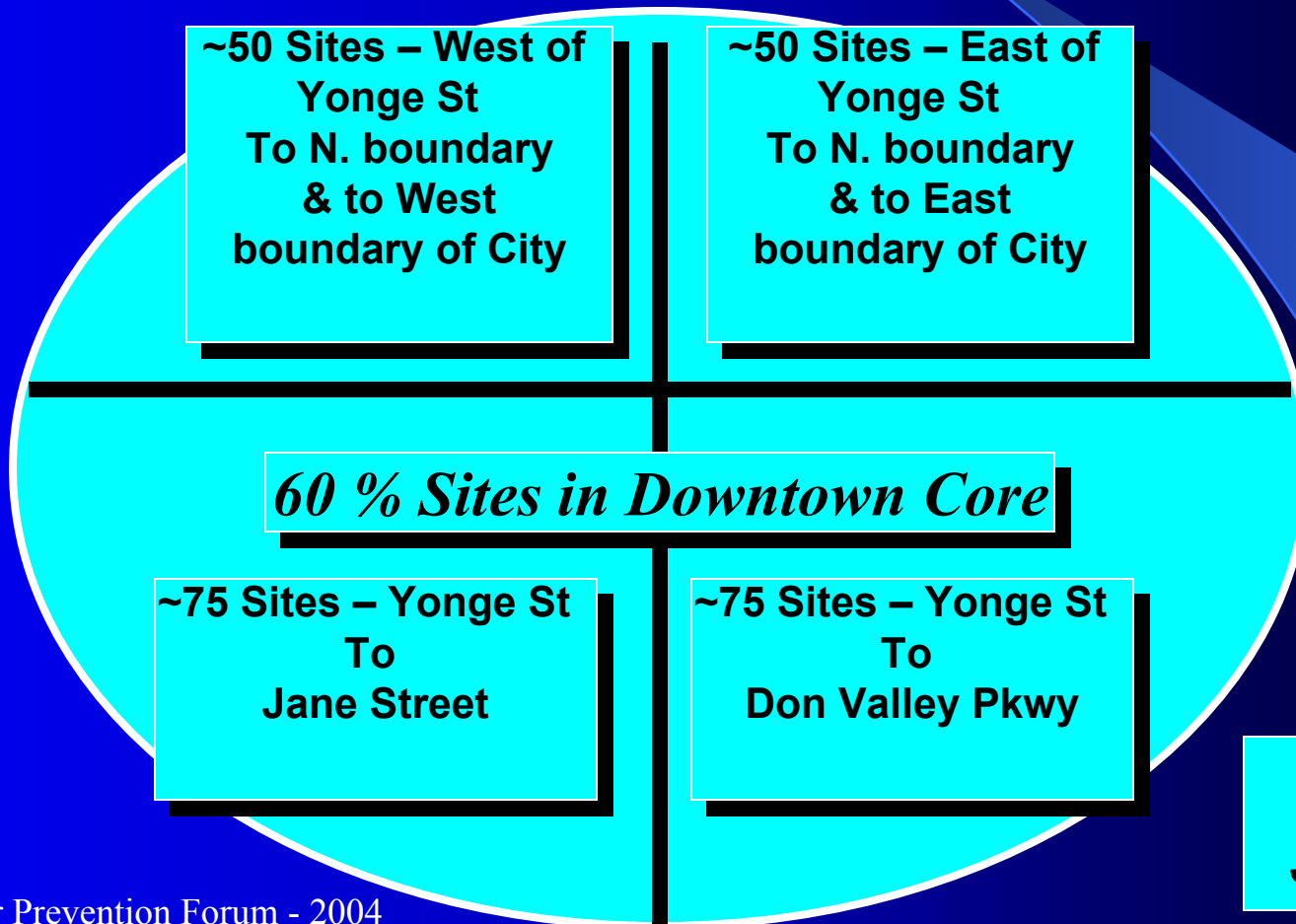
When to conduct an audit ?

- **> April – to end-October are best times**
- **Cannot be done with snow on ground**
- **Two to three weeks of field work audit**
- **4-6 weeks site preparation & data analysis -
- 8 weeks to produce a DRAFT report**
- **Preparations can occur between Jan - April ;
summer litter audits using students are best
to control audit costs**
 - **your summer students can be used instead of consultant forces**

How Sites Are Selected

Example: City of Toronto 2002

City of Toronto



Client assists
in setting
urban vs. rural
based upon
local
conditions

**247
Sites**

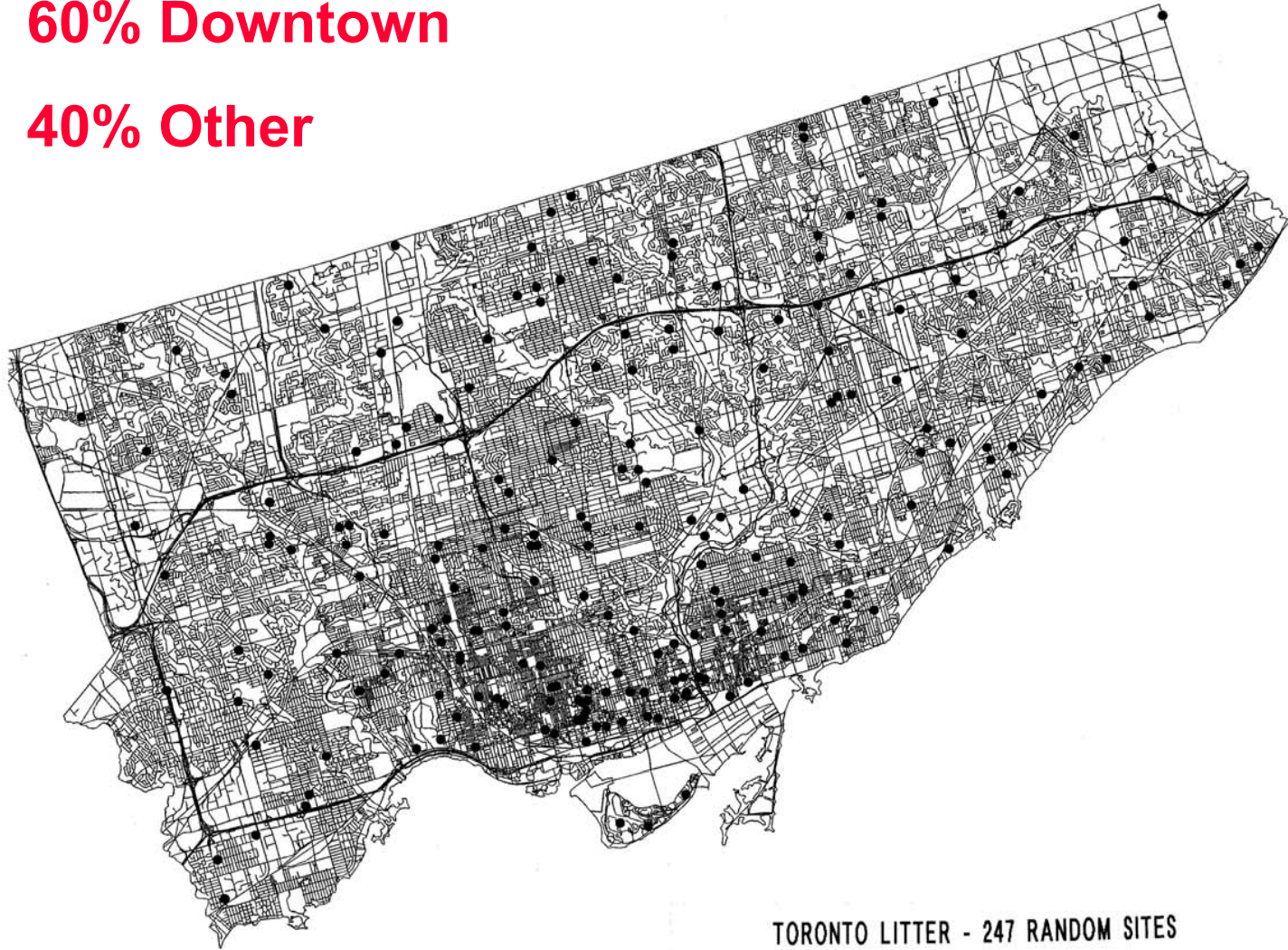
Why 60% Downtown Core?

- **Toronto spends \$ 16 MILLION dollars a year picking up litter** (equivalent to that spent on curbside recycling – SOURCE: Rathbone – RCO Conference , Belleville, Sept 2003)
- **Majority of this is in the Downtown Core (Districts # 1 & #2)**
- **Survey focus was in this area to identify and document the litter & assist with planning cost reductions**
- **Regions in 2003 chose 70% Urban / 30% rural split reflecting their local concerns and the costs to area municipi**

Randomly Selected Sites

60% Downtown

40% Other



TORONTO LITTER - 247 RANDOM SITES

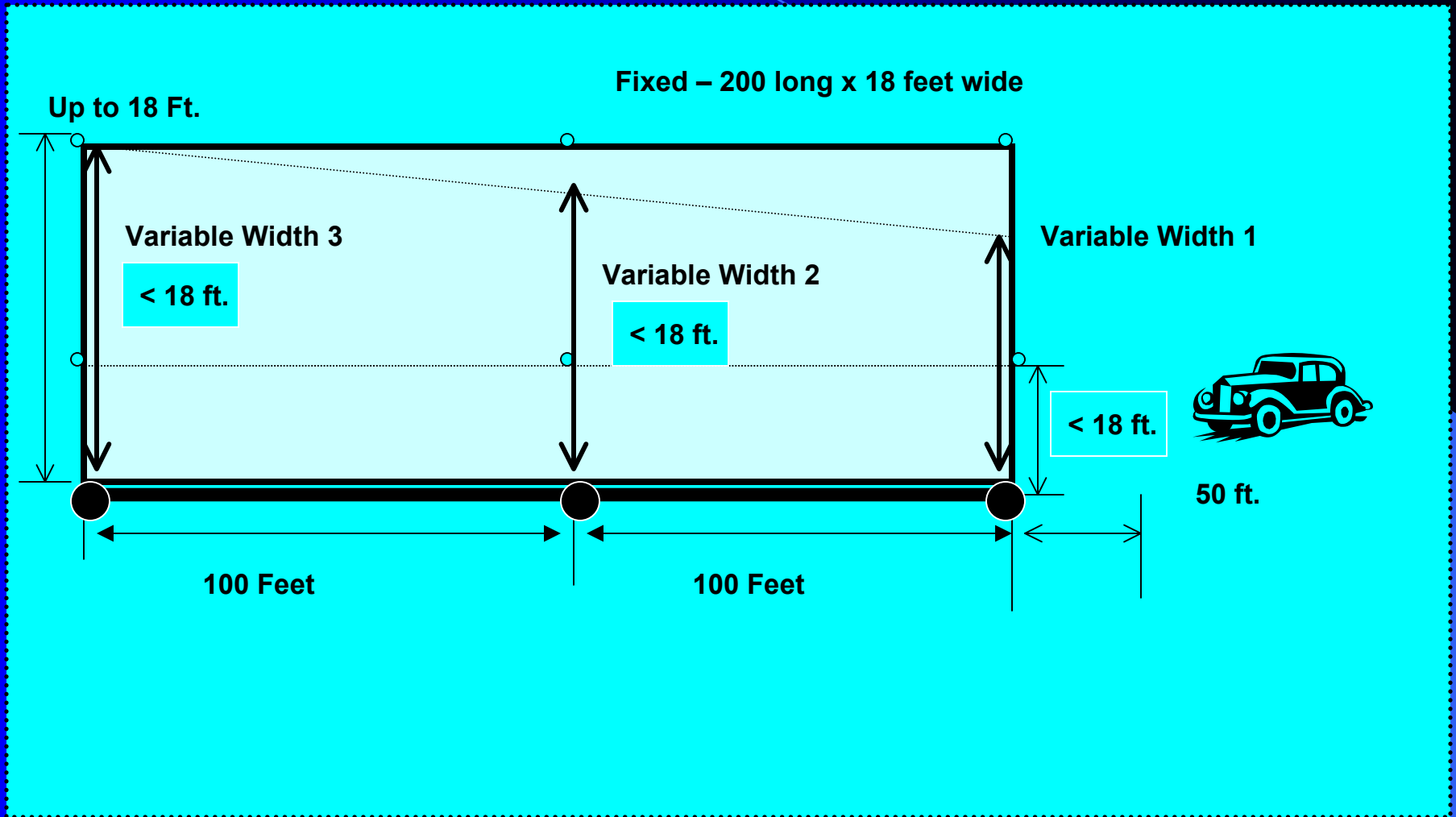
Step 1 – Selecting Sites

- **GIS Software & maps of Toronto used**
- **Random number generator – on computer to select co-ordinates.**
 - **Sample sites then drawn on GIS maps**
 - **Determine if site is within criteria**
 - **60% in Downtown Core (75 east / 75 west Yonge)**
 - **40% Rest of City (50 east / 50 west Yonge)**
 - **Peel, York & Durham Regions also weighted sites to urban areas (70% urban)**
 - **Adjust to nearest Public Land , (N, S, E, W) reject if:**
 - **Private lands unavoidable**
 - **On unpaved roads**
 - **On bridges / freeways / highways**
 - **In water / pond / lake**
 - **No reasonable access by roadway**

Step 2 – Locate the Site

- **Surveyors DID NOT examine sites prior to counting:**
 - **Approached site as specified in the Site Directions**
 - **Reason: – to remove ANY possible bias**
- **Drove to site. Parked safely. Set up site and proceeded with counting work.**

Step 3 – Set up Field Site



Step 4 – Record Results

Surveyor Site Form

(To be dictated into tape recorder at each site)

Site Number _____ Date: _____

Ward _____

Start Time: _____ Finished Time: _____

Surveyor Name: _____

Site Fixed: (18 feet) _____ or Variable?:

If Variable : Width 1 : Beginning _____ feet

 Width 2 : Middle _____ feet

 Width 3 : End _____ feet

Site length : always 200 feet

Road type: Major City Street __ , Minor City Street __ , Lane __

Lanes : 2, 4, 6, other

Is roadway divided?

Site description: Downtown core __, Urban/ business __, Residential __

 Outside Downtown Core _____

 Parkland __, School Property ____, City property _____

 Private Lands _____, Industrial _____

Grass height: a. < 3 inches, b. 3” – 6 “, c. over 6”

Evidence of litter clean-up: _____ Litter containers with in sight _____

Evidence of Who Cleans? _____ (Describe)

Fast food / Convenience store within 1 km? _____

Traffic light / stop sign in site? _____

Litter catch point a. Fence b. Hedge c. Mower line d. Other e. None

Litter visual rating (1 = cleanest , 4 = dirtiest) _____ ; Additional comments _____

CHECK TAPE RECORDER WAS WORKING _____ (confirm on tape that checked)

Large Litter Categories

| Major Category | Category Number | Large Litter | Category Name | Material |
|----------------|-----------------|------------------------------|-----------------|-----------|
| 1 | 1 | Beer Cans | Beverage | metal |
| | 2 | Beer Bottles (glass) | Beverage | glass |
| | 3 | Soft Drink (glass) | Beverage | glass |
| | 4 | Soft Drink (cans) | Beverage | metal |
| | 5 | Soft Drink (plastic) | Beverage | plastic |
| | 6 | Sport Drink (glass) | Beverage | glass |
| | 7 | Sport Drink (plastic) | Beverage | plastic |
| | 8 | Water (glass) | Beverage | glass |
| | 9 | Water (plastic) | Beverage | plastic |
| | 10 | Wine/ Liquor (glass) | Beverage | glass |
| | 11 | Wine/ Liquor (plastic/other) | Beverage | plastic |
| | 12 | Milk/Juice (Plastic) | Beverage | plastic |
| | 13 | Milk/Juice (glass) | Beverage | glass |
| | 14 | Milk/Juice (Gable Top) | Beverage | paper |
| 2 | 15 | Foil Pouches | Other Packaging | composite |
| | 16 | Aseptic (Box) | Other Packaging | composite |
| | 17 | Broken Glass Container | Other Packaging | glass |
| | 18 | Six pack plastic rings | Other Packaging | plastic |
| | 75 | Foil containers | Other Packaging | metal |
| 3 | 19 | Plastic drink cups | Cups | plastic |
| | 20 | Paper Cups (cold) | Cups | paper |
| | 21 | Paper Cups (Hot) | Cups | paper |
| | 22 | Polystyrene cups (foam) | Cups | plastic |
| | 23 | Other paper cups | Cups | paper |
| | 24 | Cup Lids, Pieces lids | Cups | plastic |

| Major Category | Category Number | Large Litter | Category Name | Material |
|----------------|-----------------|---|--------------------------|-----------|
| 4 | 25 | Plastic retail bags | Bags | plastic |
| | 26 | Paper retail bags | Bags | paper |
| | 27 | Paper bags - fast food | Bags | paper |
| | 28 | Plastic bags - not retail | Bags | plastic |
| | 29 | Paper bags - not retail | Bags | paper |
| | 30 | Zipper bags/ sandwich | Bags | plastic |
| 5 | 31 | Cardboard boxes/ box mat'l | Other Packaging | paper |
| | 32 | Paperboard (cereal type) | Other Packaging | paper |
| | 33 | Paper Beverage Cases | Other Packaging | paper |
| | 34 | Polystyrene clamshells | Other Packaging | plastic |
| | 35 | Paper clamshells | Other Packaging | paper |
| | 36 | Other Plastic Shells/Boxes | Other Packaging | plastic |
| 6 | 37 | Plastic Jars / Bottles/ Lids | OTHER CNTRS. | plastic |
| | 38 | Glass jars/ bottles misc. | OTHER CNTRS. | glass |
| | 39 | Cans - steel | OTHER CNTRS. | metal |
| | 40 | Cans - aluminum | OTHER CNTRS. | metal |
| | 41 | Container lids | OTHER CNTRS. | |
| | 42 | Aerosol cans (paint, oils, etc.) | OTHER CNTRS. | metal |
| 7 | 43 | Paper Food Wrap | Food Wraps/ Cntrs | paper |
| | 44 | Paper / foil composite wrap | Food Wraps/ Cntrs | composite |
| | 45 | Plastic wrap | Food Wraps/ Cntrs | plastic |
| | 54 | Condiment package (salt, ketchup, vinegar etc.) | Take-Out Extras | |
| | 55 | Utensils | Take-Out Extras | plastic |
| | 56 | Name Brand (Fast Food etc.) Towels / Napkins / Serviettes | Take-Out Extras | paper |
| | 57 | Paper Fast Food Plates | Take-Out Extras | paper |
| | 58 | Poly Fast Food Plates | Take-Out Extras | plastic |
| | 59 | Other Plastic FF Plates | Take-Out Extras | plastic |
| | 60 | Plates - Other Mat's | Take-Out Extras | |

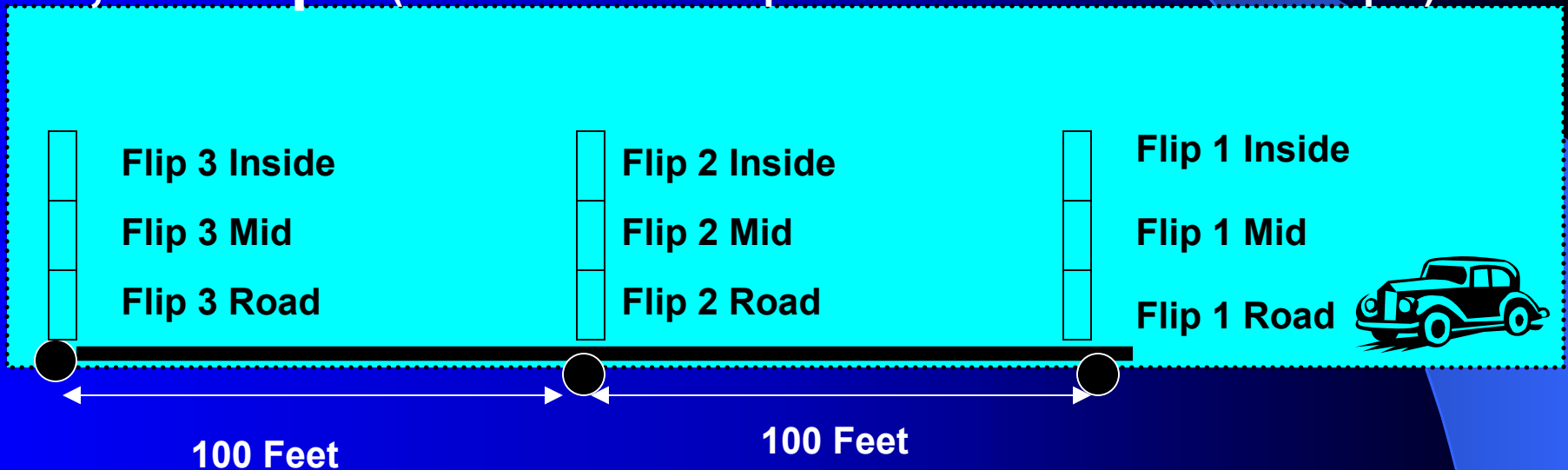
| | | | | |
|----|----|---|----------------------------|---------|
| 8 | 46 | Polystyrene Trays | Trays | plastic |
| | 47 | Paper Trays | Trays | paper |
| | 48 | Other Mat'l Trays (what?) | Trays | |
| 9 | 49 | Gum wrappers | Confectionary/Snack | |
| | 50 | Candy bar wraps | Confectionary/Snack | |
| | 51 | Candy pouches | Confectionary/Snack | |
| | 52 | Sweet packaging (describe) | Confectionary/Snack | |
| | 53 | Other confectionery (describe) | Confectionary/Snack | |
| | 63 | Snack food packaging | Confectionary/Snack | |
| 10 | 61 | Clothing or clothing pieces | Cloth | |
| | 62 | Other cloth | Cloth | |
| 11 | 64 | Plastic packaging other | Other Miscellaneous | plastic |
| | 65 | Paper packaging other | Paper/ Fibre Mat'l | paper |
| | 66 | Plastic / composite other | Other Miscellaneous | |
| | 67 | Foil materials / foil pieces | Other Miscellaneous | metal |
| 12 | 68 | No Brand Name Towels / Napkins / Serviettes | Paper/ Fibre Mat'l | paper |
| | 69 | Lottery ticket debris | Paper/ Fibre Mat'l | paper |
| | 70 | Printed material (newspapers, flyers, books etc.) | Paper/ Fibre Mat'l | paper |
| | 71 | Stationary (school, business etc.) | Paper/ Fibre Mat'l | paper |
| | 72 | Receipts (business forms, bus transfers, etc.) | Paper/ Fibre Mat'l | paper |
| 13 | 73 | Cigarette / cigar debris (>4") | Tobacco | |
| | 74 | Tobacco other (packs, matches, cellophane) | Tobacco | |
| 14 | 76 | Misc. Paper | Other Miscellaneous | paper |
| | 77 | Misc. Plastic | Other Miscellaneous | plastic |
| | 78 | Misc. Paperboard | Other Miscellaneous | paper |
| | 79 | Misc. Cardboard | Other Miscellaneous | paper |
| | 80 | Misc. Glass | Other Miscellaneous | glass |
| | 81 | Vehicle & Metal Road Debris | Other Miscellaneous | |
| | 82 | Construction debris | Other Miscellaneous | |
| | 83 | Tire & Rubber debris | Other Miscellaneous | rubber |
| | 84 | Home Articles | Other Miscellaneous | |

Step 5 – Counting and Recording SMALL Litter

- **Small litter counted at same site – same time (small litter < 4 sq. Inches)**
- **Use forms and tape recorder for small litter**

Step 6 – Small Litter Count

- * Small Litter – Counted inside 1' x 5' Frame – flipped three times per transact
- * Sample statistically weak – 45 sq.ft. in total of 3,600 sq.ft (1.25% of site sampled – costs dictate small sample)





Litter Prevention Forum - 2004

Step 7 – “Brands” of Litter

- **Purpose:**
 - **Identify manufacturers of litter, to understand brand sources & whether cooperative litter abatement programs might be possible**
 - **Successful in Florida & Texas**
 - **Successful in P.E.I. and Nova Scotia , & New Brunswick with major coffee/food chain**
 - **Unbiased observations of what is on the ground**

RESULTS -

GTA Litter

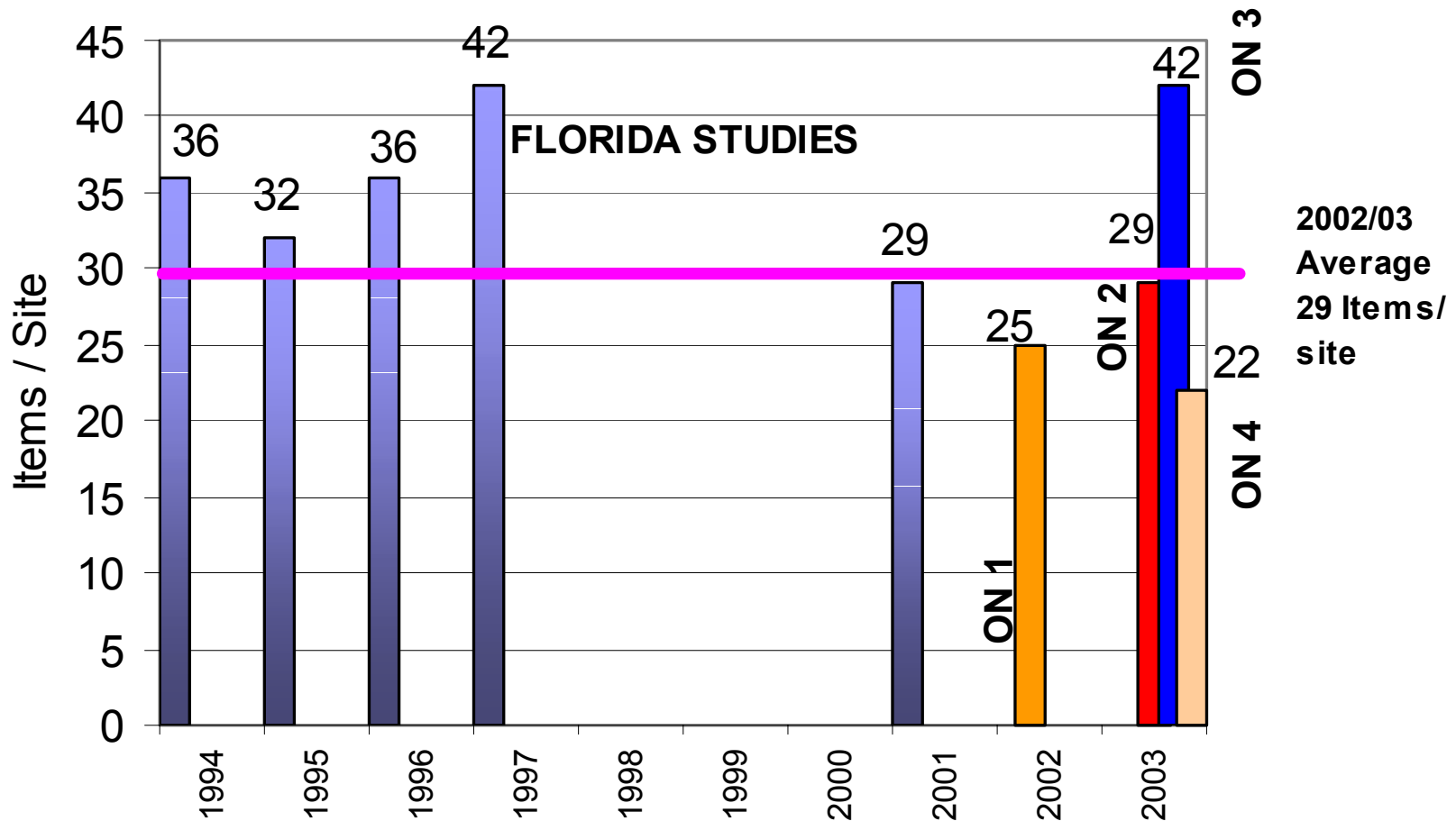
Audits

(2002 & 2003)

Comparison of Audits

Ontario Study Litter Rates vs. Florida

(Large Items/ site)



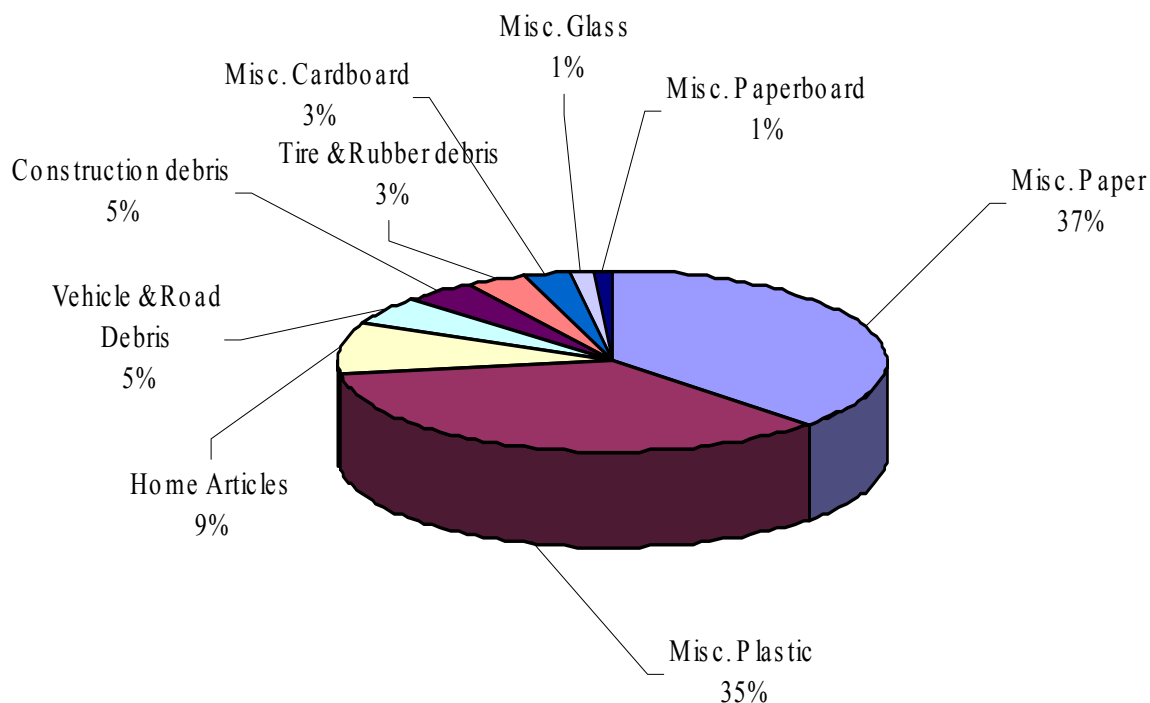
14 Major Categories

Fourteen Major Categories - Four Large Ontario Municipalities

| | | ON 1 | ON 2 | ON 3 | ON 4 | Total Items | % of Total Items |
|----|-------------------------------|-------|-------|-------|-------|-------------|------------------|
| 1 | Other Miscellaneous | 1,318 | 1,955 | 3,967 | 2,482 | 9,721 | 39% |
| 2 | Printed Mat'l | 752 | 425 | 1,607 | 580 | 3,364 | 13% |
| 3 | Candy/Confection | 527 | 464 | 538 | 624 | 2,153 | 9% |
| 4 | Other Packaging | 1,316 | 270 | 163 | 302 | 2,107 | 8% |
| 5 | Cups | 328 | 287 | 730 | 504 | 1,792 | 7% |
| 6 | Containers (Bev & Non-Bev) | 300 | 333 | 638 | 516 | 1,786 | 7% |
| 7 | Fast Food Extra | 924 | 155 | 147 | 110 | 1,336 | 5% |
| 8 | Tobacco | 158 | 259 | 414 | 271 | 1,102 | 4% |
| 9 | Wrap | 289 | 39 | 135 | 72 | 534 | 2% |
| 10 | Bags | 175 | 76 | 182 | 88 | 521 | 2% |
| 11 | Textiles | 11 | 78 | 119 | 89 | 297 | 1% |
| 12 | Boxes | 23 | 22 | 34 | 51 | 130 | 1% |
| 13 | Plates | 81 | 1 | 6 | 13 | 101 | 0% |
| 14 | Trays | 0 | 0 | 0 | 0 | 0 | 0% |
| | | | | | | | |
| | | 6,200 | 4,363 | 8,678 | 5,698 | 24,939 | 100% |

“Other” Category Was Most Significant – 39% of Total

Misc. Fibre & Plastics >75% of “Other Miscellaneous” Category



*** Misc. paper / paperboard / cardboard most significant category sub-categories**

Significant Large Litter Categories

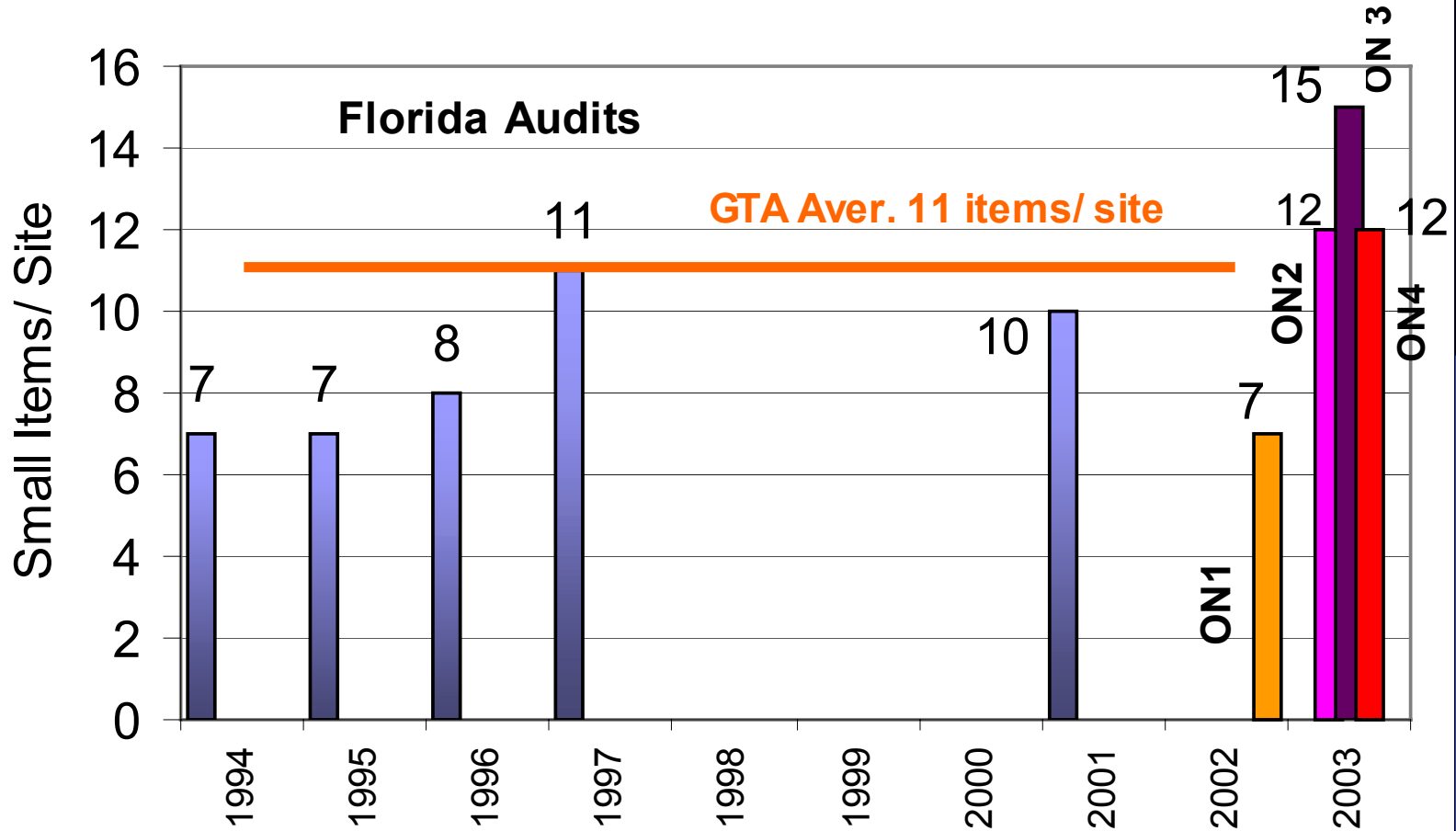
| <u>Significant Large Litter Categories</u> | | |
|--|-------------------------|-------------------------|
| | % of Total Large Litter | |
| Total take away food litter | 14% | % of Total Large Litter |
| Cups & lids | | 7% |
| Fast food condiments | | 5% |
| Fast food w rap | | 2% |
| Printed paper litter | 13% | |
| Candy & confectionary | 9% | |
| Containers (beverage & non-beverage) | 7% | |
| | 43% | |

Small Litter Results

- **Small litter are those items that are less than 4 square inches in size, and include 15 categories:**
 - **Small paper**
 - **Cigarette butts**
 - **Other tobacco**
 - **Small glass**
 - **Plastic film**
 - **Hard plastic**
 - **Polystyrene pieces**
 - **Polyfoam pieces**
 - **Aluminum pieces**
 - **Metal not aluminum**
 - **Candy <4 sq. in.**
 - **Straws**
 - **Rubber**
 - **Bottle caps**
 - **Other materials**

GTA Small Litter Results

GTA Small Litter vs. Other Jurisdictions



Small Litter

Paper & Cigarette Butts are Significant

Small Litter - Super Site Analysis (2003)

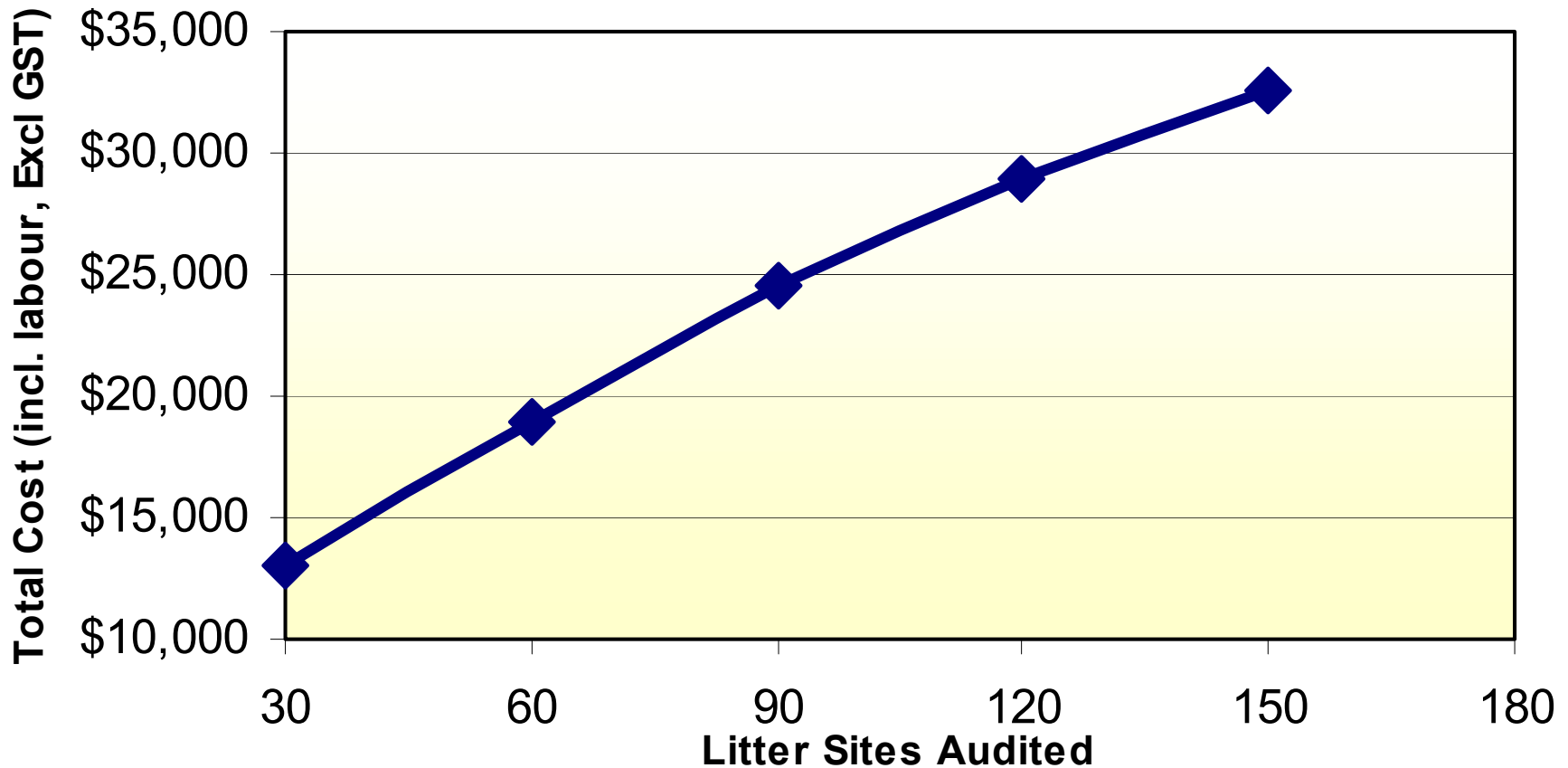
| | Region 1 Item Count | Region 2 Item Count | Region 3 Item Count |
|------------------------|-------------------------------|-------------------------------|-------------------------------|
| Small Paper | 1,073,997,006 | 1,386,223,553 | 1,508,632,735 |
| Cigarette butts | 1,302,754,491 | 1,377,461,078 | 614,945,110 |
| Hard plastics | 170,598,802 | 467,916,168 | 436,452,096 |
| Alum pieces | 410,988,024 | 152,467,066 | 383,882,236 |
| Plastics film | 286,916,168 | 569,560,878 | 311,751,497 |

Litter Audits Should Include

- **Audits include:**
 - Detailed litter audit plans & budget
 - Report on large litter
 - Details on small litter
 - Report on brands of litter (if requested)
 - Observations of litter problems as witnessed by field crews (i.e. clean up frequency, litter bins, parks, proximity to food service etc)

Litter Audits

Cost of Municipal Litter Surveys



Thank You

- **For more information or for a copy of this presentation:**
- **Leave me your business card or contact Mark McKenney**
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