

# Recycling Collection Efficiency Report

Cambria County, Pennsylvania

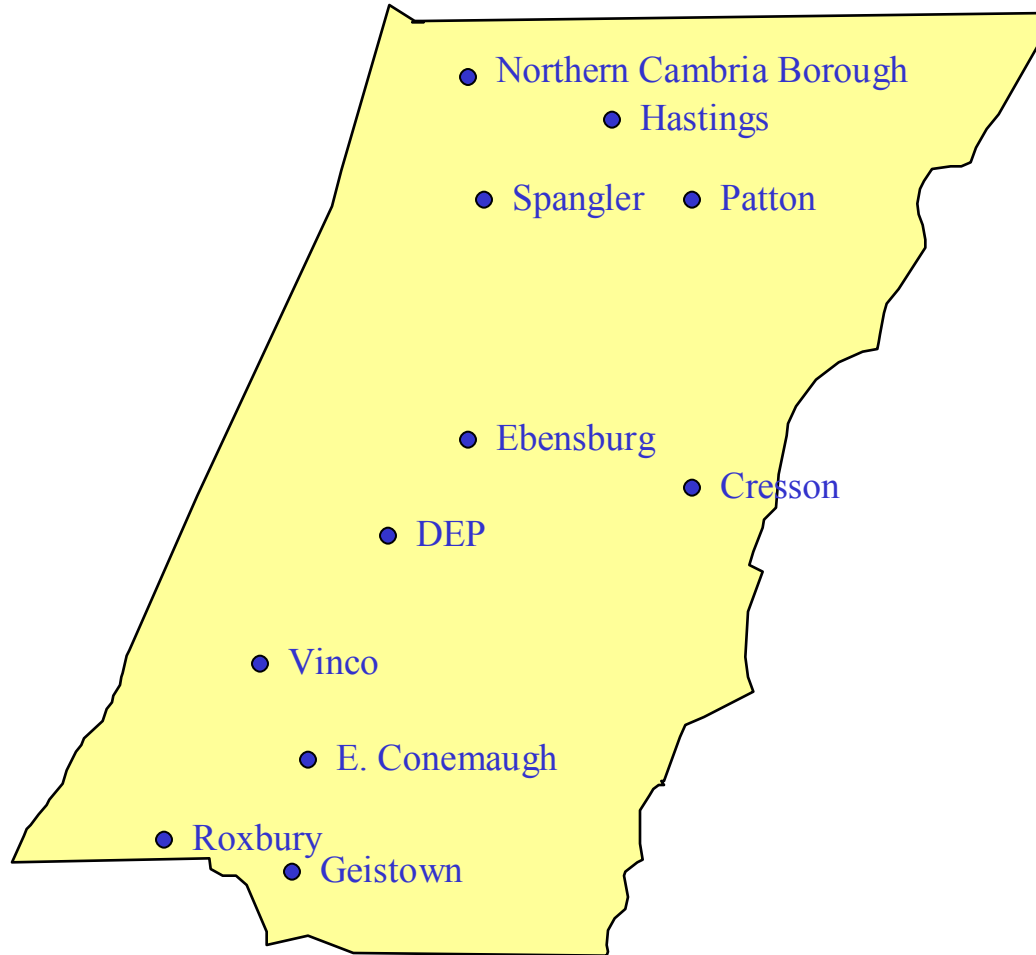
March 12, 2002

# Cambria County Drop-off Sites

- Ebensburg
- DEP
- Geistown
- Roxbury
- E. Conemaugh
- Vinco
- Cresson
- Patton
- Hastings
- Spangler



# Cambria County Map



# Recycling Bin Collection Schedule

Monday	Newspaper All (except Patton & Hastings)
Tuesday	Plastic All
Wednesday	Metal All
Thursday	Glass All (if necessary or Bin maintenance)
Friday	Newspaper All
On call	Office paper from DEP site

# Cambria County Drop-off Sites

(cubic yards of bin storage)

Site	ONP	Plastic	Metal	Glass	Other (OCC, Ledger, Magazines)
Ebensburg	6	12	6	6	
DEP	6	6	3	3	12
Geistown	6	12	6	6	
Roxbury	12	12	6	6	
E. Conemaugh	6	12	6	6	
Vinco	6	12	6	6	
Cresson	6	12	6	6	
Patton	6	12	6	6	
Spangler	6	12	6	6	
Hastings	6	12	6	6	

# Data Currently Collected by Operator

- Operator collects data in hand-held Palm computer
- Takes 75 to 90 seconds to record data in Palm computer
- Data collected includes:
  - Site name
  - Date
  - Time arrive at site
  - Recyclable material type
  - Amount of recyclables in bin
  - Comments
  - Time arrive at Recycling Center
  - Amount of weight dumped at Recycling Center

# R. W. Beck Field Observations

- Full day of operational observations performed:
  - Rode with a County driver on the plastic route
  - Compiled productive time, mileage, and quantity data
  - Visited each recycling site

# Data Collected During Field Observations (slide #1)

Productive and Nonproductive time:

- Clock-in time
- Time leave for route
- Stops collected
- Time arrive at each stop
- Time leave each stop
- All break times
- Time leave route for Recycling Center
- Time arrive at Recycling Center
- Time arrive at shop
- Clock-out time
- All breakdown times



# Data Collected During Field Observations (slide #2)

## Mileage:

- Starting mileage
- Mileage arriving at each stop
- Mileage leaving route for Recycling Center
- Mileage arriving at Recycling Center
- Ending mileage
- Fuel used

## Material Quantities:

- All tonnage delivered to Recycling Center

# Operational Statistics

(Based on R. W. Beck field observation)

Average service time per Site	12.27 minutes
Average time per dump a <i>plastic</i> bin	3.55 minutes
Average Yards per <i>plastic</i> bin dumped	1.76 yards
% of Travel Time from site to site	55%
% of Productive Time at site	45%
Average travel time from Stop to Stop	16 minutes
Average trip time to processing facility (est.)	90 minutes
Average Miles between sites	8.5 miles
Average Miles per Hour traveled	31 mph
% of productive hours verses total time	62.5%
% of non-productive hours verses total time	37.5%

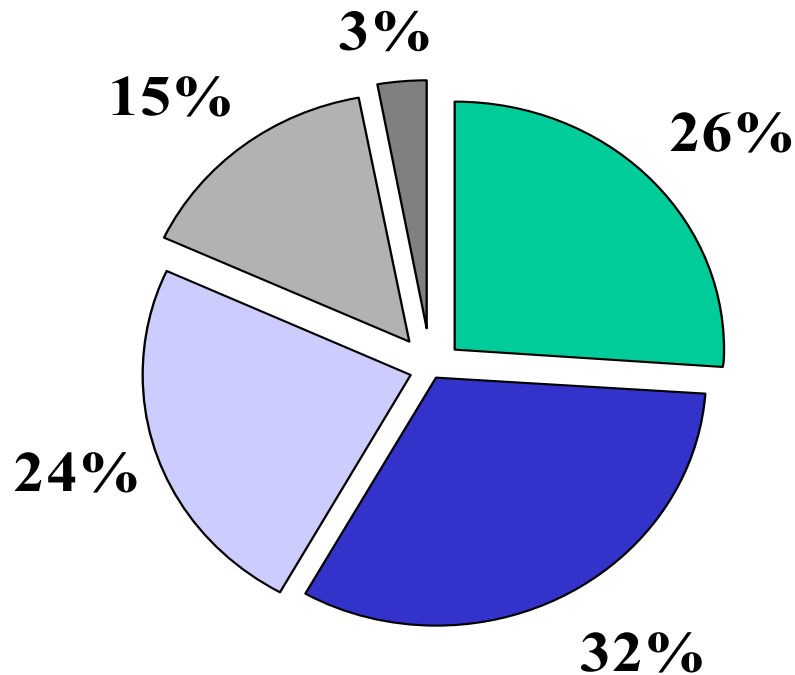
# Operational Review

(Based on R. W. Beck field observation)

Notes:

- No processing facility trip that day
- Majority of day spent at recycling sites

## Plastic Collection Route



<span style="color: green;">■</span>	<b>Productive travel between sites</b>
<span style="color: blue;">■</span>	<b>Productive at sites</b>
<span style="color: lightblue;">■</span>	<b>Pre/Post trip</b>
<span style="color: gray;">■</span>	<b>Breaks</b>
<span style="color: darkgray;">■</span>	<b>Travel to &amp; from Route</b>

## Supplemental Field Data Collection performed by County

- R. W. Beck provided specially developed data collection forms
- County employees completed forms all routes over seven days
- Data collected was same as recommended data

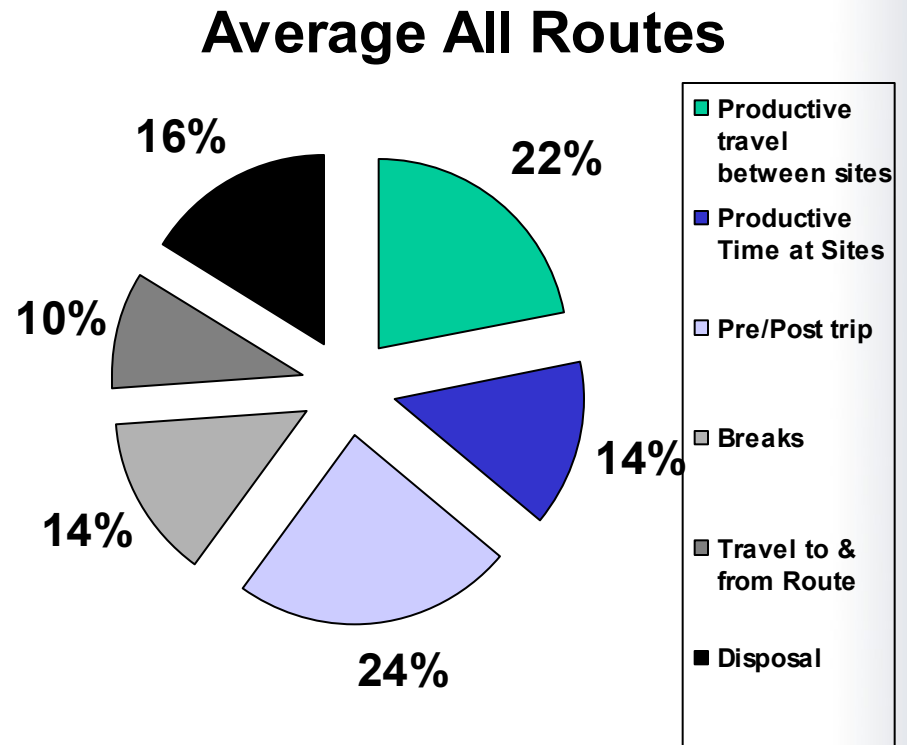
# County Detailed Data Collection Statistics

Route Type	ONP	glass	Metal	Plastic
Productive Hours	4:48	3:20	5:08	4:27
Disposal Hours	1:00	2:16	0:43	0:45
Non-Productive Hours	3:41	3:39	3:39	3:47
Sites Dumped	9	7	13	11
Total Dumps	51	11	20	43
Total Yards	42.3	11.5	29.8	66.8
Average fullness of Containers	66%	27%	42%	59%
<b>Analysis</b>				
Average minutes per Site	0:11:54	0:07:00	0:09:14	0:11:35
Avg Dumps per site	5.5	1.6	1.6	4.1
Average minutes per dump	0:02:11	0:04:27	0:05:28	0:02:56
Average Yards per Dump	0.83	1.05	1.49	1.59
Avg Pounds per Yard	338	710	70	28
% of Travel Time site to site	61%	75%	64%	55%
% of Productive Time at site	39%	25%	36%	45%
Average travel minutes Stop to Stop	0:18	0:21	0:15	0:06:33
Average disposal trip minutes	1:00	2:16	0:43	0:45:00
Average Miles between sites	10.4	6.1	11.6	7.7
Average Productive Miles per Hour	35	24	32	30
% of Total productive hours	51%	36%	54%	50%
% of Total non-productive hours	49%	64%	46%	50%

# Supplemental Data Collection

## Operational Review (slide #1)

- Processing facility trip time is included in this graph, which makes comparison to previous chart difficult
- Too much time spent on post trip activities. Drivers often complete route between 2:00 & 3:00 p.m. but do not complete day until 4:30 p.m.
- Drivers spent more time driving between sites than dumping bins at the recycling sites



# Supplemental Data Collection Operational Review (slide #2)

- Drivers consistently complete routes in less than 8 hours
  - Non-productive hours are high because drivers go directly to office at the end of each route
  - The drivers download the data from the palm pilot into a spreadsheet
  - Drivers then wait till 4:30 to punch out and go home

# Data Inconsistencies

- Why does it take twice as long to dump glass at recycling facility than other materials?
- Why are average miles and miles per hour for the glass routes 30% less than other materials?
- More analysis may be needed to answer these questions



# Current Data Tracking Procedures

(performed by drivers)

- County staff uses Palm Pilot to track data
- Data collected includes: location, material type, time of service, estimated cubic yards of material collected, and tons dumped at recycling center
- Data is downloaded into excel spreadsheet daily at end of route
- Data cannot be easily organize or formulated into reports
- Following 8 slides incorporate data from the database

# Operational Statistics

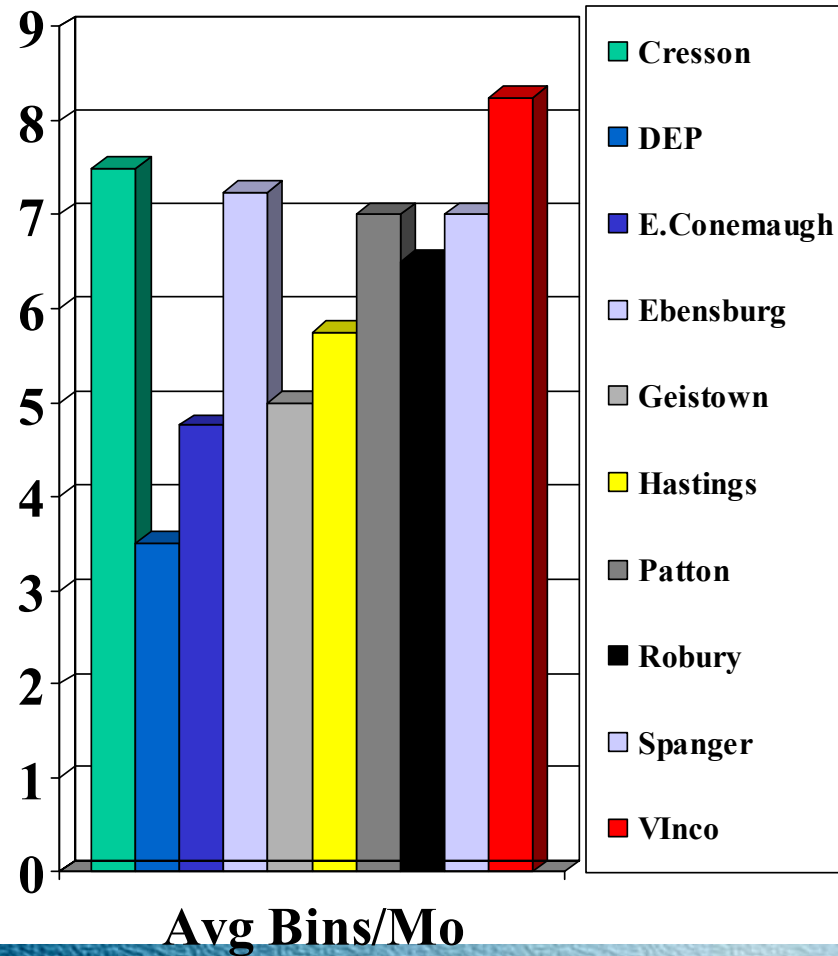
(estimated by staff)

Material	ONP	Plastic	Glass	Metal
Avg. Bins per Load	8	24	8	10
Avg. Yards per Load	32	64	25	29

# Plastic Collection Route

Average Bins Dumped per Month

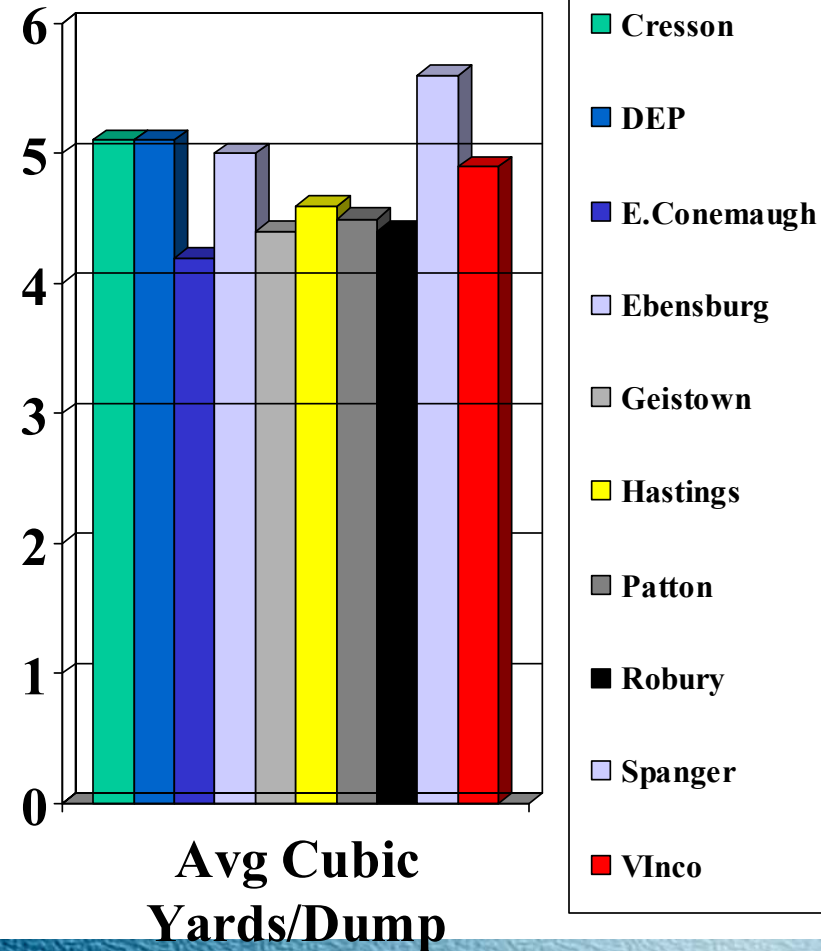
- Bins are 6 cubic yards
- Sites with 2 Bins
  - Cresson
  - Ebensburg
  - Geistown
  - Hastings
  - Patton
  - Roxbury
  - Spangler
  - Vinco



# Plastic Collection Routes

Average Fullness of Bins

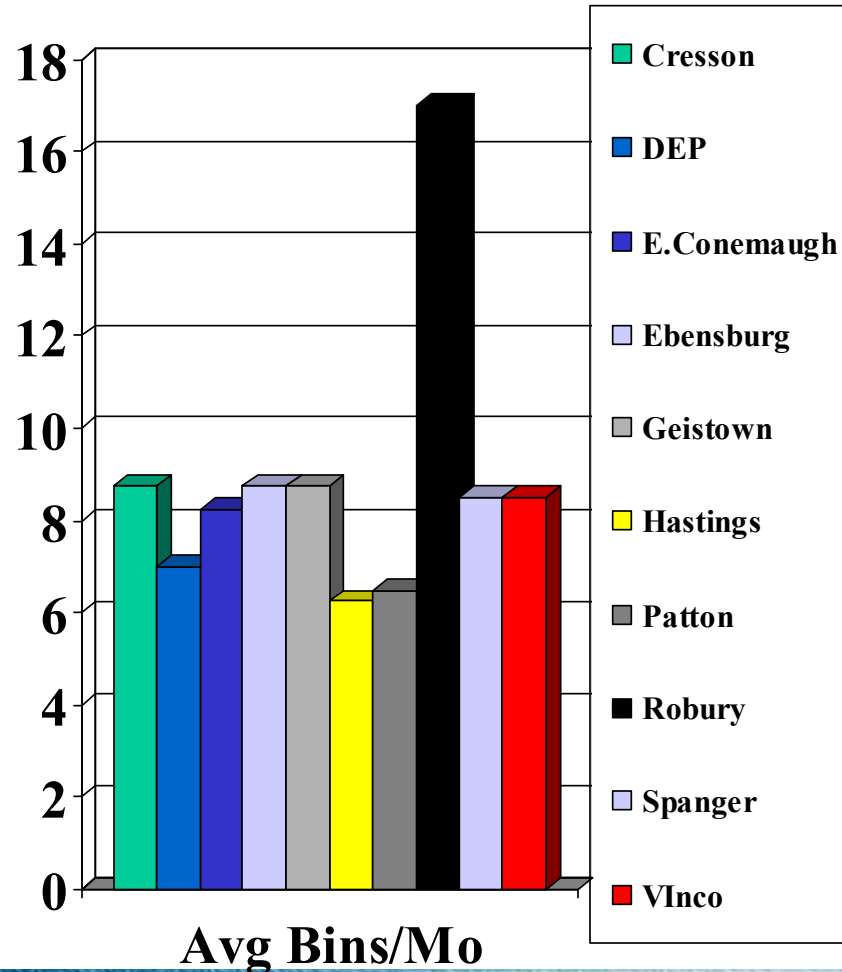
- Graph illustrates the average cubic yards in each bin dumped
- Bins are 6 cubic yards
- Driver estimates fullness of bin before dumping



# Newspaper Collection Routes

(Average Bins Dumped per Month)

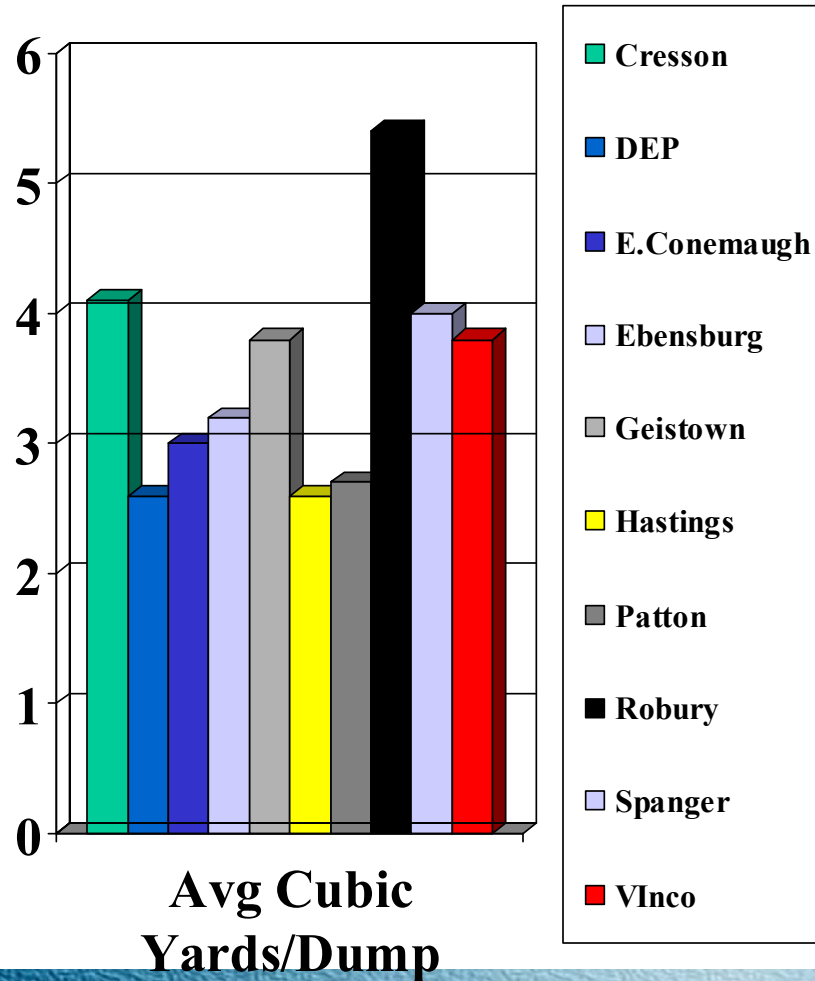
- Graph illustrates the average number of bins dumped per month
- Bins are 6 cubic yards
- Site with 2 Bins
  - Roxbury



# Newspaper Collection Routes

(Average Fullness of Bins)

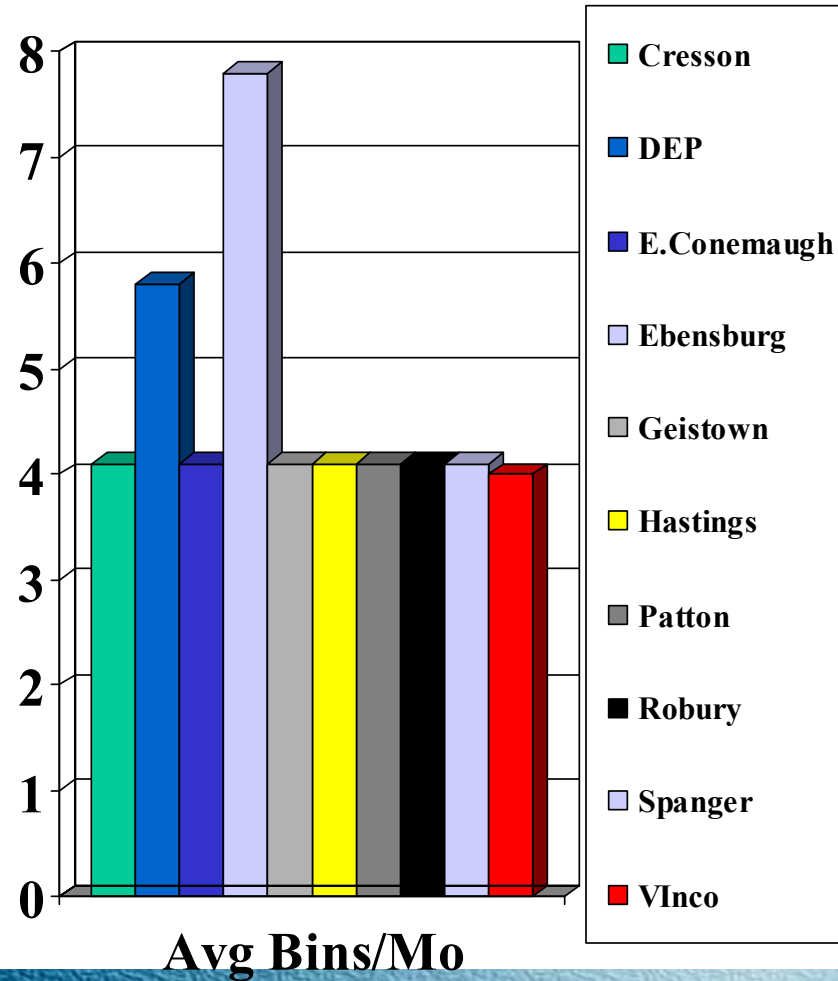
- Graph illustrates the average cubic yards in each bin dumped
- Bins are 6 cubic yards
- Driver estimates fullness of bin before dumping



# Metal Collection Routes

(Average Bins Dumped per Month)

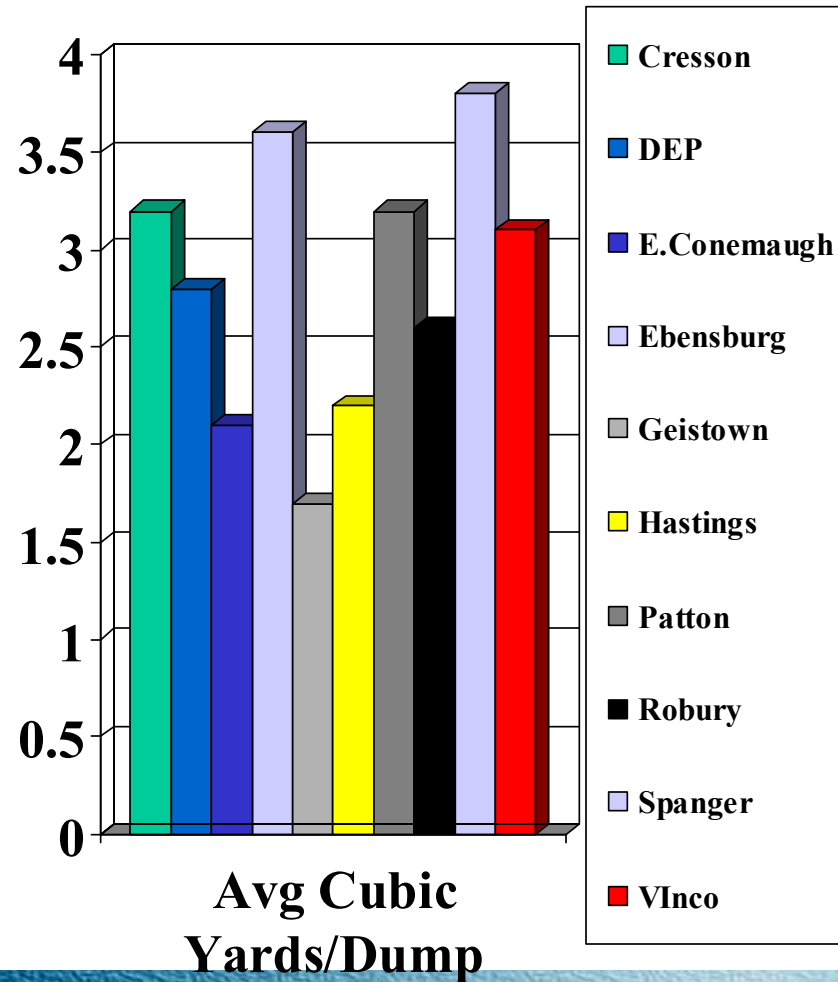
- Graph illustrates the average number of bins dumped per month
- Bins are 6 cubic yards
- Site with 2 Bins
  - Roxbury



# Metal Collection Routes

(Average Fullness of Bins)

- Graph illustrates the average cubic yards in each bin dumped
- Bins are 6 cubic yards
- Driver estimates fullness of bin before dumping

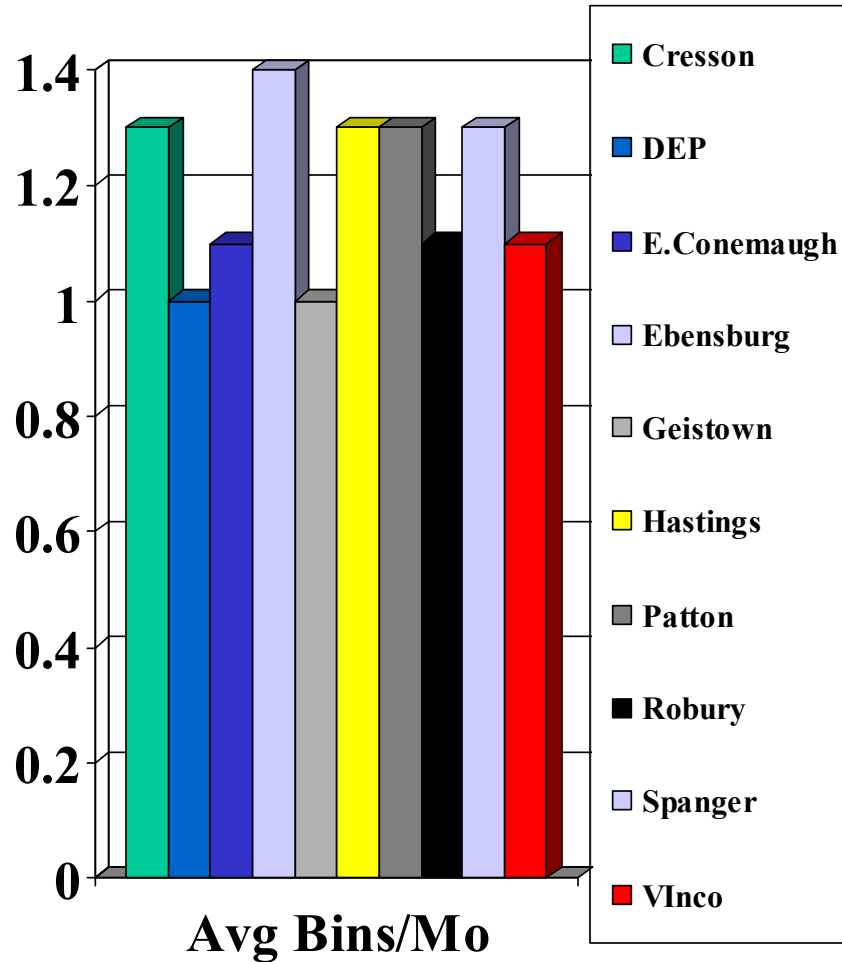




# Glass Collection Routes

(Average Bins Dumped per Month)

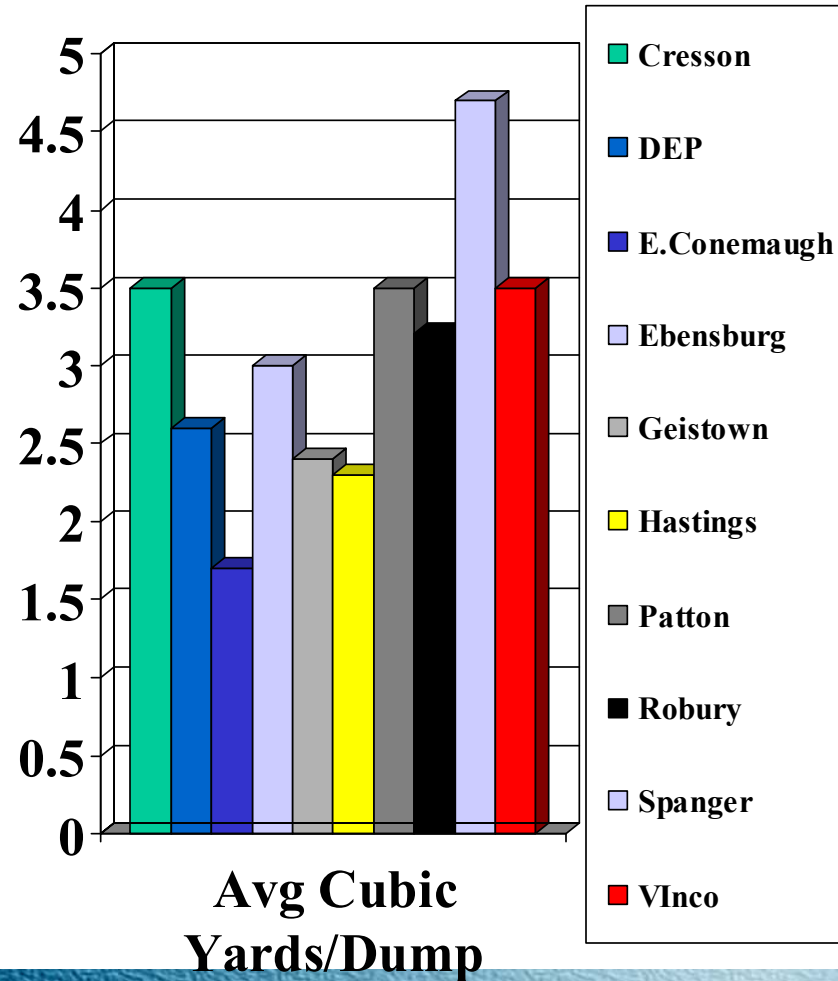
- Graph illustrates the average number of bins dumped per month
- Bins are 6 cubic yards
- Site with 2 Bins
  - Roxbury



# Glass Collection Routes

(Average Fullness of Bins)

- Graph illustrates the average cubic yards in each bin dumped
- Bins are 6 cubic yards
- Driver estimates fullness of bin before dumping



# Estimates for Additional Sites (slide #1)

- Each new recycling drop-off site will add:
  - 32 minutes of drive time between stops
    - (this could be reduced if site located on present route path)
  - 12 minutes of service time
- Adding additional plastic, glass, and metal bins should not be a collection problem.
  - Metal once week, only 52% full
  - Plastic truck only dumps every other week
  - Glass every other week, only 51% full

## Estimates for Additional Sites (slide #2)

- Adding additional ONP bins may be a problem as truck is currently fully loaded each collection day
- Options:
  - Look at second collection route
  - Look at adding additional bins at Spangler and Vinco to reduce drive time  
Only pick up northern county sites once per week
  - New sites should have two ONP bins and be collected once per week
  - All southern county sites with heavy generation will remain on twice per week collection
  - Collect northern county sites once per week on Wednesday or Thursday after metal or glass collection

# Operational Recommendations (slide #1)

- Work with Indiana Recycling Center to reduce tipping time
  - Driver reports that often spends 30 minutes waiting at recycling center
- Deliver second newspaper bins to Spangler and Vinco
  - Only collect newspaper once per week from northern sites

# Operational Recommendations (slide #2)

- Consider collecting the glass and metal bins less frequently. Possibly and every other week schedule
  - Glass is 27% full when emptied
  - Metal is 42% full when emptied
- Another alternative is to collect the metal and glass on the same day
  - Recycling Center would have to allow the glass to be dumped more efficiently to assure that this could be collected in 8 hours

## Next Steps

- Proceed with recommendations as able
- Enhance desktop data tracking
  - Develop desktop database to track productive time, mileage, and quantity data
  - Develop useful management reports to be generated by desktop database
- Integrate desktop database data entry in Palm Pilot system