

A Web-based BIOmass Site Assessment Tool



version 1.0

Timothy M. Young – UT

Donald G. Hodges – UT

Timothy G. Rials – UT

James H. Perdue – USFS

Andy Hartsell – USFS

The University of Tennessee

Southeastern Sun Grant Center

Forest Products Center



U.S. Forest Service

Southern Research Station



Motivation

Bioenergy and biofuels are emerging industries that require an economic-based decision-making framework and easily accessible tools to assist in plant site location



Problem Definition



Develop a web-based economic decision-making model for cellulose resources that exists in the public domain with quasi real-time data update capabilities

Phase I: woody and ag cellulose, geo-referenced aggregate supply curves, develop web-site - www.BioSAT.net

Phase II: stochastic-based site selection, market constraints (price elasticities, policy influence, some sustainability criteria)

Phase I Objectives

1. Develop SQL database of resource data
 - Forest – USFS FIA
 - Mill Residues – USFS FIA
 - Logging Residues – SRTS
 - Urban Waste – BT²
 - Ag Residues - NASS
2. Develop wood resource costs
 - Timber Mart South
 - State reports
3. Develop truck transportation models
4. Develop harvesting cost models
 - FRCS for logging residues (Dennis Dykstra)
 - AHA for merchantable wood (Bob Rummer/Dale Greene)

Phase I Objectives

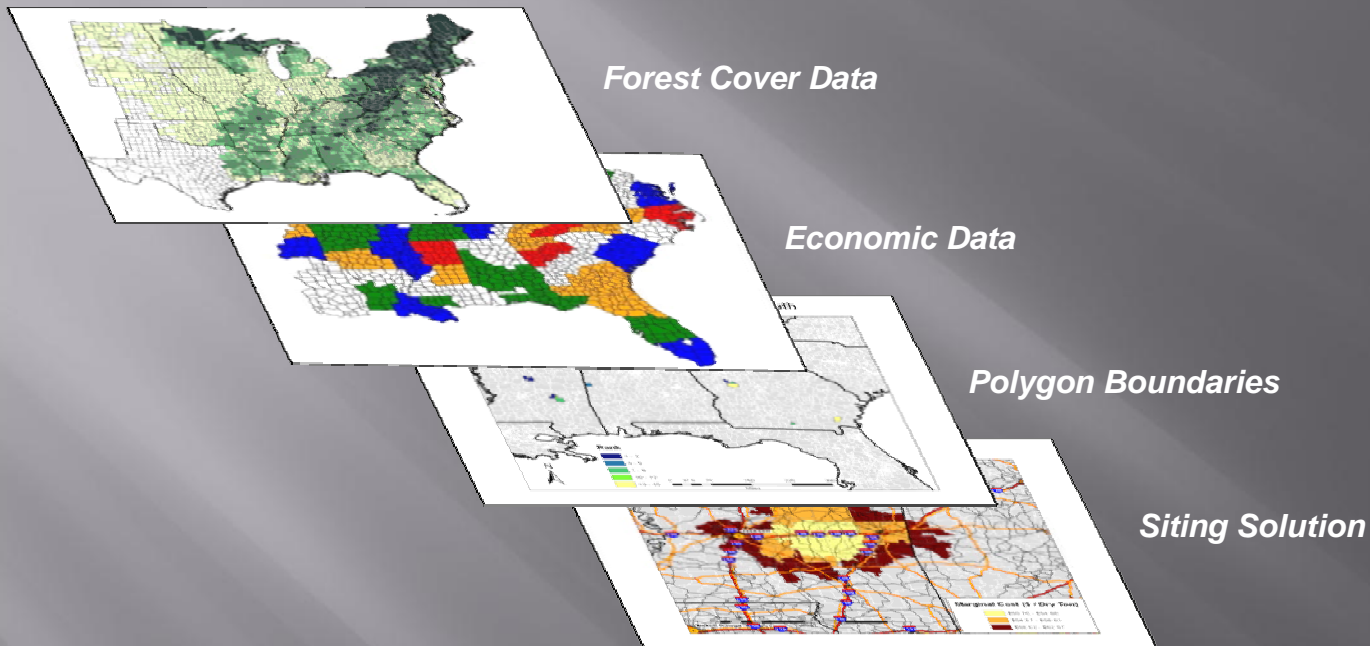
5. Develop web-based system in the public domain (www.BioSAT.net)
6. Develop a web-based system with quasi real-time data update capabilities
 - Diesel prices (US DOE EIA)
 - Resource costs (TMS, State Reports)
 - Road network (MapPoint 2006)
 - Resource data (USFS FIA, SRTS, BT²)

Scope: 33 Eastern United States

Resolution: 24,975 Zip Code Tabulation Areas (ZCTA)

Database Development

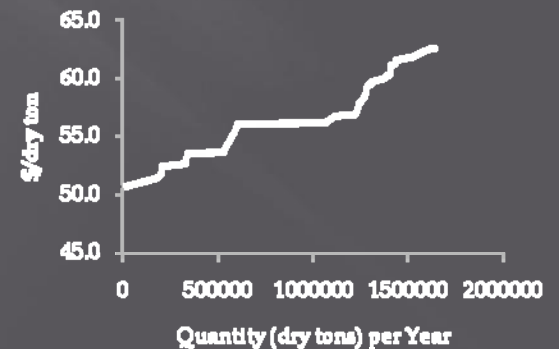
Fusion of Phase I data layers



SQL Relational Database

County	Date/Time	Quantity	Type	Ownership	Stumpage	Logging	Transport
A		tons	I	I	S	S	S
B		tons	II	II	S	S	S
C		tons	III	III	S	S	S
D		tons	IV	IV	S	S	S
E		tons	V	V	S	S	S
F		tons	VI	VI	S	S	S
G		tons	VII	VII	S	S	S
H		tons	I	VIII	S	S	S
I		tons	II	IX	S	S	S
J		tons	III	X	S	S	S
K		tons	IV	xi	S	S	S
L		tons	V	xii	S	S	S
M		tons	VI	xiii	S	S	S
N		tons	VII	xiv	S	S	S
O		tons	I	xv	S	S	S
P		tons	II	xvi	S	S	S
Q		tons	III	xvii	S	S	S
R		tons	IV	I	S	S	S
S		tons	V	II	S	S	S
T		tons	VI	III	S	S	S
U		tons	VII	IV	S	S	S
V		tons	I	viii	S	S	S
W		tons	II	ix	S	S	S
X		tons	III	x	S	S	S
Y		tons	IV	xi	S	S	S
Z		tons	V	xii	S	S	S

Phase I Supply Curves



METHODS

Biomass Quantity



Physical Biomass:

- Logging Residues (hardwood/softwood)
(at landing/in-woods)
- Mill Residues (clean/unclean, hardwood/softwood)
- Urban Waste
- Thinnings
- Merchantable (pulpwood and sawtimber)

Initially, for any demand ZCTA the “physical biomass” available is the sum of “physical biomass” in nearest neighbor ZCTAs for up to a 40, 80, 120, or 160 mile one-way haul distances

METHODS

Nearest Neighbor ZCTAs

For any demand ZCTA, nearest neighbor supply ZCTAs are computed from the change in longitudes and latitudes:

$$D = \sqrt{(M \times \Delta\tau)^2 + (N \times \cos \tau \times \Delta\lambda)^2}$$

where τ - mean latitude

$\Delta\tau$ - difference in latitude

$\Delta\lambda$ - difference in longitude (in radians)

M - Earth's radius of curvature in the (north-south) meridian at τ

N - radius of curvature in the prime normal to M at τ

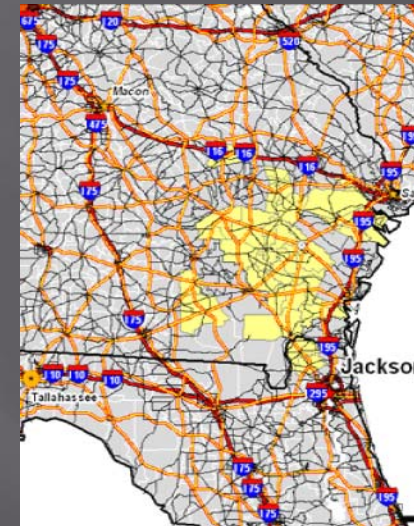
METHODS

Final Selection of Neighboring ZCTAs (“Bioshed”)

For each potential neighboring supply ZCTA, the driving time and distance are calculated from

Microsoft MapPoint 2006

- Geographic Data Technology, Inc. (GDT) data are used for rural areas and small to medium size cities
- Navteq data are used for major metropolitan areas.



Next, ZCTAs beyond **5-hour** one-way haul are eliminated (assume day-cab trucks with legal driving maximum of **11 hours**)

METHODS

Resource Costs

South (Timber Mart South www.tmart-south.com)

➤ Mill Residues

➤ Clean/Unclean

➤ Pulpwood

➤ Softwood/Hardwood

➤ Sawtimber

➤ Softwood/Hardwood

➤ Biomass



North (State Reporting Services)

➤ Connecticut (pulpwood, sawtimber, biomass)

<http://forest.fnr.umass.edu/snespsr/reports/all%20reports.htm>

➤ Maine (pulpwood, sawtimber, biomass)

<http://www.state.me.us/doc/mfs/pubs/annpubs.htm#stump>

➤ etc.

METHODS

Trucking Cost Model

Enhancement of Berwack et al. 2003

(dry van, live bottom van, longwood log trailer, shortwood log trailer)

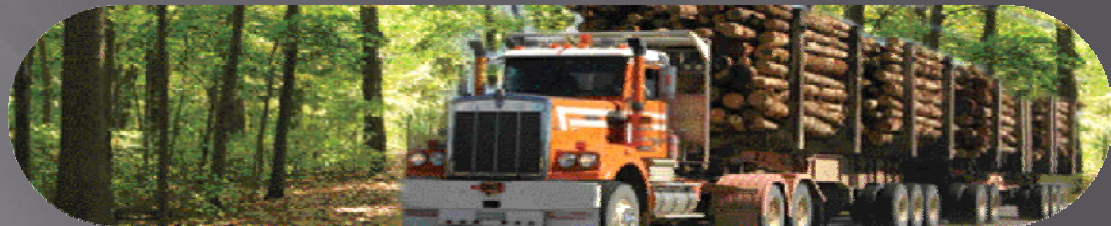
Total Cost (a, d, t) = Variable Cost (d, t) + Fixed Cost (a, d, t)

where,

a = annual miles

d = travel distance (miles)

t = travel time (hours)



Validation assuming a contract fleet: three trucking companies and one forest products company (4 mills): $\pm 2\%$

METHODS

Trucking Cost Model

Fixed Cost = Σ (Equipment Cost, State Tax, State License Fee, Overhead Cost, Insurance Premium)/a x d

Variable Cost = Fuel Cost (c, d, g, j, k) + Labor Cost (i, w)
+ Tire Cost (c, m, n, r) + Maintenance and Repair Cost (b, c, v)

where, b = repair cost per mile

g = diesel price per gallon

j = loaded truck miles/gallon

m = miles/tire

r = tire cost

w = wage rate

c = time loaded (%)

i = labor time (hours)

k = empty truck miles/gallon

n = number of tires

v = gross vehicle weight

User can use model default values or enter their own inputs

METHODS

Harvesting Cost Models

Fuel Reduction Cost Simulator
(FRCS) – BT²



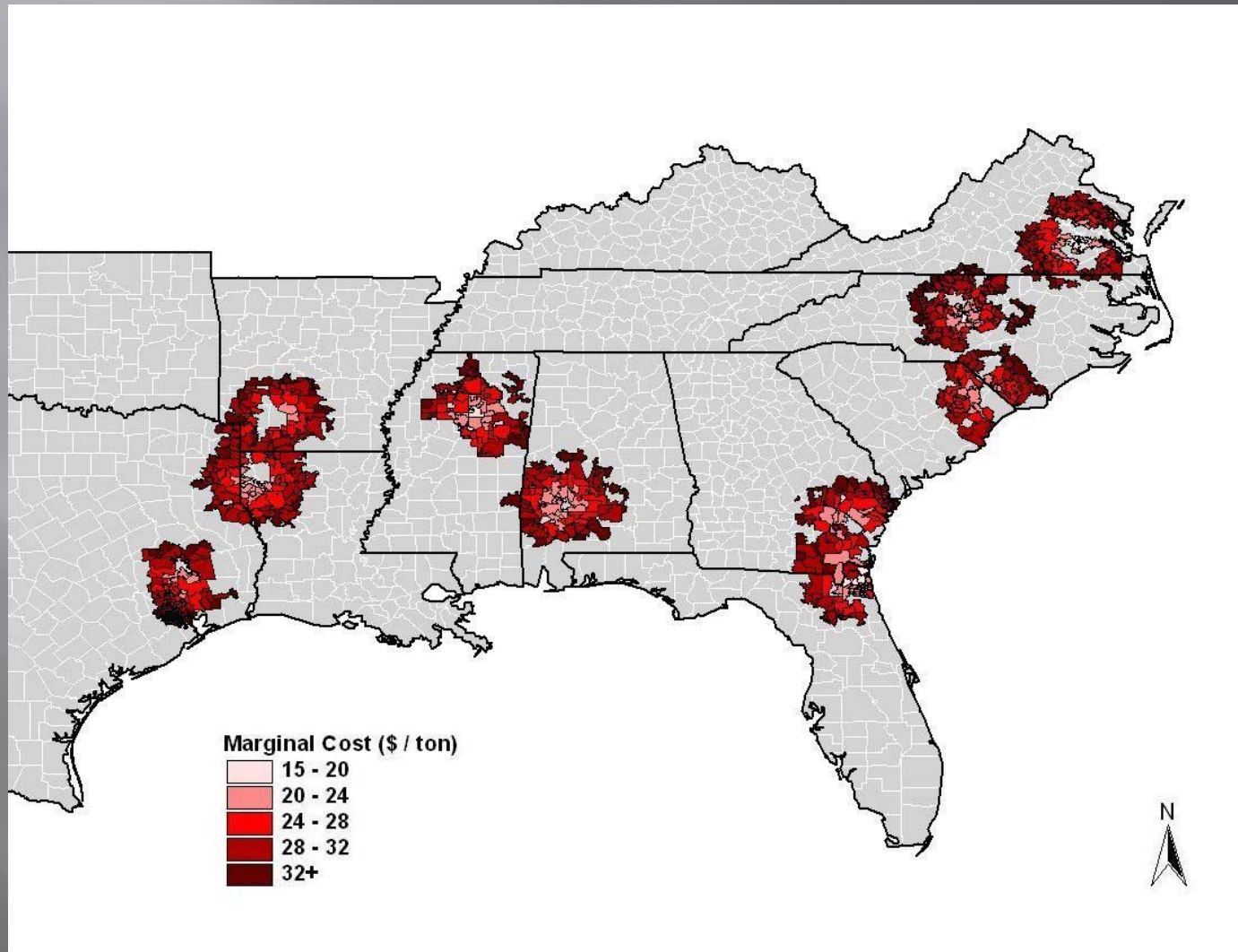
➤ Logging Residue Costs
(at-landing, in-woods)

Auburn Harvest Analyzer (AHA)

- Pulpwood Costs
- Sawtimber Costs
- Thinning Costs

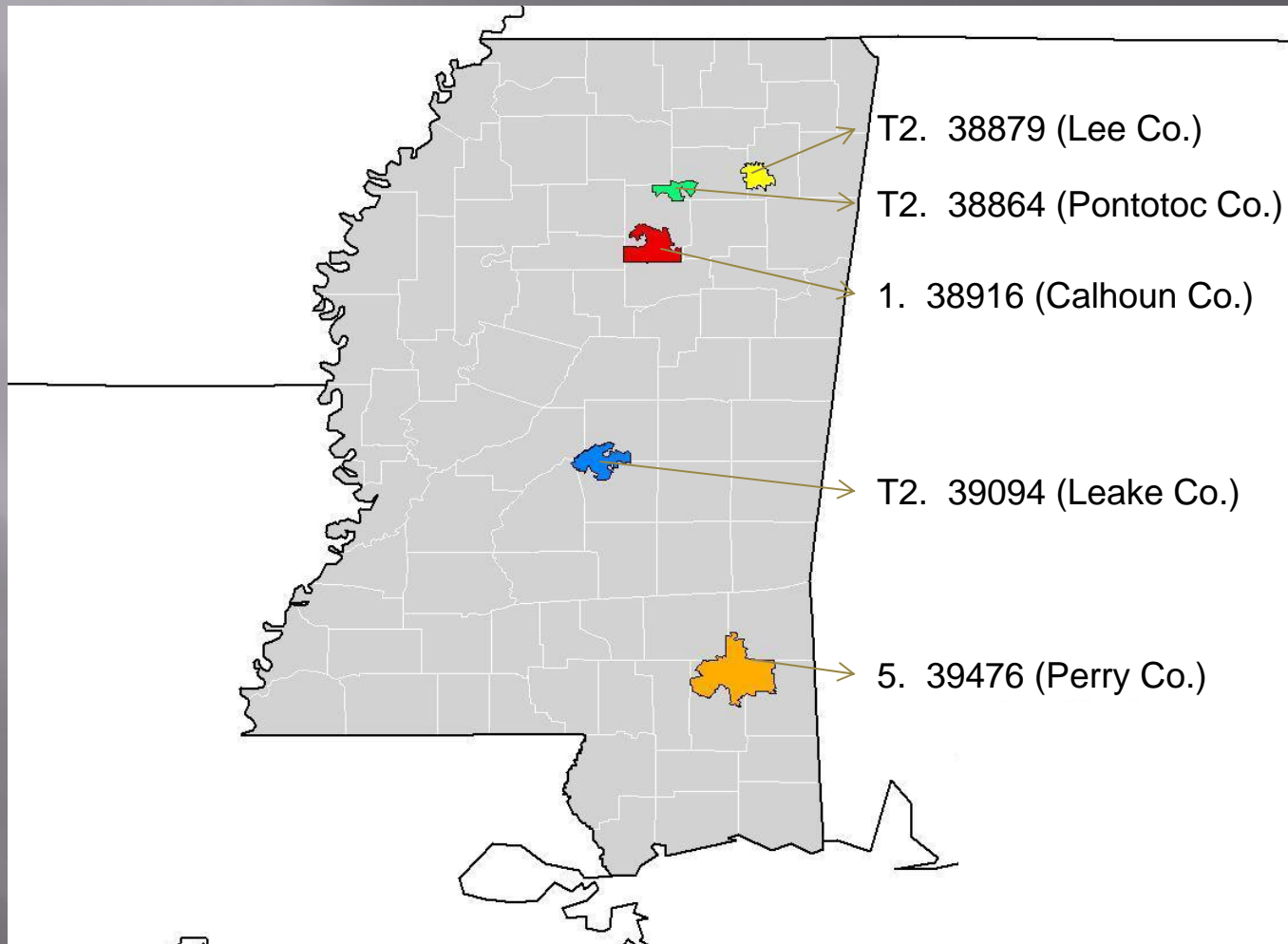
RESULTS

LOW COST BIOSHEDS FOR 11 SOUTHERN STATE
(MILL RESIDUES \leq 1.5 M DRY TONS / YEAR)



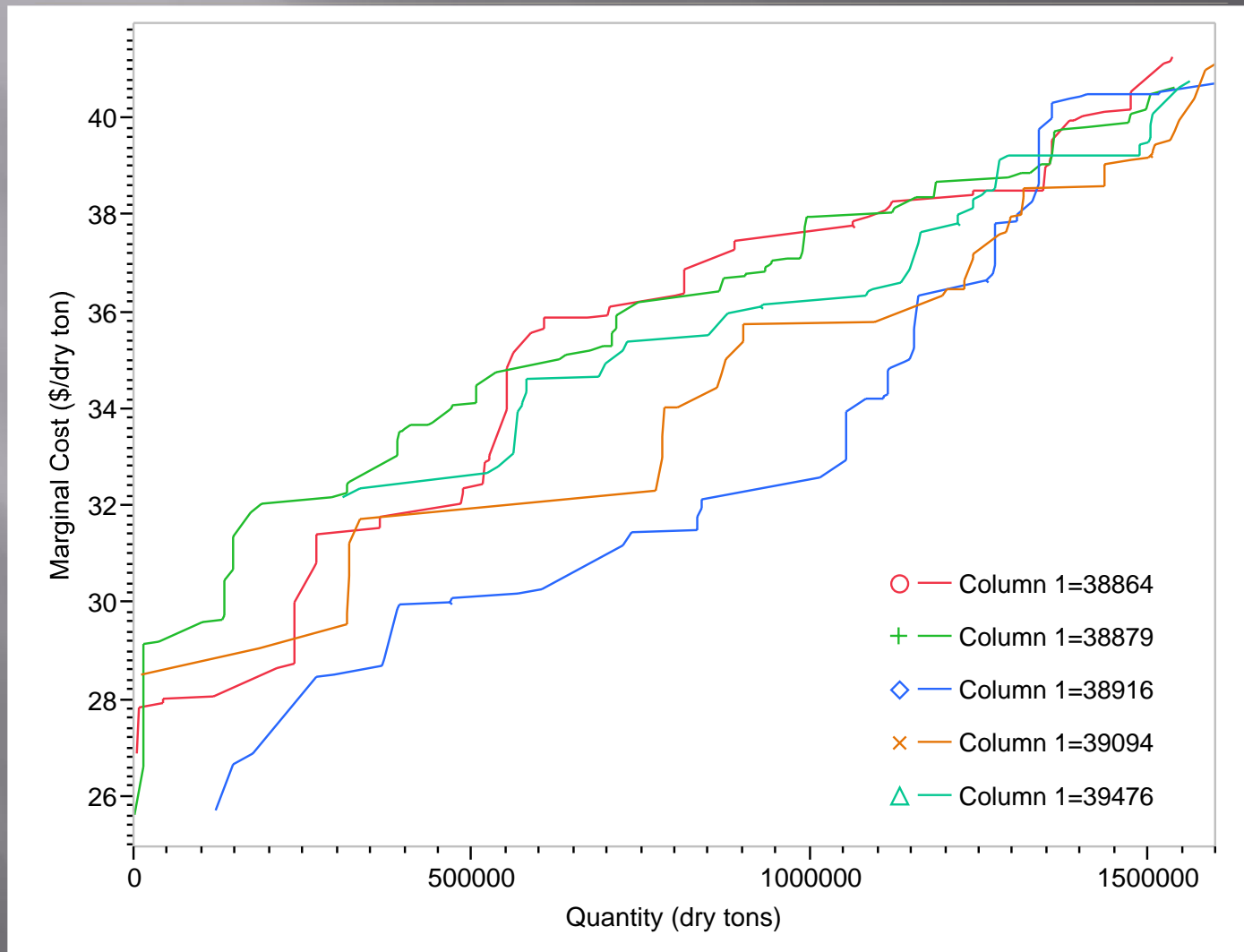
RESULTS

MS – Top Five Demand ZCTAs for Mill Residues
(≤ 1.5 M Dry Tons per Year)



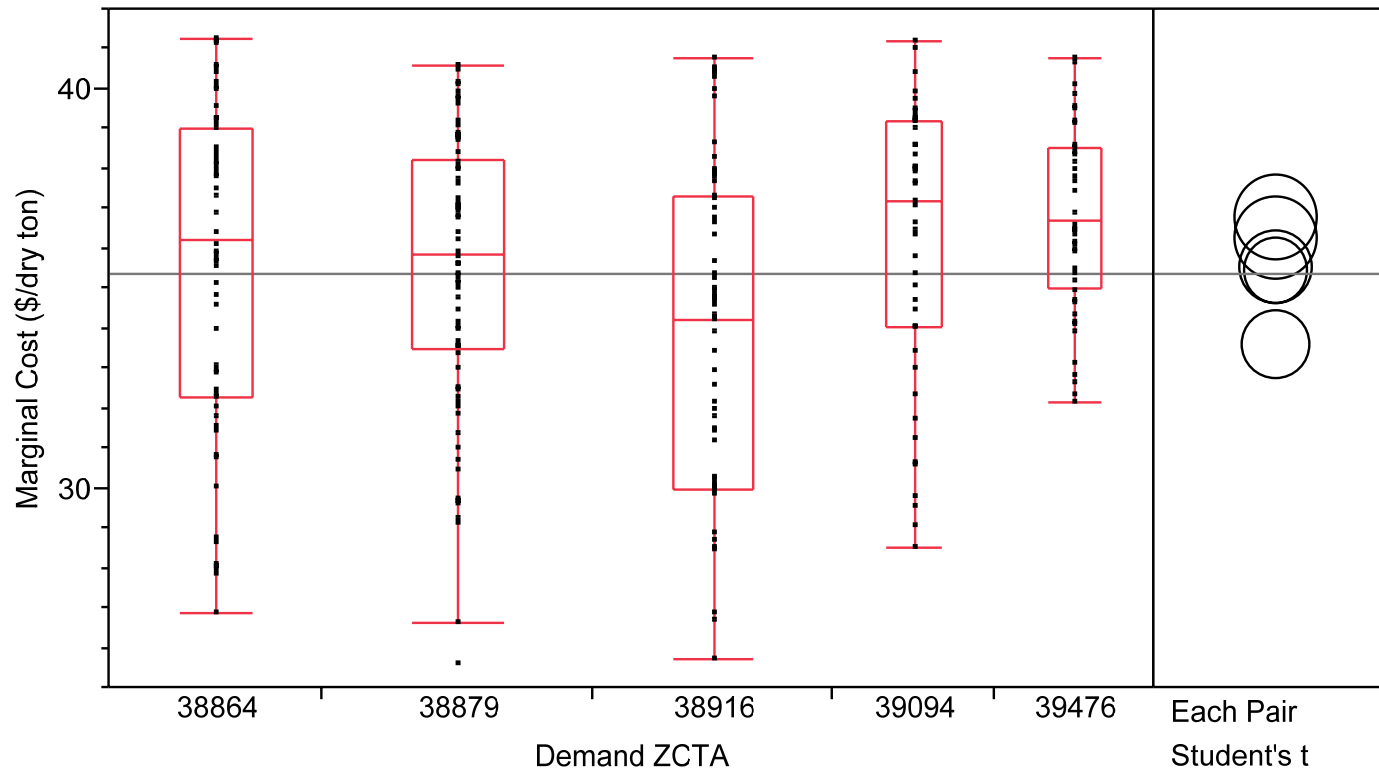
RESULTS

MS - Top Five Demand ZCTAs MC Curves (≤ 1.5 M Dry Tons per Year)



RESULTS

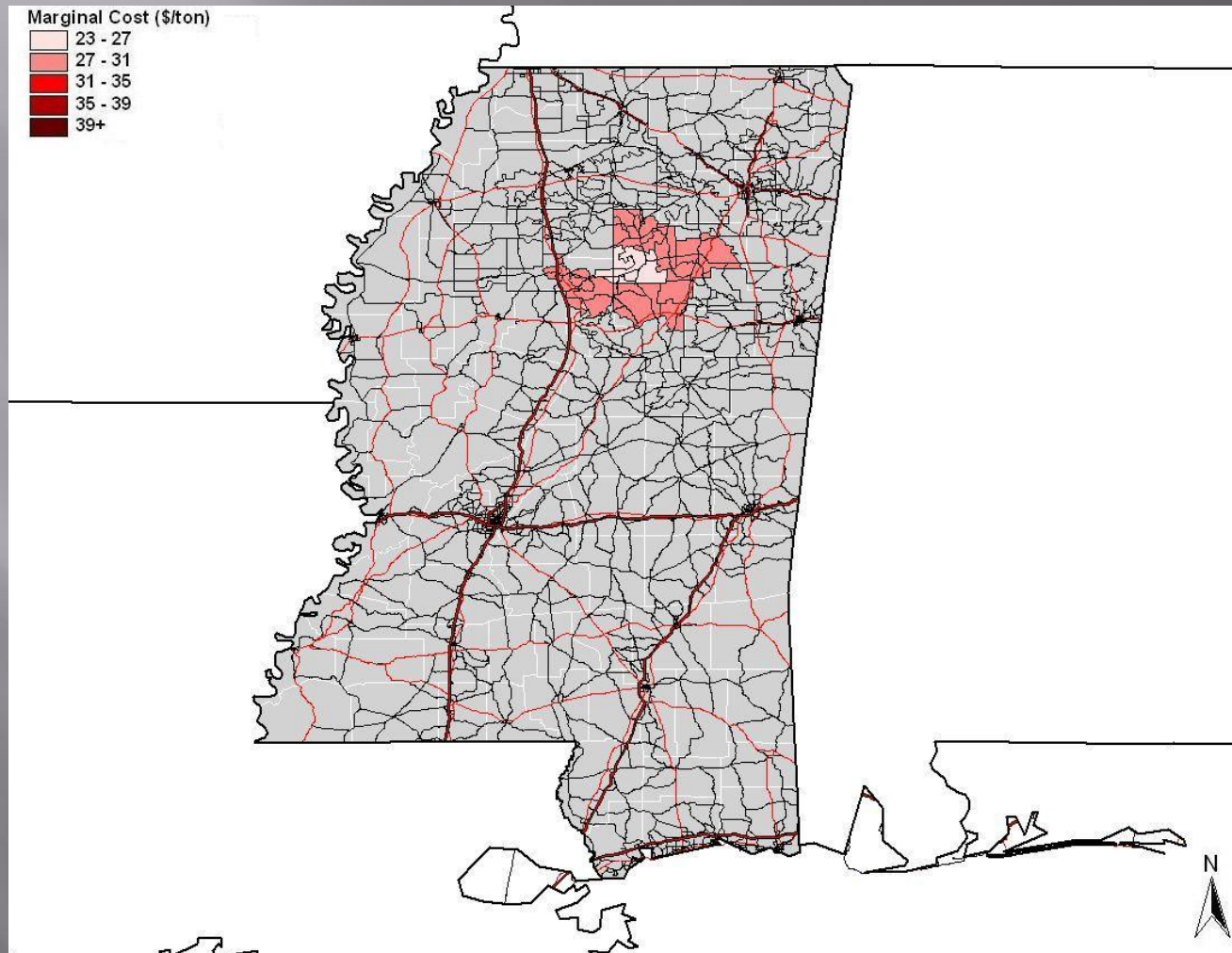
MS - Top Five Demand ZCTAs MC Curves (≤ 1.5 M Dry Tons per Year)



Level	Mean
39476 A	36.815208
39094 A B	36.285510
38864 A B	35.544375
38879 B	35.483049
38916 C	33.635556

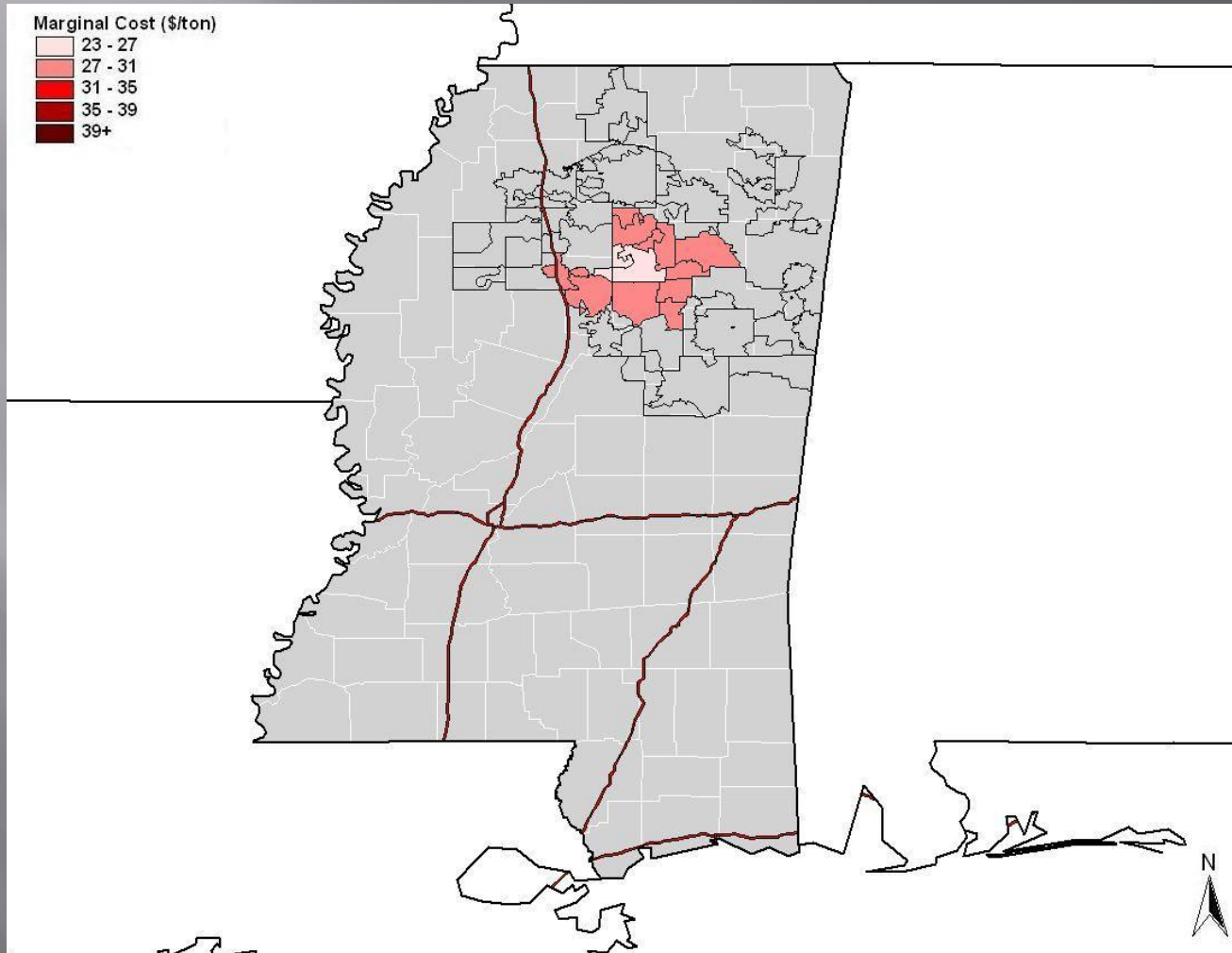
RESULTS

DEMAND ZCTA 38916 (CALHOUN CO.)



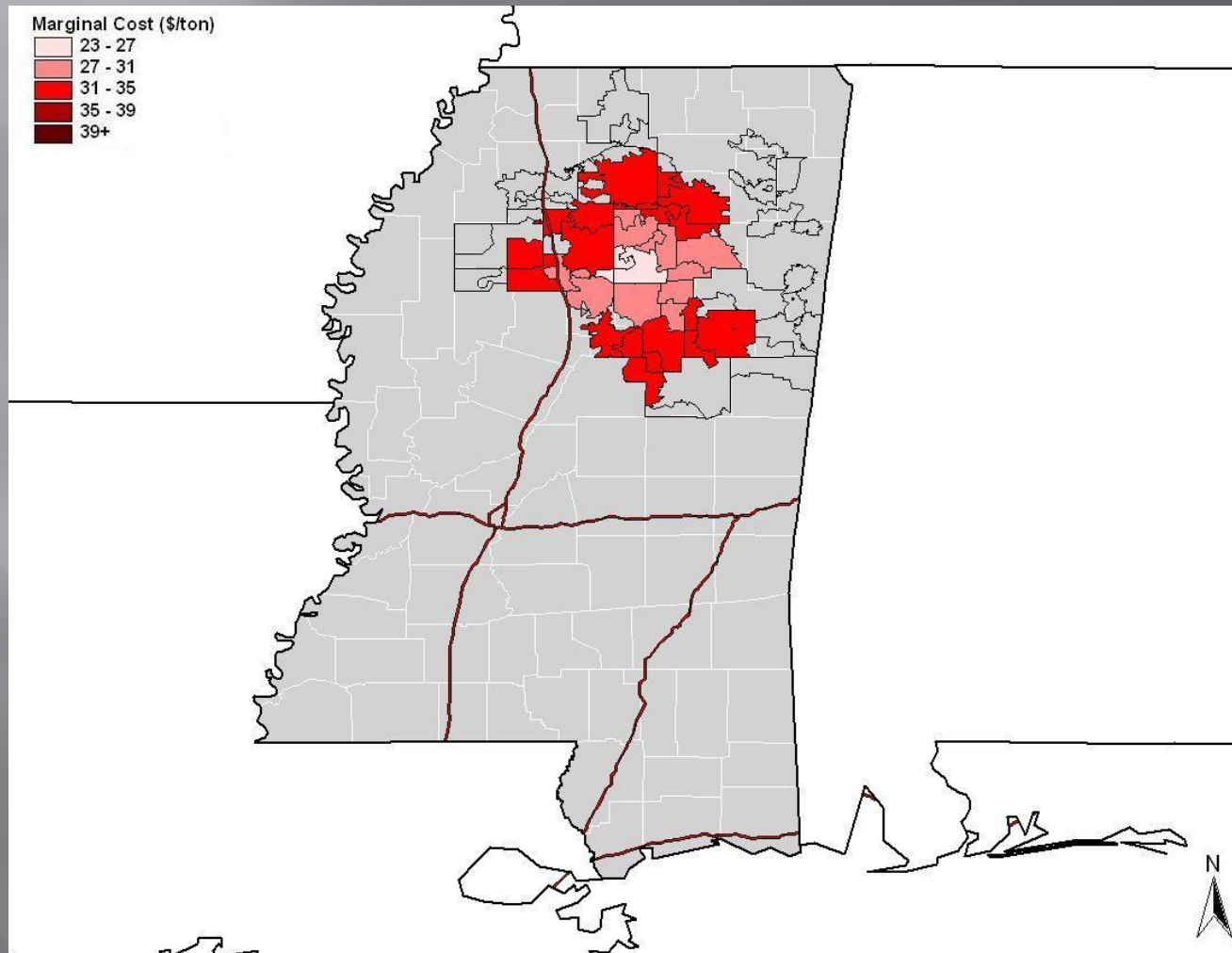
RESULTS

DEMAND ZCTA 38916 (CALHOUN CO.)



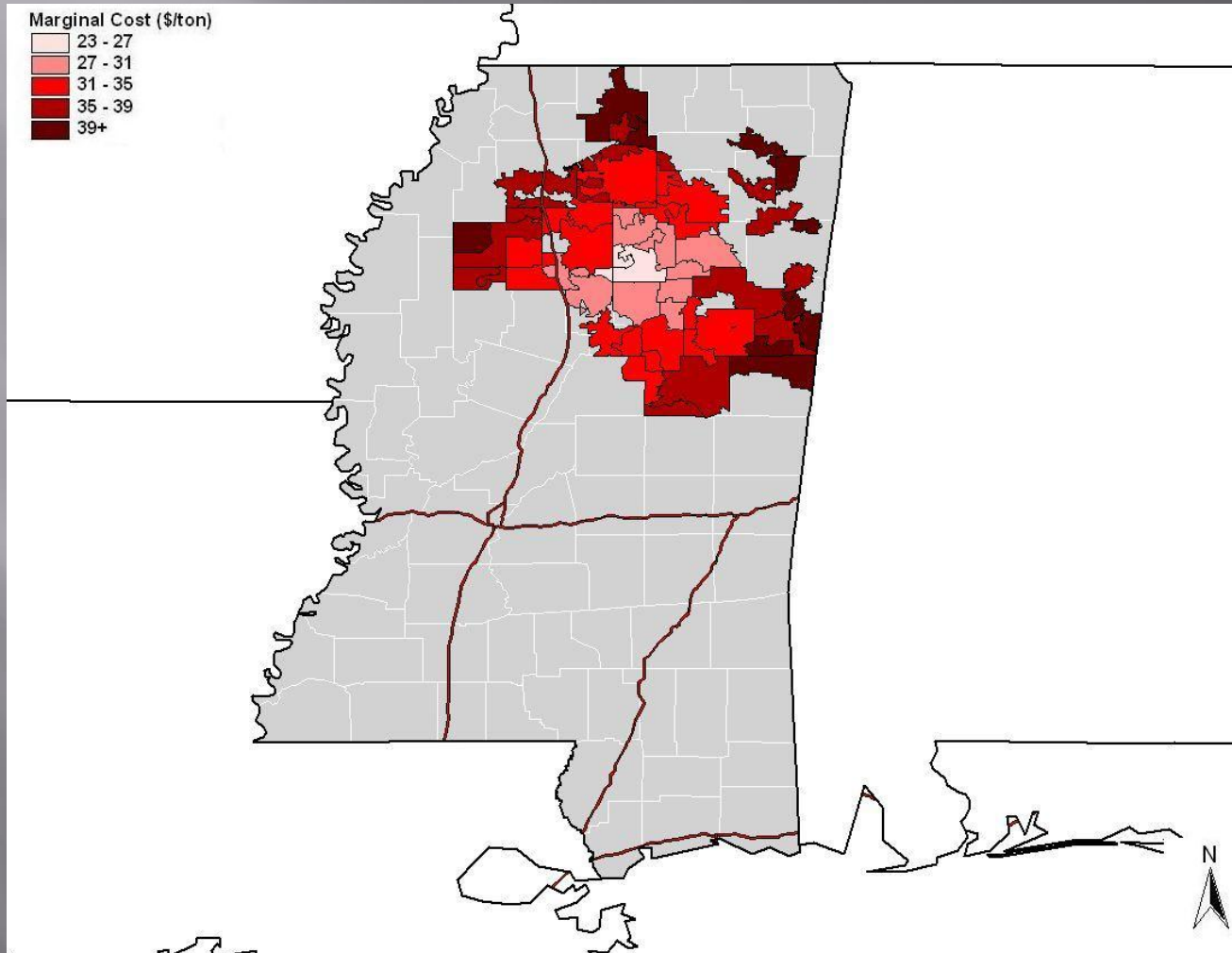
RESULTS

DEMAND ZCTA 38916 (CALHOUN CO.)



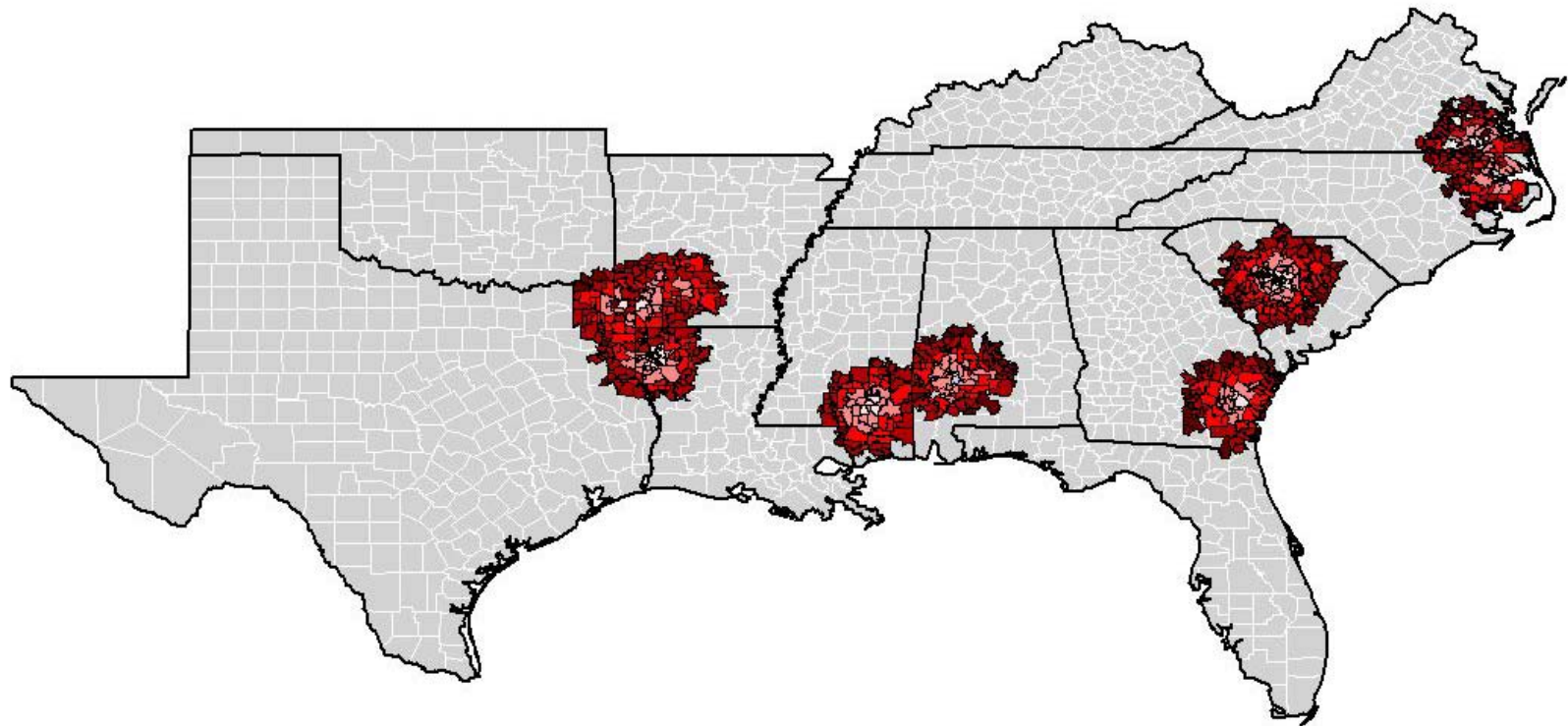
RESULTS

DEMAND ZCTA 38916 (CALHOUN CO.)



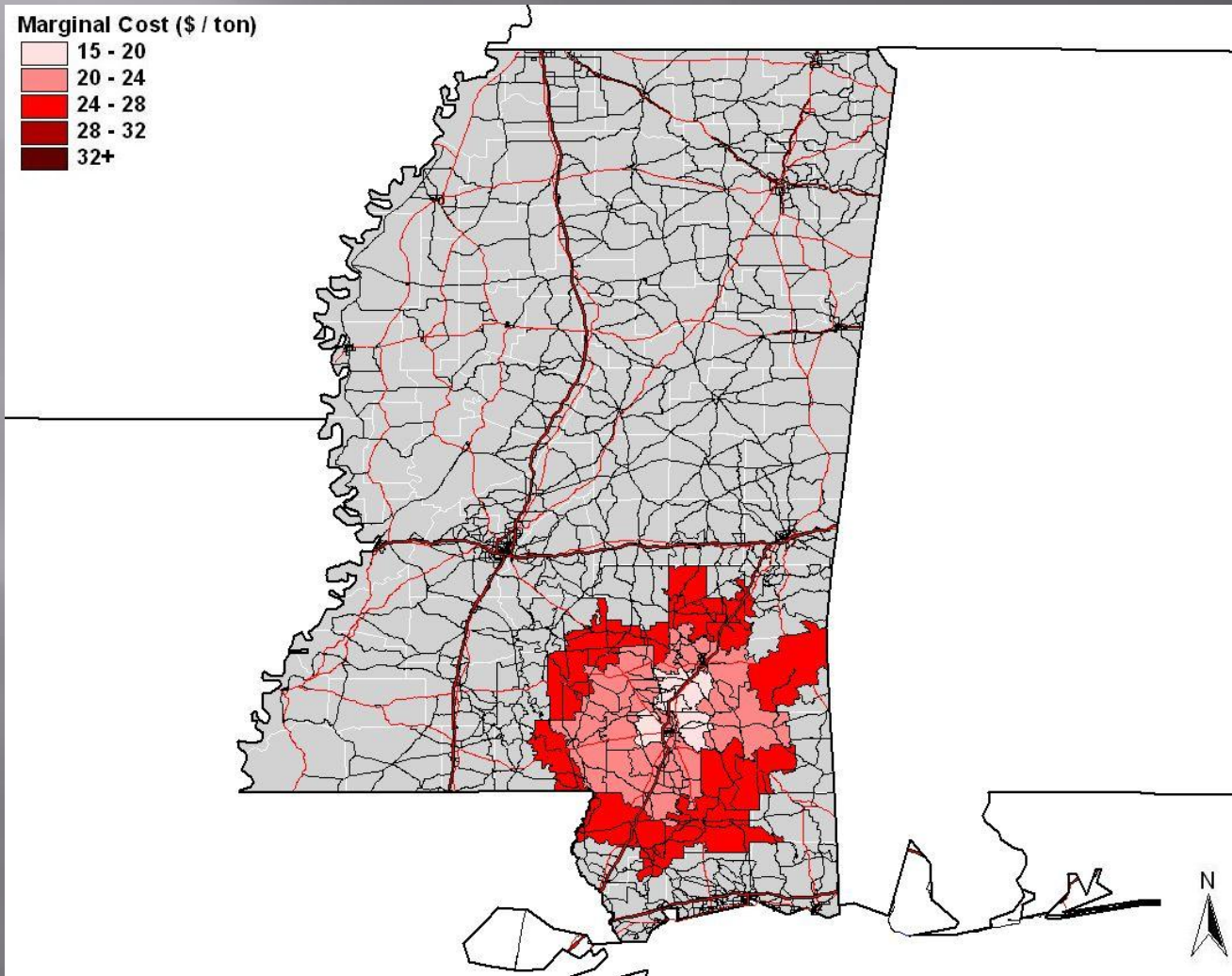
RESULTS

Low cost biosheds for 9 southern state
(Logging residues “at-landing” ≤ 1.5 M Dry tons / year)



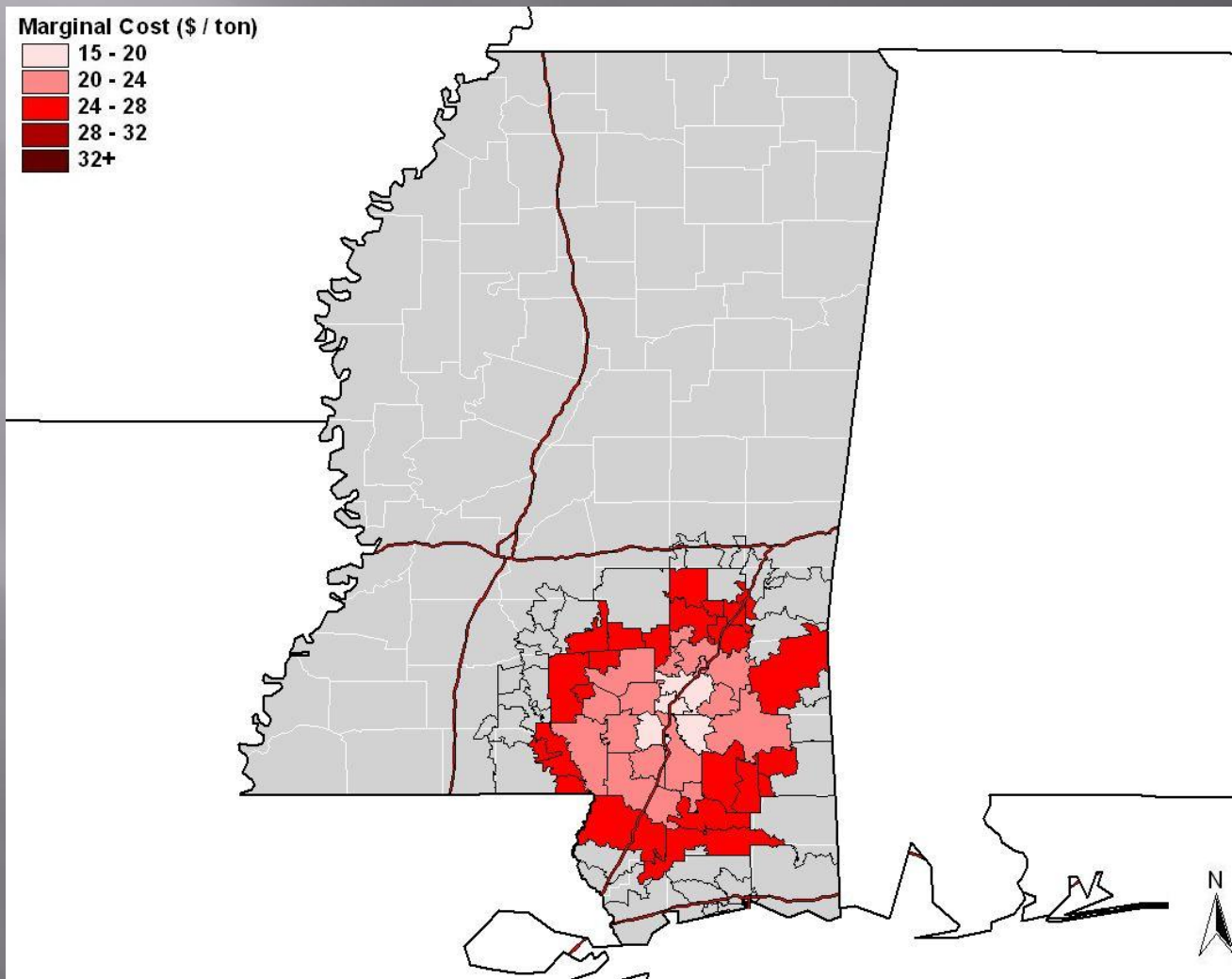
RESULTS

MS – Least Cost Logging Residue (“at-landing”) Bioshed
(≤ 1.5 M Dry Tons per Year)



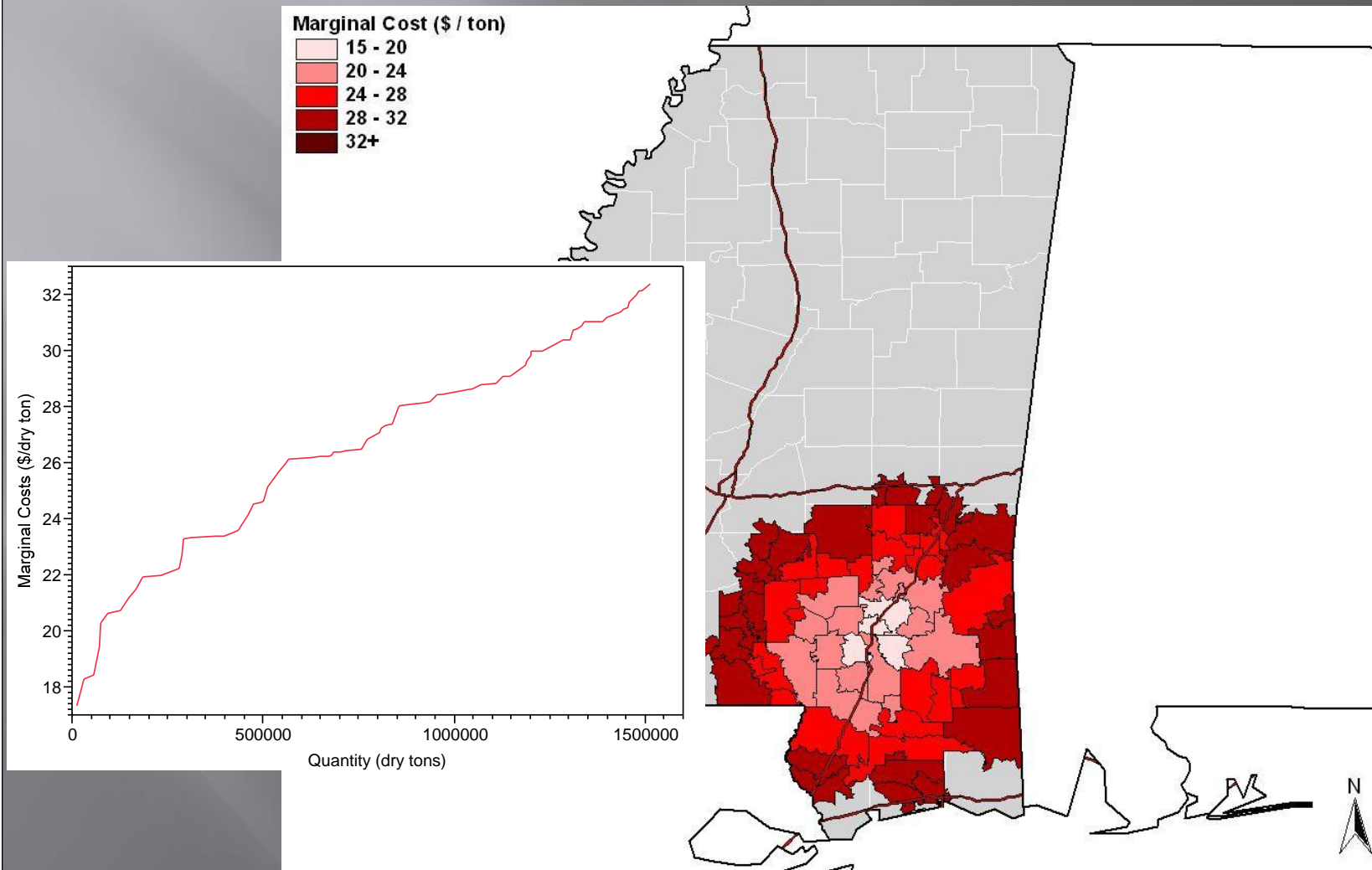
RESULTS

MS – Least Cost Logging Residue (“at-landing”) Bioshed
(≤ 1.5 M Dry Tons per Year)



RESULTS

MS – Least Cost Logging Residue (“at-landing”) Bioshed
(≤ 1.5 M Dry Tons per Year)



www.BioSAT.net

RESULTS

The screenshot shows a Windows Internet Explorer browser window displaying the BioSAT website. The browser's address bar shows the URL <http://www.biosat.net/>. The website's header features the BioSAT logo with the tagline "Making Innovation Work" and a background image of a road and a compass. Below the header is a navigation menu with buttons for "BioSAT Log in", "BioSAT Home", "BioSAT Fundamentals", "Biomass Sources", "Logistics", "BioSAT Guide", "BioSAT Dashboard", and "Contact Us". A vertical sidebar on the left contains a list of links: "Fact Sheets", "Publications", "Presentations", "Toolset", "Research Links", "Glossary", "Images", "Our Progress", "Collaborators", and "Restricted Files". The main content area displays a "Welcome to BioSAT" message. Below this is a featured announcement for the "Southern Growth Policies Board presents The Future of Southern Energy 2009 Innovator Award Winner" with a Tennessee state logo. The announcement also mentions the "BioSAT Web System" and lists its partners: "U.S. Forest Service, Southern Research Station and the Southeastern Sun Grant Center at the University of Tennessee". A paragraph below describes the board's mission: "The Southern Growth Policies Board develops and advances visionary economic development policies by providing a forum for partnership and dialog among cross-section of the region's governors, legislators, business and academic". At the bottom left, contact information for James H. Perdue is provided: "For more information: James H. Perdue 865 946 1123". The browser's status bar at the bottom shows "Internet" and "100%" zoom.

BioSAT - Windows Internet Explorer

http://www.biosat.net/

File Edit View Favorites Tools Help

Convert Select

Google Search Bookmarks Check AutoFill Sign In

Favorites Suggested Sites Free Hotmail Web Slice Gallery

BioSAT Google

Page Safety Tools

BioSAT
Making Innovation Work

BioSAT Log in BioSAT Home BioSAT Fundamentals Biomass Sources Logistics BioSAT Guide BioSAT Dashboard Contact Us

Fact Sheets
Publications
Presentations
Toolset
Research Links
Glossary
Images
Our Progress
Collaborators
Restricted Files

Welcome to BioSAT

*Southern Growth Policies Board presents
The Future of Southern Energy
2009 Innovator Award Winner*

BioSAT Web System
*U.S. Forest Service, Southern Research Station and the Southeastern
Sun Grant Center at the University of Tennessee*

The Southern Growth Policies Board develops and advances visionary economic development policies by providing a forum for partnership and dialog among cross-section of the region's governors, legislators, business and academic

For more information:
James H. Perdue
865 946 1123

Internet 100%

www.BioSAT.net

RESULTS

BioSAT - Windows Internet Explorer

http://www.biosat.net/

File Edit View Favorites Tools Help

Convert Select

Google Search Bookmarks Check AutoFill Sign In

Favorites Suggested Sites Free Hotmail Web Slice Gallery

BioSAT Google

Page Safety Tools

BioSAT
Making Innovation Work

BioSAT Log in BioSAT Home BioSAT Fundamentals Biomass Sources Logistics BioSAT Guide BioSAT Dashboard Contact Us

Fact Sheets
Publications
Presentations
Toolset
Research Links
Glossary
Images
Our Progress
Collaborators
Restricted Files

Supply Chain
Trucking
Rail
Fuel
Toolset
BioSAT Dashboard

Welcome to BioSAT

Southern Growth Policies Board presents
The Future of Southern Energy
2009 Innovator Award Winner

Tennessee

BioSAT Web System
U.S. Forest Service, Southern Research Station and the Southeastern Sun Grant Center at the University of Tennessee

The Southern Growth Policies Board develops and advances visionary economic development policies by providing a forum for partnership and dialog among cross-section of the region's governors, legislators, business and academic

For more information:
James H. Perdue
865 846 1123

http://www.biosat.net/ Internet 100%

www.BioSAT.net

RESULTS

BioSAT - Windows Internet Explorer

http://www.biosat.info/Analysis/OneZCTA.aspx

File Edit View Favorites Tools Help

Convert Select

Google Search Bookmarks Check AutoFill Sign In

Favorites Suggested Sites Free Hotmail Web Slice Gallery

BioSAT

Home Page Safety Tools



BioSAT Log in BioSAT Home BioSAT Fundamentals Biomass Sources Logistics BioSAT Guide BioSAT Dashboard Contact Us

Marginal Cost Analysis for one Zip Code Tabulation Area (ZCTA)

Zip Code:

Biomass Type: Logging Residues (At Landing, Hardwood) ▾

Travel Distance: 40 Miles ▾ (one way)

Internet 100%

www.BioSAT.net

RESULTS

BioSAT - Windows Internet Explorer

http://www.biosat.info/Analysis/OneZCTA.aspx

File Edit View Favorites Tools Help

Convert Select

Google Search

Sign In

BioSAT Log in BioSAT Home BioS Fundam

Guide BioSAT Dashboard Contact Us

Marginal Cost Analysis for BioSAT

ion Area (ZCTA)

Zip Code: _____

Biomass Type:

Travel Distance: (one way)

- Logging Residues (At Landing, Hardwood)
- Logging Residues (At Landing, Softwood)
- Logging Residues (At Landing, Total)
- Logging Residues (In Woods, Hardwood)
- Logging Residues (In Woods, Softwood)
- Logging Residues (In Woods, Total)
- Other Removals (Hardwood)
- Other Removals (Softwood)
- Other Removals (Total)
- Thinning 40
- Thinning 80
- Thinning 120
- Thinning 160
- Thinning 200
- Total Mill Residues
- Unused Mill Residues
- Urban Waste
- Mill Residues (Clean, Softwood)
- Mill Residues (Unclean, Softwood)
- Mill Residues (Clean, Total)
- Mill Residues (Clean, Hardwood)
- Mill Residues (Unclean, Hardwood)
- Mill Residues (Unclean, Total)
- Total Logging Residues

Internet 100%

www.BioSAT.net

RESULTS

BioSAT - Windows Internet Explorer

http://www.biosat.info/Analysis/OneZCTA.aspx

File Edit View Favorites Tools Help

Convert Select

Google Search

Bookmarks Check AutoFill Sign In

Favorites Suggested Sites Free Hotmail Web Slice Gallery

BioSAT BioSAT

Distance below shows Round Trip Distance.

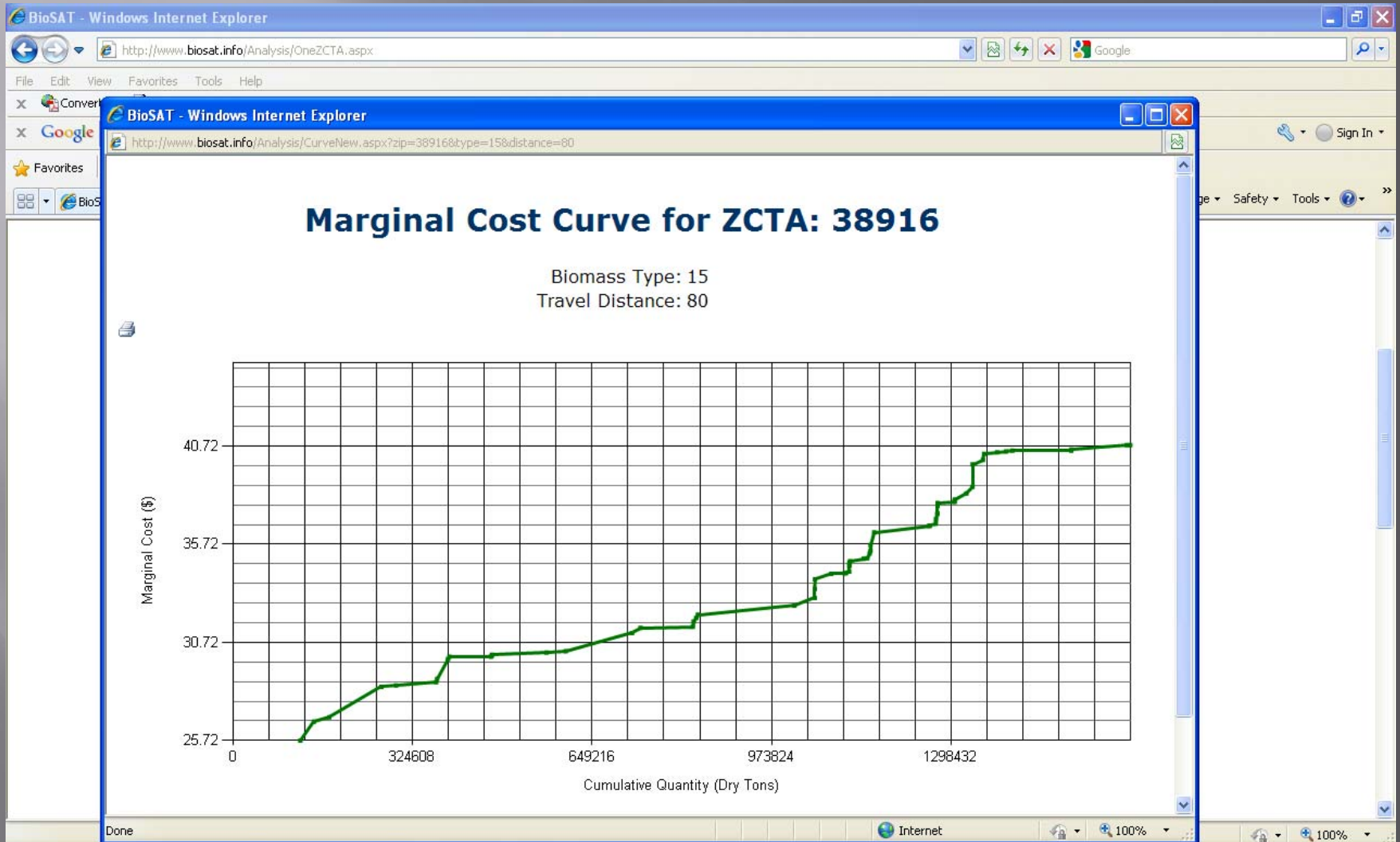
ZCTA	Quantity	Distance	Resource Cost	Trucking Cost	Harvesting Cost	Total Cost	Cumulative Qty	Marginal Cost
38916	121369.40	15.640	21.10	4.62	0.00	3121620.97	121369.40	25.72
38929	24570.50	23.660	21.10	5.58	0.00	655540.94	145939.90	26.68
38914	27583.40	23.340	21.10	5.80	0.00	741993.46	173523.30	26.90
38915	94393.50	39.900	21.10	7.36	0.00	2686439.01	267916.80	28.46
38951	26620.70	40.480	21.10	7.43	0.00	759488.57	294537.50	28.53
38878	72508.80	42.060	21.10	7.59	0.00	2080277.47	367046.30	28.69
39744	1736.90	40.940	21.10	7.76	0.00	50126.93	368783.20	28.86
39752	19622.40	51.040	21.10	8.77	0.00	586121.09	388405.60	29.87
39776	2585.50	53.980	21.10	8.89	0.00	77539.15	390991.10	29.99
38925	75200.50	50.920	21.10	8.90	0.00	2256015.00	466191.60	30.00
38851	1498.50	53.660	21.10	8.93	0.00	44999.96	467690.10	30.03
39751	446.90	54.240	21.10	8.99	0.00	13447.22	468137.00	30.09
38901	98860.70	55.920	21.10	9.10	0.00	2985593.14	566997.70	30.20
38913	34572.20	56.500	21.10	9.18	0.00	1046846.22	601569.90	30.28
39735	119850.90	65.260	21.10	10.10	0.00	3739348.08	721420.80	31.20
38864	15268.70	67.000	21.10	10.36	0.00	480353.30	736689.50	31.46
38922	94633.60	66.480	21.10	10.42	0.00	2982851.07	831323.10	31.52
39750	1356.80	68.740	21.10	10.68	0.00	43119.10	832679.90	31.78
38949	4829.90	70.320	21.10	10.87	0.00	154411.90	837509.80	31.97
38850	2795.80	74.760	21.10	11.04	0.00	89857.01	840305.60	32.14
38940	174953.20	77.700	21.10	11.49	0.00	5701724.79	1015258.80	32.59

Done

Internet 100%

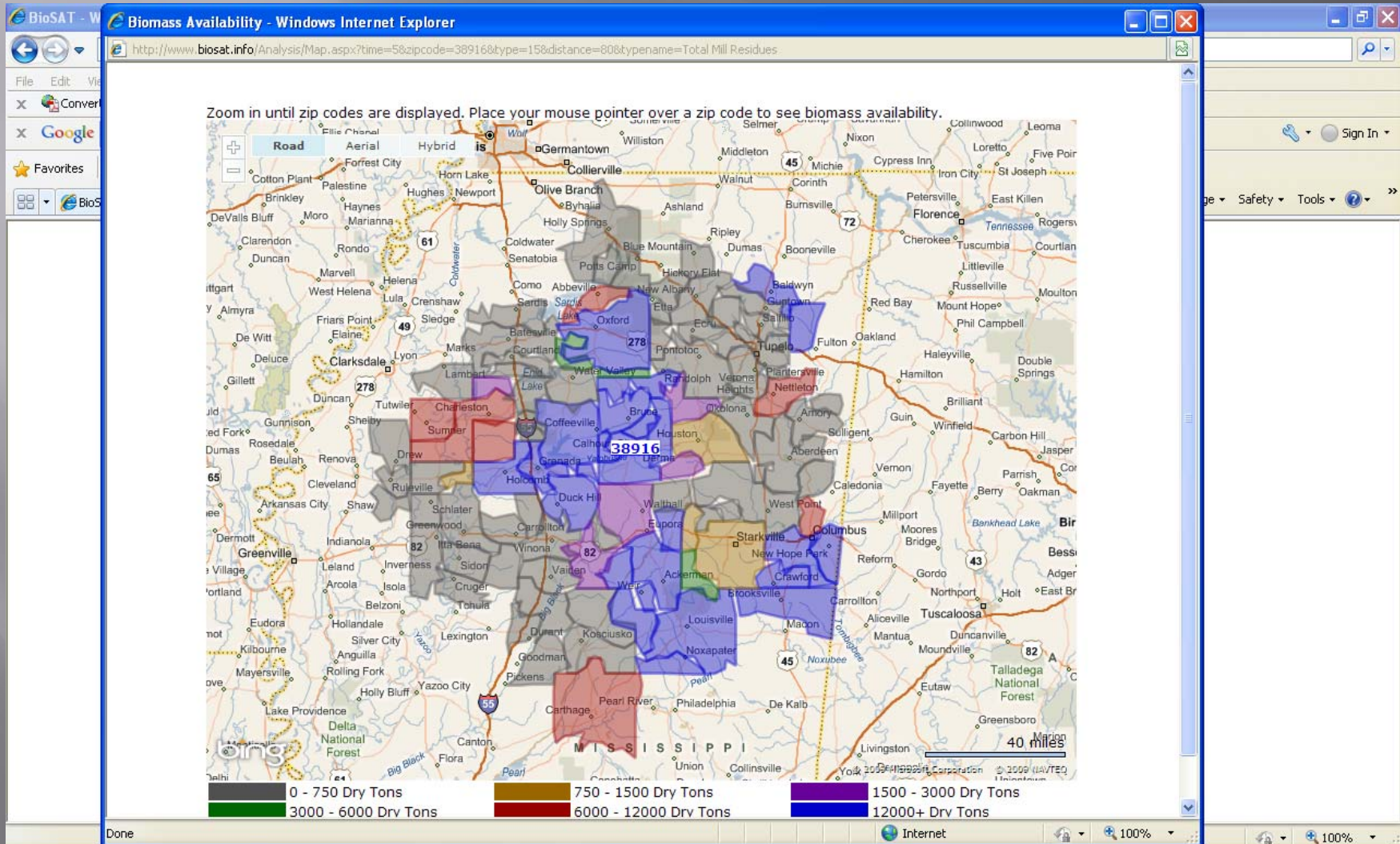
www.BioSAT.net

RESULTS



www.BioSAT.net

RESULTS



www.BioSAT.net

RESULTS

BioSAT - Windows Internet Explorer

http://www.biosat.info/Analysis/SouthernStatesNew.aspx

File Edit View Favorites Tools Help


Convert Select

Google Search Bookmarks Check AutoFill Sign In

Favorites Suggested Sites Free Hotmail Web Slice Gallery

BioSAT BioSAT

Page Safety Tools



BioSAT
Making Innovation Work

BioSAT Log in BioSAT Home BioSAT Fundamentals Biomass Sources Logistics BioSAT Guide BioSAT Dashboard Contact Us

Biomass Type
Total Mill Residues

Travel Distance
40 Miles

Transportation
Truck - Dry Van

Biomass Supply Quantity
1.5 Million Ton/Year

States

<input type="checkbox"/> Alabama	<input type="checkbox"/> Maine	<input type="checkbox"/> Ohio
<input type="checkbox"/> Arkansas	<input type="checkbox"/> Maryland	<input type="checkbox"/> Oklahoma
<input type="checkbox"/> Connecticut	<input type="checkbox"/> Massachusetts	<input type="checkbox"/> Pennsylvania
<input type="checkbox"/> Delaware	<input type="checkbox"/> Michigan	<input type="checkbox"/> Rhode Island
<input type="checkbox"/> Florida	<input type="checkbox"/> Minnesota	<input type="checkbox"/> South Carolina
<input type="checkbox"/> Georgia	<input checked="" type="checkbox"/> Mississippi	<input type="checkbox"/> Tennessee
<input type="checkbox"/> Illinois	<input type="checkbox"/> Missouri	<input type="checkbox"/> Texas
<input type="checkbox"/> Indiana	<input type="checkbox"/> New Hampshire	<input type="checkbox"/> Vermont
<input type="checkbox"/> Iowa	<input type="checkbox"/> New Jersey	<input type="checkbox"/> Virginia
<input type="checkbox"/> Kentucky	<input type="checkbox"/> New York	<input type="checkbox"/> West Virginia
<input type="checkbox"/> Louisiana	<input type="checkbox"/> North Carolina	<input type="checkbox"/> Wisconsin

Run Reset

Done Internet 100%

www.BioSAT.net

RESULTS

BioSAT - Windows Internet Explorer

http://www.biosat.info/Analysis/SouthernStatesNew.aspx

File Edit View Favorites Tools Help

Convert Select

Google Search Bookmarks Check AutoFill Sign In

Favorites Suggested Sites Free Hotmail Web Slice Gallery

BioSAT BioSAT

BioSAT
Making Innovation Work

BioSAT Log in BioSAT Home BioSAT Fundamentals Biomass Sources Logistics BioSAT Guide BioSAT Dashboard Contact Us

Biomass Type
Total Mill Residues
Total Mill Residues
Total Logging Residues
Logging Residues (At Landing, Hardwood)
Logging Residues (At Landing, Softwood)
Logging Residues (In Woods, Hardwood)
Logging Residues (In Woods, Softwood)
Urban Waste
Mill Residues (Clean, Softwood)
Mill Residues (Unclean, Softwood)
Mill Residues (Clean, Hardwood)
Mill Residues (Unclean, Hardwood)

Travel Distance
80 Miles

Transportation
Truck - Dry Van

Biomass Supply Quantity
1.5 Million Ton/Year

Maine Ohio
 Maryland Oklahoma
 Massachusetts Pennsylvania
 Michigan Rhode Island
 Minnesota South Carolina
 Mississippi Tennessee
 Missouri Texas
 New Hampshire Vermont
 New Jersey Virginia
 New York West Virginia
 North Carolina Wisconsin

Run Reset

Select a format Export

Internet 100%

www.BioSAT.net

RESULTS

BioSAT - Windows Internet Explorer

http://www.biosat.info/Analysis/SouthernStatesNew.aspx

File Edit View Favorites Tools Help

Convert Select

Google Search Bookmarks Check AutoFill Sign In

Favorites Suggested Sites Free Hotmail Web Slice Gallery

BioSAT BioSAT

BioSAT
Making Innovation Work

BioSAT Log in BioSAT Home BioSAT Fundamentals Biomass Sources Logistics BioSAT Guide BioSAT Dashboard Contact Us

Biomass Type
Total Mill Residues

Travel Distance
80 Miles

Transportation
Truck - Dry Van

Biomass Supply Quantity
1.5 Million Ton/Year

States

<input type="checkbox"/> Alabama	<input type="checkbox"/> Maryland	<input type="checkbox"/> Ohio
<input type="checkbox"/> Arkansas	<input type="checkbox"/> Massachusetts	<input type="checkbox"/> Oklahoma
<input type="checkbox"/> Connecticut	<input type="checkbox"/> Michigan	<input type="checkbox"/> Pennsylvania
<input type="checkbox"/> Delaware	<input type="checkbox"/> Minnesota	<input type="checkbox"/> Rhode Island
<input type="checkbox"/> Florida	<input type="checkbox"/> Missouri	<input type="checkbox"/> South Carolina
<input type="checkbox"/> Georgia	<input checked="" type="checkbox"/> Mississippi	<input type="checkbox"/> Tennessee
<input type="checkbox"/> Illinois	<input type="checkbox"/> New Hampshire	<input type="checkbox"/> Texas
<input type="checkbox"/> Indiana	<input type="checkbox"/> New Jersey	<input type="checkbox"/> Vermont
<input type="checkbox"/> Iowa	<input type="checkbox"/> New York	<input type="checkbox"/> Virginia
<input type="checkbox"/> Kentucky	<input type="checkbox"/> North Carolina	<input type="checkbox"/> West Virginia
<input type="checkbox"/> Louisiana		<input type="checkbox"/> Wisconsin

Run Reset

Select a format Export

Internet 100%

www.BioSAT.net

RESULTS

BioSAT - Windows Internet Explorer

http://www.biosat.info/Analysis/SouthernStatesNew.aspx

File Edit View Favorites Tools Help

Convert Select

Google Search Bookmarks Check AutoFill Sign In

Favorites Suggested Sites Free Hotmail Web Slice Gallery

BioSAT BioSAT

BioSAT
Making Innovation Work

BioSAT Log in BioSAT Home BioSAT Fundamentals Biomass Sources Logistics BioSAT Guide BioSAT Dashboard Contact Us

Biomass Type
Total Mill Residues

Travel Distance
80 Miles

Transportation
Truck - Dry Van

Biomass Supply Quantity
1.5 Million Ton/Year
1.5 Million Ton/Year
1.0 Million Ton/Year
0.5 Million Ton/Year

States

<input type="checkbox"/> Alabama	<input type="checkbox"/> Maine	<input type="checkbox"/> Ohio
<input type="checkbox"/> Arkansas	<input type="checkbox"/> Maryland	<input type="checkbox"/> Oklahoma
<input type="checkbox"/> Connecticut	<input type="checkbox"/> Massachusetts	<input type="checkbox"/> Pennsylvania
<input type="checkbox"/> Delaware	<input type="checkbox"/> Michigan	<input type="checkbox"/> Rhode Island
<input type="checkbox"/> Florida	<input type="checkbox"/> Minnesota	<input type="checkbox"/> South Carolina
<input type="checkbox"/> Georgia	<input checked="" type="checkbox"/> Mississippi	<input type="checkbox"/> Tennessee
<input type="checkbox"/> Illinois	<input type="checkbox"/> Missouri	<input type="checkbox"/> Texas
<input type="checkbox"/> Indiana	<input type="checkbox"/> New Hampshire	<input type="checkbox"/> Vermont
<input type="checkbox"/> Iowa	<input type="checkbox"/> New Jersey	<input type="checkbox"/> Virginia
<input type="checkbox"/> Kentucky	<input type="checkbox"/> New York	<input type="checkbox"/> West Virginia
<input type="checkbox"/> Louisiana	<input type="checkbox"/> North Carolina	<input type="checkbox"/> Wisconsin

Run Reset

Select a format Export

Internet 100%

www.BioSAT.net

RESULTS

BioSAT - Windows Internet Explorer

http://www.biosat.info/Analysis/SouthernStatesNew.aspx

File Edit View Favorites Tools Help

Convert Select

Google Search

Bookmarks Check AutoFill Sign In

Favorites Suggested Sites Free Hotmail Web Slice Gallery

BioSAT BioSAT

Run Reset

Select a format Export

Report Formats	Total Cost	Marginal Total Cost	State	County
7	35.2444	40.5000	MS	Calhoun
2	36.4564	39.5000	MS	Perry
39079	54352304.35	36.5502	40.5000	MS Lee
38864	54977527.55	35.5652	41.1200	MS Pontotoc
39094	55166272.54	36.7523	39.1900	MS Leake
39457	55408137.18	36.7130	39.9800	MS Pearl River
39072	55711034.16	36.6337	39.7000	MS Madison
39056	55835501.88	36.6541	39.5400	MS Hinds
39451	56243756.66	36.1159	41.1400	MS Greene
38839	56263286.35	36.7428	40.1900	MS Calhoun
39152	57258650.76	35.9284	39.6300	MS Scott
39350	57347098.06	37.9213	39.3600	MS Neshoba
38870	57655921.10	38.2630	40.4400	MS Monroe
39057	57853615.34	37.7709	39.6300	MS Newton
39120	57917779.60	35.9432	40.7500	MS Adams
38801	57995309.01	37.9227	40.1300	MS Lee
38878	59153219.06	35.6914	40.5800	MS Calhoun
39470	59287248.97	38.0989	39.5400	MS Pearl River
39086	59518876.08	36.8210	40.1500	MS Calhoun

Internet 100%

Summary

- www.BioSAT.net version 1.0 provides an economic decision-making framework and tool for identifying least cost woody and ag cellulose demand sites for 33 eastern states
 - mill residues, logging residues, and ag residues
 - resource costs, transportation costs, harvesting costs
- Validation is on-going
- Web-site nears beta-ready

Future Research

- Merchantable wood costing
- Ag cellulose resource database
- Ag cellulose costing
 - Resource, harvest, transport
- Railroad networks and intra-modal transfer points
- Water availability
- Wood using facilities (competition)
- Stochastic-model site selection
- Policy influence
- Sustainability criteria

ACKNOWLEDGEMENTS

- USDA Forest Service Southern Research Station
- USDA Forest Service
 - Dennis Dykstra and Bob Rummer
- US DOT Southeastern Sun Grant Center
- University of Tennessee Office of Bioenergy Programs
 - Sam Jackson, Research Assistant Professor
 - Bob Longmire, Graphic Design
 - Sachiko Hurst, Programmer
- University of Tennessee Agricultural Experiment Station
 - Zhimei Guo, GRA
 - Kerri Norris, Research Associate
 - Christy Pritchard, Research Associate
 - Xu (Nancy) Liu, GRA
 - Yingjin Wang, former GRA
- University of Tennessee College of Business (Frank Guess)
- North Carolina State University (Bob Abt)
- University of Georgia (Dale Greene)

QUESTIONS



BioSAT
Making Innovation Work

