

**Planning for Intermodal Facilities and
Infrastructure Changes to Enhance Traffic Flow in Southern Mississippi**

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Abstract

There has been a sustained growth in population, business and tourism in Mississippi's three southern most counties (Hancock, Harrison, and Jackson). Each of these counties has an active and growing port facility. A major problem facing the ports is the intermodal movement of goods. The sustained growth that the area has seen has resulted in slower movement of traffic especially, in the Gulfport area. The long range potential for the ports is very positive, thus the problems of the movement of goods and people will probably increase in the future if the current infrastructure is not improved. Discussions with port personnel reveal that an intermodal facility would help to improve the movement of goods along the coast.

An objective of this project was to determine potential locations for intermodal facilities in the three Mississippi counties listed above. Consideration was given to the intermodal transfer of goods in all modes of traffic (air, sea, rail and truck). The location of potential facilities was accomplished using Arc GIS and satellite imagery from various sources of the three counties. Layers were developed using data available on urbanized areas, national forest, wildlife management areas and parks. These areas were excluded when considering locations. After visiting intermodal facilities and holding discussions with knowledgeable people, it was determined that the area had to have a minimum of 250 acres to be considered. No cost considerations were given to infrastructure changes that would have to be made to have a facility in each location. The methodology used allows one to simultaneously use multiple layers of digitized data to provide visual images. This methodology allows one to visualize the adequacy of sites fitting predetermined criteria.

Using the methodology developed for this project, 15 potential locations were pinpointed in the three counties. One location was found in Hancock, six in Harrison, and eight in Jackson. Most of the sites are located along I-10 since

the railroad across the Mississippi Gulf Coast may be moved along this corridor. Some of the sites located are near current rail and highway sites. These sites would be helpful if the existing rail facilities were not moved.

Methodology

The methodology for this low level, preliminary research of potential intermodal sites on the Mississippi Gulf Coast followed these steps:

- 1) Obtained remotely sensed imagery.
 - a) Data was obtained from PixSell, Inc., NASA John C. Stennis Space Center.
 - b) Imagery was made by fusing 5-Meter Landsat 7 imagery with 5-Meter panchromatic IRS 1-C Imagery.
 - c) Data was supplied as one image per county (Hancock, Harrison, and Jackson Counties comprise the Mississippi Gulf Coast) as a GeoTIFF with world files.
 - d) Other features of the files include
 - (1) Projection: UTM Zone 16
 - (2) Spheroid: GRS 1980
 - (3) Datum: NAD83
 - (4) Units: Meters
- 2) The three images were imported into Environmental Systems Research Institute's (ESRI) ArcGIS® software.
- 3) ESRI vector data of interstates, highways, and major roads were added to the GIS.

- 4) The three images were then geo-rectified into a seamless image by using visible highway and road intersections.
- 5) Additional vector features were obtained from various sources and added to the GIS as layers:
 - a) Environmentally sensitive areas
 - b) Toxic release sites (Harrison County only)
 - c) Railroads
 - d) Rivers and streams
 - e) Parks
 - f) Wildlife management areas
 - g) National forests
 - h) Hydrography
 - i) Soil composition (Harrison County only)
 - j) Major water areas
 - k) Airports
 - l) Urbanized areas
- 6) The imagery was used to visualize and locate “open spaces” with adequate acreage for developing an intermodal yard.
- 7) The vector data was used to enhance the political, natural, and manmade features of the land with the intent of eliminating potential sites as well as helping form the boundaries of prospective sites.
- 8) Using all data as a guide, the potential sites were digitally drawn as another layer and the acreage of each site was calculated.
- 9) The distances from the center of each site to each of the three Mississippi ports on the Gulf Coast was approximated using the measure tool in ArcGIS. This was done for both road distances and rail distances (rail

distances were only calculated for sites that seemed to have logical access to rail lines).

The GIS system used for this study was packaged in a free format and put on a CD for the distribution to and education of interested parties. The CD can be obtained by contacting David Parrish of the Mississippi State University Social Science Research Center at David.Parrish@SSRC.MsState.edu or by phone (662) 325-8116. The interactive CD allows one to view in more detail the characteristics of the areas surrounding the selected sites.

Results

Given the constraints above, 15 potential locations were pinpointed in the three counties. One location was found in Hancock, six in Harrison, and eight in Jackson. The location of these sites is shown on the map with the acreage of each site shown. Figure 1 shows the number associated with each of the sites that are discussed. The numbering was from West to East as shown in Figure 1. Table 1 provides some of the statistics compiled for the 15 sites. A discussion of the individual sites follows.

Figure 1. Site Locations Corresponding to the Map.

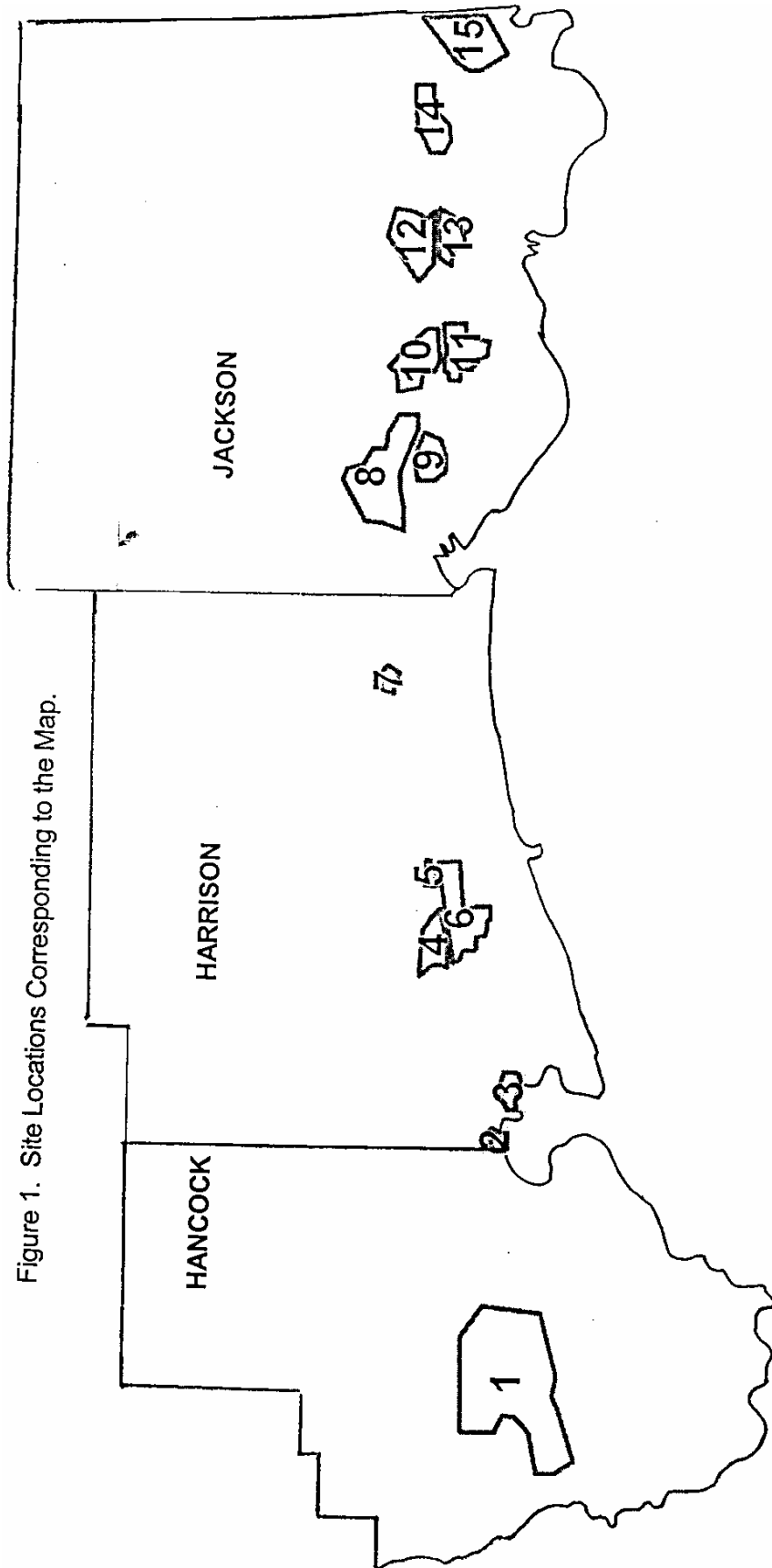


Table 1. Potential Intermodal Sites on the gulf Coast with Calculated Area Available, and Distances from Major Ports for Truck and Rail.

Potential Site Number	Area (Acres)	Distance From Port Of Bienville (miles)		Distance From Port of Gulfport (miles)		Distance From Port of Pascagoula (miles)	
		via Road Network	via Rail Network	via Road Network	via Rail Network	via Road Network	via Rail Network
1	18,943.51	20	n/a	33	n/a	70	n/a
2	388.95	24	n/a	20	n/a	57	n/a
3	920.61	27	n/a	20	n/a	57	n/a
4	1,914.90	34	n/a	10	n/a	47	n/a
5	339.44	37	35	6	5	43	39
6	4,040.34	34	34	7	4	46	38
7	536.94	46	n/a	14	n/a	34	n/a
8	6,836.12	57	n/a	25	n/a	23	n/a
9	1,836.98	59	n/a	26	n/a	22	n/a
10	2,894.68	64	n/a	31	n/a	17	n/a
11	2,588.54	64	n/a	32	n/a	17	n/a
12	3,546.60	70	n/a	37	n/a	11	n/a
13	1,448.97	70	n/a	37	n/a	11	n/a
14	2,444.55	75	71	43	40	12	8
15	4,541.11	82	73	49	43	12	11

Notes:

- Distance calculations made by using the measure tool in ArcGIS 8.3, and all distances are rounded to the nearest mile.
- The shortest path was taken between points; however use of Interstate 10 was utilized whenever logical. Access from I-10 directly to the respective site along the interstate was assumed in the calculations.
- Port to potential sites via *road networks* were measured from the port to the centroid of the potential site polygon.
- Port to potential sites via *rail networks* were measured from the port to a point on a rail network adjacent or within a mile of a potential site. Therefore, a majority of sites were not applicable because the site was not within a mile of an existing rail line.

SITE 1

Site one is the largest site with almost 19 thousand acres. One advantage of this site is that it is close to the Stennis International Airport. Depending on where the railroad across the Mississippi Gulf Coast is placed when relocated near the I-10 corridor, this site could be very accessible to Port Bienville and the Port of Gulfport. The site is located 33 miles from the Port of Gulfport and 20 miles from Port Bienville.

SITES 2 and 3

These two sites are different in that they would have the potential to be reached by barge, rail and highway. These sites, however, would require major infrastructure changes to accommodate barge or ship traffic. Site 2 has 388 acres while site 3 has over 900 acres.

SITES 4, 5, and 6

These sites offer the greatest potential especially for the Port of Gulfport all being 10 miles or less from the Port. They are in close proximity to the Gulfport Airport and the current North-South railroad. Sites 5 and 6 would be the most accessible to the current infrastructure and if the proposed railroad changes are made, they would have even more advantages. Site 5 is accessible to a current highway that bisects these areas.

Site 7

Site 7 is located between the Port of Gulfport (14 miles) and the Port of Pascagoula (34 miles). It is in close proximity to I-10 and another highway but would be at a disadvantage until the railroad is moved.

Sites 8, 9, 10, and 11

Sites 8 through 11 are basically the same as site 7 except they are larger. They are closer to the Port of Pascagoula but closer to the same distances between the ports (Table 1).

Sites 12 & 13

Sites 12 & 13 are closer to the Port of Pascagoula but further from a current highway other than I-10 than any of the other locations.

Site 14

Site 14 is the closest to the Port of Pascagoula and currently accessible to current transportation infrastructure near the Port of Pascagoula as are sites 5 and 6 for the Port of Gulfport. This site is also near an existing railroad.

Site 15

Site 15 is accessible to the current railroad and near a current highway. It is the farthest from the Port of Gulfport and Bienville. Sites 12-15 are all within 12 miles or less from the Port of Pascagoula.

Site Summary

There are four sites (1, 5, 7, and 14) that currently are in close proximity to a port, rail and highway facilities. Site 1 is near Port Bienville, sites 5 and 7 near Gulfport and site 14 near Pascagoula. Given the current infrastructure, these four sites offer the most potential for intermodal facilities in the short run. Sites 5 and 7 are close to the current interstate highway I-10, Highway 49, and the North South rail facility and some East West links between Gulfport and Biloxi. Sites 5 and 7 are the most centrally located but are more than 30 miles from either Port Bienville or the Port of Pascagoula.

Under the current situation, Port Bienville is the least crowded of the ports and may have space to grow within the current complex. This was not shown on the map; however, personal observation of the facilities of the complex lead to this statement.

The Port of Gulfport is the most crowded and currently needs greater accessibility to space. Additionally, the Port of Gulfport is also located in a highly congested traffic area. More space is currently being created at the Port, however.