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REMOTE SENSING AS AN AID TO ROUTE EVALUATION FOR RELOCATED LOUISIANA HIGHWAY 1

Division of Engineering Research
Louisiana State University
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REMOTE SENSING AS AN AID TO ROUTE EVALUATION FOR RELOCATED LOUISIANA HIGHWAY 1

by

Robert L. Thoms, Professor
Engineering Science

and

Judith A. Monte, Research Associate
Division of Engineering Research

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REMOTE SENSING AS AN AID TO ROUTE EVALUATION FOR RELOCATED LOUISIANA HIGHWAY 1

R. L. Thoms* and Judith A. Monte**

SYNOPSIS

NASA aerial photography in the form of color infrared and color positive transparencies is used as an aid for evaluation of the route proposed for relocated Louisiana Highway 1, between LaRose and Golden Meadow, in South Louisiana.

1. Introduction

The objective of this study was to demonstrate the utility and economic feasibility of using remote sensing techniques to evaluate a corridor proposed for a planned highway. The type of remote sensing employed relied on aerial photography furnished by the National Aeronautics and Space Administration. Both color infrared and color positive 9 in. x 9 in. film transparencies were utilized.

Remote sensing, in the form of referral to conventional aerial photography, has been employed for some time by various agencies planning construction projects. The Tennessee Valley Authority, Soil Conservation Service, and other agencies concerned mainly with agricultural land use pioneered in the early development of remote sensing techniques by obtaining and interpreting black and white aerial photography. Development of remote sensing techniques was forwarded for military applications during and after World War II. Also, highway departments have used black and white aerial photography for some time as an aid to route evaluation.

*Professor, Engineering Science, LSU, Baton Rouge

**Ph.D. candidate, Geography, LSU, Baton Rouge

Over the past decade remote sensing techniques have been broadened in scope and developed to a high degree of sophistication. Much of this work has been reported by personnel of the Willow Run Laboratories of the Institute of Science and Technology, Ann Arbor, Michigan, to the "Symposiums on Remote Sensing of Environment"; and, more recently, by the Environmental Research Institute of Michigan.[10] In addition, recent specific applications of remote sensing have included studies of: Location of breeding habitats of mosquitos by NASA in Southern Mississippi,[3] land use by the United States Geological Survey,[1] and highway route evaluation by the Virginia Highway Department.[7] Also a special publication, "Remote Sensing and its Application to Highway Engineering," is available at a nominal charge from the Highway Research Board.[9]

In summary, from the beginning phase of the use of black and white photography, remote sensing has progressed to a stage where a multitude of devices, utilizing a wide range of wavelengths of energy for monitoring, and aircraft to satellites for transport, are being employed to gather data which is then analyzed both by man and machine.

2. Implementation Site, The LaRose to Golden Meadow Corridor

Existing two-lane Louisiana Highway 1 between Donaldsonville and Golden Meadow has been referred to as "The Longest Mainstreet in the Country." It is built on the natural levee of Bayou Lafourche on the west side, and between LaRose and Golden Meadow the highway is almost without shoulders. The slightly elevated natural levee of the Bayou is narrow here, and consequently the scarcity of relatively "high ground" is reflected by the crowding of business establishments, homes, and industrial structures close to the side of the highway.

Figure 2.1 is a general land-use map of the land area bounded by LaRose and Golden Meadow to the north and south respectively; and by the west bank of Bayou Lafourche and the drainage canal and levee on the forty arpent line to the east and west respectively. Existing Highway 1 essentially tracks the west bank of the Bayou. The planned route of Relocated Highway 1 is depicted as a solid line starting at LaRose and running approximately parallel to Bayou Lafourche. For most of the way, the planned route of Relocated 1 is closer to the Bayou than it is to the forty arpent line.

The symbols used on the map of Figure 2.1 correspond to those proposed by the U. S. Geological Survey for classification of land-use where remote sensing data is employed.[1] Thus, along the Bayou where almost all buildings and structures are located, the symbol 01-07. denotes "Strip and Clustered Settlement." Other employed symbols with their definitions are: 01-09., "Open and Other (Urban)"; 02-01., "Cropland and Pasture"; 05-01., "Stream and Waterways"; and 06-01., "Vegetated Nonforested Wetland." More detail of land-use is given in the Vegetation and Soil maps drawn to 1: 14,000 scale and presented later in this study. It should be noted here, however, that the symbol 01-09. immediately above the title of Golden Meadow refers to a park (recreational) bounded on only one side by an urban area.

Lafourche Parish appears on the verge of a substantial amount of increased construction and associated industrial activity. The subject of this study, Relocated Louisiana Highway 1, will be a major project. In addition, the U.S. Army Corps of Engineers has completed plans for construction of an auxiliary waterway along Grand Bayou Blue to the west of the forty arpent line, and for a hurricane protection levee system between LaRose and Golden Meadow.[8] Further, if a superport for oil tankers is constructed

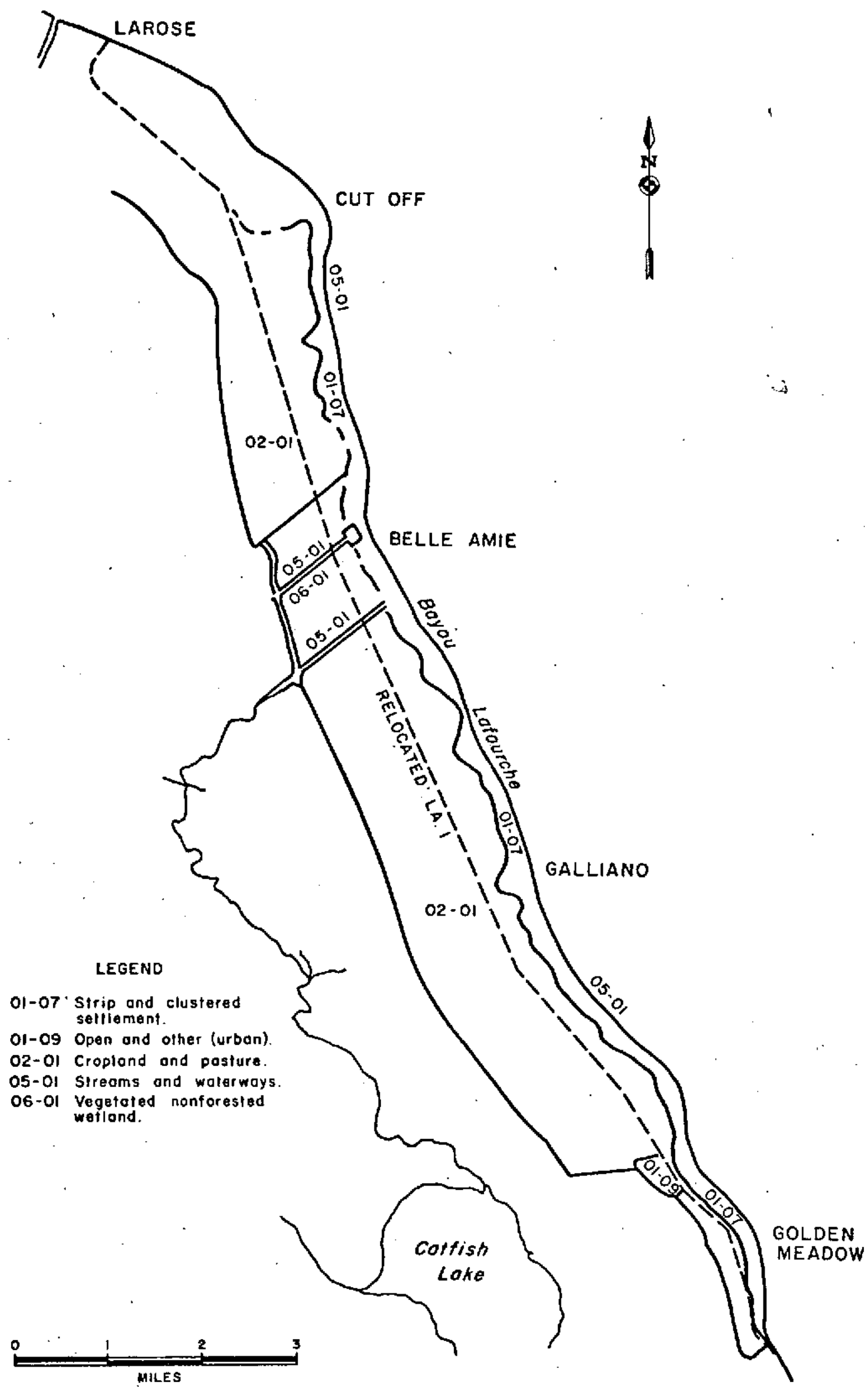

FIG. 2.1 GENERAL LAND-USE MAP

off the mouth of Bayou Lafourche in the Gulf of Mexico, a major pipeline tentatively will be laid somewhere in the vicinity of the forty arpent line on the west side of the Bayou. A new highway linking LaRose directly to existing highways below New Orleans also has been started. Obviously, if all these projects are carried to completion, the Parish of Lafourche certainly will be affected.

Recreational facilities in the area are based on fishing and hunting. Entry (by the general public) into rich fishing and waterfowl hunting areas in the brackish and freshwater marshes to the west of Bayou Lafourche can presently be made by boats launched at the park to the west of Golden Meadow or at the Bully Camp marsh area to the west of Belle Amie. Small game probably is hunted also in the wooded areas and fields on slightly higher ground. General tourism is not encouraged by the local populance. For example, not a single road side park exists between the town of Donaldsonville and Grand Isle, and the "Oakridge Park" behind Golden Meadow is noted only by a relatively small and obscure sign on Louisiana 1. This writer, who has been an avid marsh fisherman in this general area for the past ten years, only recently became aware of the park's existence by studying aerial imagery associated with this project.

People of the area are largely "Cajuns" of Acadian heritage. Bowie[2] (1935) described the life style of the area and the influence of Bayou Lafourche before the advent of industrial impact.

The general geology of the area is similar to that described in Soil Survey of Terrebonne Parish,[12] U. S. Department of Agriculture, (1960). The soil materials were deposited as stream alluvium by distributaries of several older deltas of the Mississippi River. At one time the Mississippi River followed the course of the present Bayou Lafourche. Natural levee ridges were built along stream channels, and "catch basins" of soil at lower elevations were formed between them. Following floods, silt laden waters deposited their soil when trapped in these basins. In some cases deep deposits of very soft fat clays and organic materials resulted. Such deposits naturally cause settlement problems when construction is attempted off of the stiffer lean clays of natural levee ridges. Thus, both flooding and significant settlement possibilities[11] must be considered when building off the natural levee ridges in bayou country.

Figure 2.2 is a general soils map of the area of interest. It is based on a soils map by the Soil Conservation Service of the U. S. Department of Agriculture[5] (1969). The natural levee of the Bayou is clearly defined by the extent of housing alongside existing Louisiana 1 and Bayou Lafourche. Symbols used for soil types are: 1, Commerce-Mhoon Association (gray and grayish-brown loamy soils found on the higher elevation of the natural levees of Bayou Lafourche); 2, Sharkey-Tunich Association (gray clay soils found at the lower elevations of the natural levees); 4, marsh (freshwater, undrained); 5, marsh (saltwater, undrained); 6, swamp (drained); 7, marsh (freshwater, drained).

Until fairly recently the Mississippi River, when in flood stage, overflowed Bayou Lafourche and deposited soils in the area. Bowie (1935) noted that in the great Mississippi River flood of 1884, a boat, one hundred and ten feet long and with a draft of four feet, was washed through Davis Crevasse twenty-three miles above New Orleans and piloted across overflowed lands to Bayou Lafourche.

3. Study of Proposed Corridor Based on NASA Imagery and Supplemental Information

Section 3 of this report consists primarily of studies of vegetation and soil conditions along the proposed route. Each study is

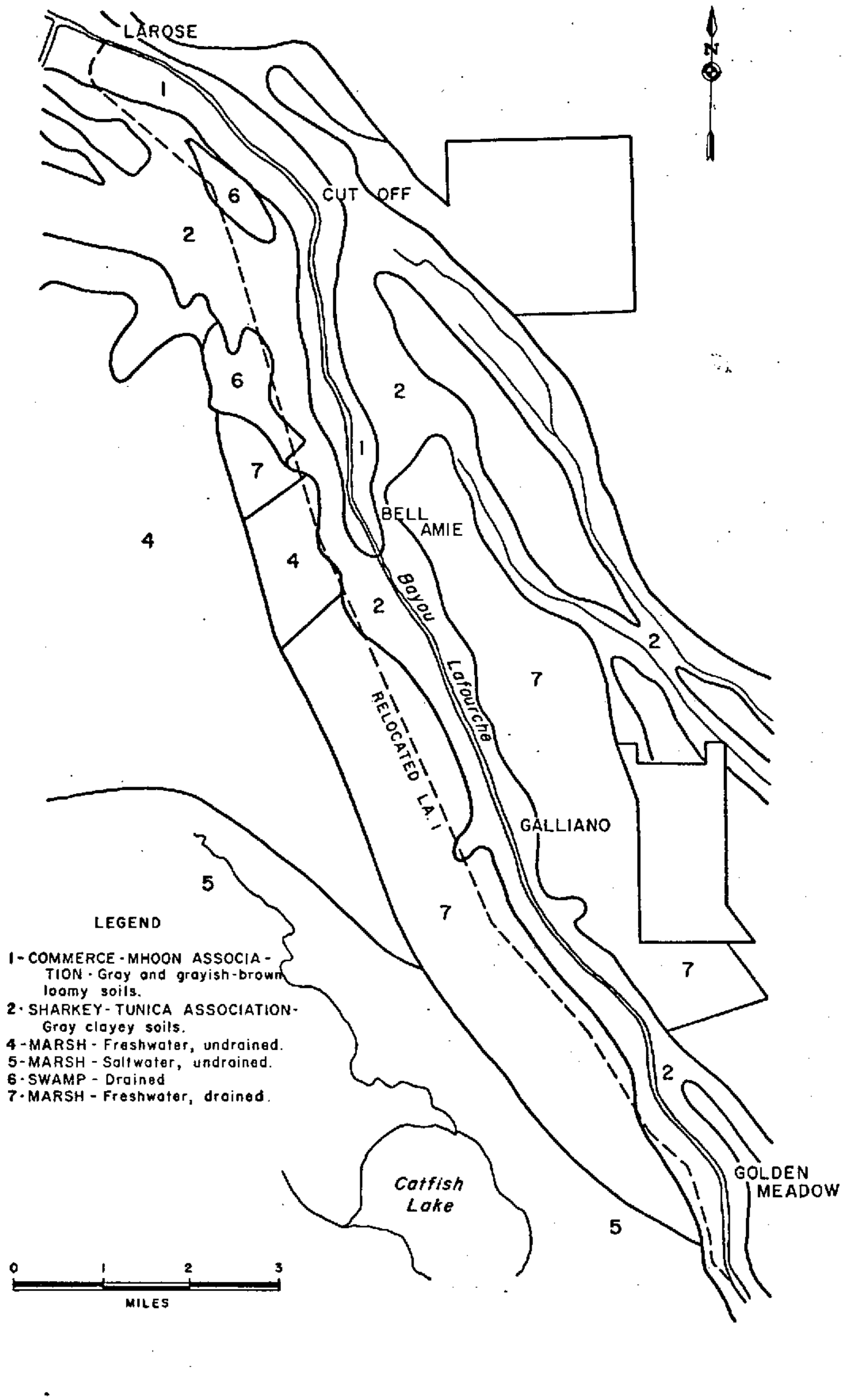

FIG. 2.2 GENERAL SOIL MAP

essentially self contained, and is based for the most part on NASA supplied imagery of the area and also on supplemental sources as noted in the text.

VEGETATION*

Methods:

The vegetation along the corridor was mapped using color infrared photography (9 x 9 inch transparencies) and limited ground truth work. This type of imagery, in which all healthy vegetation appears pink to red in color, a result of adding false colors, has been shown to be especially well suited to vegetation delineation. The ground truth consisted of four trips to the area where visual estimates of species dominance were made and specimens were collected.

The imagery was flown on May 14, 1973, at an altitude of 7,000 feet using a six-inch camera lens. The vegetation patterns were drawn directly from the imagery by using photographic tone and texture to distinguish the vegetation zones, on to a 1:14,000 scale base map, which was made by enlarging and bringing up to date a U.S.G.S. topographic map of the scale 1:24,000. The map is included as a fold-out in this report. A smaller map showing the general vegetation zones is also included.

Results:

The resulting vegetation map shows that five major vegetation zones or types exist along the western side of Bayou Lafourche from LaRose to Golden Meadow out to the forty arpent line. These are: (1) forest; (2) shrub; (3) pasture; (4) cropland; and (5) marsh. The area immediately adjacent to the Bayou is heavily urbanized as shown on the map.

Early settlement took place along the high and drier levee. With

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*VEGETATION study by Judith A. Monte

time, the populus has expanded toward the backswamp. Eight years ago most of the area, except for the Bully Camp area and the marsh west of Golden Meadow, was diked and drained back to the forty arpent line (personal correspondence with Wayne Plaisance). Much of the land has since been cleared or is presently being cleared for use as cropland or pasture. Thus the area has experienced an increased interest in agriculture in a previously dominant fishing area, and the vegetation reflects these changes.

Vegetation Types:

The following paragraphs describe each of the five major vegetation types in detail, giving the dominant species of each type. Other less dominant species are included where field work has made their identification possible.

Forest

The forest of this area consists mainly of bottomland hardwoods, with cypress-tupelo gum swamps existing in low areas. The "true swamp," with standing water, does not exist here--probably the result of draining and reclaiming the land. Generally the forest canopy is composed of a mixture of many species. Besides the cypress and occasional tupelo gum, these include swamp red maple, sweet gum, sugarberry, live oak, water oak, Nuttall oak, black willow, American elm, American sycamore, Chinese tallow tree, chinaberry, and water locust. Spanish moss hangs from several of these trees.

The understory of the forest consists of palmetto, poison ivy, elderberry, Virginia creeper, buttonbush, and swamp bay. Scattered among the shrubs may be found several herbs, the most abundant of which are lizard's tail and daisy fleabane.

Approximately 20 per cent of study area is forested (Figure 3). The forest is found along the natural ridge of the bayou at the northern end of the corridor. From LaRose to Cut Off, it extends back to the forty arpent line, but from Cut Off to Belle Amie it narrows and is found closer to the bayou, that is, east of the twenty arpent line. A small section of the forest is located just west and north of Galliano, and is also found east of the twenty arpent line.

Shrub

As a result of reclaimation, a large part of this corridor is composed of shrubs. The area south of Cut Off between the natural levee and the forty arpent line, was at one time a fresh water marsh. Near Galliano it was an intermediate marsh, and near Golden Meadow it was a brackish marsh (classification according to Chabreck, Joanen and Palimisano, 1968). With the construction of levees and drainage pumps the marsh was converted, through natural vegetational succession, to a land of shrubs within eight years. [This does not include the Bully Camp area or the marsh to the west of Golden Meadow. Neither of these were diked, however, the brackish marsh near Golden Meadow has been greatly dissected by oil canals producing numerous spoil banks on which shrubs are found.] Some of the shrubs have been cleared for pasture and cropland, but much of this shrub environment still remains.

The dominant shrub species, in both the reclaimed and the spoil bank areas, is, by far, eastern baccharis, with some marsh elder (Iva) and wax myrtle present. Other species found in the diked area are elderberry, dewberry, roseau cane, prickly ash, and giant ragweed. Occasionally, one finds an understory of herbs composed of goldenrod, grasses and sedges. Scattered small black willows and Chinese tallow trees, which tower a few feet above the six to eight feet tall baccharis, are evidence of another successional stage taking place.

Where clearing of the land is taking place, the successional stage toward a tree community is being accelerated. The result however, is not a forest, but a kind of "wooded parkland," where clumps of willows in pasture provide shade for cattle.

Shrubs cover about 25 per cent of the corridor (Figure 3) and are found north of Bully Camp to Raccoon Bayou, and from a few miles north of Galliano south to Golden Meadow, except for an area just west of Galliano which is mostly pasture, and another similar area about two miles south of Galliano. Outside of the area they are found north and west of Golden Meadow, on the spoil banks in the brackish marsh.

Pasture

Three kinds of pastures may be recognized in this area. All three are easily distinguished on the imagery, but were not included on the map. It was felt that this amount of detail is not needed for the planned routing of a highway, since all three kinds of pastures represent essentially cleared land, that is, nonarboreal and shrubless areas. Also, in order to include these divisions on the map, and still have the map appear legible, a larger scale map should be used.

The three kinds of pasture which show up in this area are: (1) an improved short-grass pasture consisting of planted Bermuda Blue grass; (2) an improved tall-grass pasture, about a foot or more tall, of Johnson grass (this is often cut for hay for winter feed); and, (3) an unimproved pasture consisting mostly of weeds, predominantly nettle, and some grasses, with scattered small trees. The unimproved pasture represents the initial steps of clearing the shrub and forested areas for pasture. Small trees, such as the black willow, Chinese tallow tree and sugarberry are left for shade for the cattle.

About 25 per cent of the corridor is covered with pasture (Figure 3). Short and tall grass pastures are intermixed with cropland as far south as Galliano and are mostly located adjacent to the bayou, with a couple of exceptions in the LaRose and Cut Off areas, and just south of Bully Camp, while the unimproved pastures extend out to the forty arpent line and are located to the west and about a mile south of Galliano.

Cropland

The important crop of this area is sugar cane. It is grown predominantly in the LaRose to Cut Off area and in an area about two miles south of Belle Amie. It is usually found adjacent to the bayou although it does extend back to the forty arpent line occasionally in the north. Other types of crop plants are grown in gardens, and much of the produce is sold locally at roadside stands. These vegetables include corn, tomatoes, okra, squash, garlic, onions, and green beans.

Gardens are found all along the bayou from LaRose to Golden Meadow, but are more prevalent in the northern part of the corridor. Sugar cane and gardens together make up about ten per cent of this area.

On the imagery it is possible to distinguish between gardens and cane fields, but this distinction was not mapped.

Marsh

Both fresh and brackish water marshes are located along this area. The largest fresh water marsh is located in the Bully Camp area just west of Belle Amie. This marsh has not been diked. There are several canals with their associated spoil banks located near the forty arpent line, but drainage into and out of the marsh is not impeded, although it may be reduced slightly, resulting in rain water, or fresh water retention.

Vegetation composition of this marsh is bulltongue, great bulrush, narrow-leaved cat-tail, alligatorweed, duckweed, spike rush, water pennywort, pickerel weed, water hyacinth, giant cutgrass, and coontail.

Just outside the forty arpent line, to the west and south of this fresh water marsh, is an intermediate marsh with wiregrass and several other marsh grasses. A small fresh water marsh, composed of maidencane, is located in LaRose just south of the Gulf Intercoastal Water Way, and another, composed of water hyacinth and alligatorweed, makes up a crawfish pond located at the forty arpent line half way between LaRose and Cut Off.

To the west and north of Golden Meadow is a brackish water marsh composed predominantly of wiregrass, oystergrass, and salt grass. This marsh has not been diked, but it has been severely dissected by numerous oil canals. The spoil banks of these canals contain mostly the shrub, baccharis.

The marshes make up about 20 per cent of this corridor (Figure 3). Natives of the area recall when fresh water marshes were found as far south as Galliano. Today the marshes are brackish to intermediate as far north as Belle Amie. Several factors, such as subsidence, changes in drainage patterns due to spoil bank deposition, and dredging may have brought on salt intrustion, and resulting vegetation change.

Impact on the Vegetation:

The most noticeable effect on the vegetation will be the destruction of it along the right-of-way. In the northern part of the corridor the highway will be routed through forest, pasture and cropland. Opposition may be met by these people who do not wish to give up their farms.

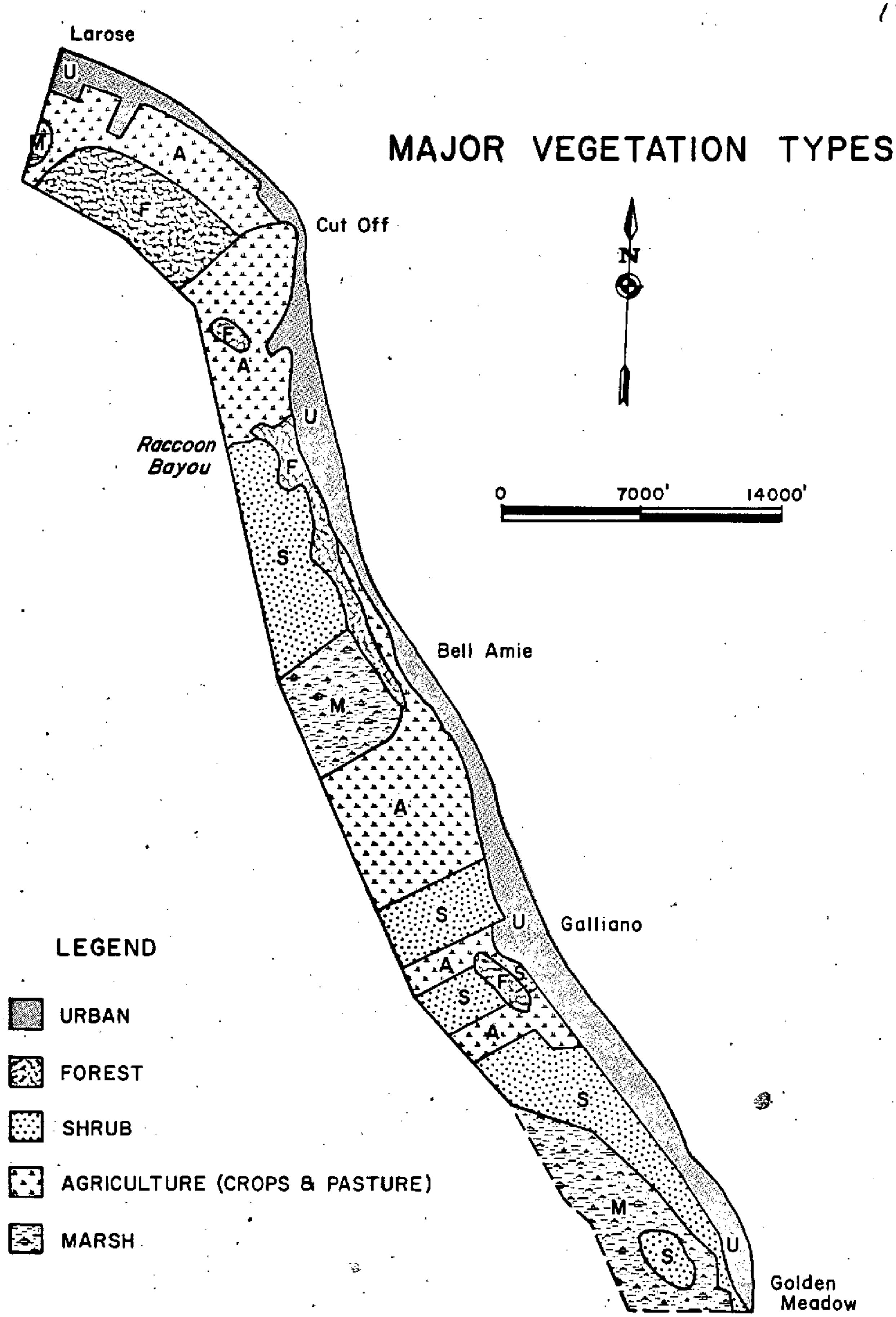
MAJOR VEGETATION TYPES
Larose
Cut Off
Raccoon Bayou
Bell Amie
Galliano
Golden Meadow
N
0
7000'
14000'
U
M
A
F
S
LEGEND
URBAN
FOREST
SHRUB
AGRICULTURE (CROPS & PASTURE)
MARSH

FIG. 3

Large potentially productive areas, those located to the west of the proposed highway, may be lost, if no access cross areas are provided.

In the southern part of the corridor the highway will pass through pastures and shrubs. Perhaps the greatest loss, in terms of ecological habitat destruction, will be caused by the routing of the highway through the Bully Camp fresh water marsh. This scenic marsh provides enjoyment to the eye, is a valuable waterfowl and fishery habitat, and is an important link in the wetland ecosystem of the area.

Long term effects, such as those produced by increased air pollution from cars, on the vegetation are not fully understood yet, and cannot be speculated on at this time. This effect would be a function of the number of cars using the highway.

Appendix A lists the plants referred to in this discussion of vegetation encountered along the corridor planned for Relocated Highway 1.

SOIL CONDITIONS

Soil conditions along the Relocated Highway 1 corridor were analyzed by use of NASA supplied color-positive aerial imagery (9 in. x 9 in. color transparencies), limited ground truth work, and supplemental soil borings data available through the U. S. Corps of Engineers and Louisiana Department of Highways.

The imagery was obtained on the same NASA flight (Mission 235, May, 1973) and with the same type of lens system as was used to collect the infrared (false color) imagery described in the preceding section on vegetation. The soils information gathered from the film and other sources is presented in a fold-out map (imagery and base map scale 1:14,000) included in this report.

Ground truth work on soils was limited to two one-day field trips.

Samples to depths of a maximum of two feet were obtained manually with four-inch diameter cylinders, hammer, and shovel. Samples were obtained at three locations west of Cut Off, Louisiana, (on road W 48th dividing Rural Sections II and III on Relocated Highway 1), in the Bully Camp marsh area, and immediately south of it on the forty arpent line, and west of Golden Meadow (on road W 216th dividing Municipal Section II and Rural Section I).

Gathering soil samples manually in marshy terrain is difficult, and there is a limit on depth at which samples can be taken. Particularly for engineering works, the need for deeper sampling procedures is evident. Thus a search was begun for records collected on soil sampling done in the area and associated with potential construction.

The U. S. Corps of Engineers District office in New Orleans made available soil sampling data collected for the hurricane protection levee system[8] (mentioned earlier) to be constructed from Golden Meadow to LaRose. The soils data was obtained by Bernard and Burk, Consulting Engineers, Baton Rouge, in March, 1972, under contract to the Corps of Engineers. Borings of interest for this study were spotted along the forty arpent line west of Golden Meadow north to LaRose, and on two transverse sections (approximately perpendicular to Bayou Lafourche) south of the Bully Camp Canal, and slightly south of Cut Off, respectively.

Location of soil borings taken for the Corps are depicted on the fold-out map and are numbered 8 through 56. Also given on the map are descriptions of soils from the borings for the first few (0'-5') feet beneath the natural ground surface. Soil conditions at greater depths were not noted on the map as they would have little affect on ground surface appearance, and probably could not be correlated with aerial imagery.

In addition to the above supplemental data, soil boring data was made available through the Louisiana Department of Highways. Borings were obtained at eight sites across the Bully Camp marsh and along the corridor of Relocated Highway 1 as depicted on the fold-out map. Locations are numbered I through VIII, and again descriptions pertaining to soil conditions within the first few feet of the surface are noted on the map at each site.

Descriptions of the soil samples gathered on the two field trips correlated with data obtained for the Corps and the Department of Highways. The terms, "fat clay" and "clay with organic," used by Bernard and Burk and Highway Department personnel, respectively, were assumed to apply to the same type of soil. Samples collected on the field trips consisted either of dessicated or saturated (depending on drainage) fat clay or peat. Dessicated fat clay was found close to the route of Relocated 1 west of Cut Off, saturated fat clay and peat were found in the Bully Camp area, (peat at the forty arpent line), and fat clays and peat west of Golden Meadow.

In can be noted on the fold-out map that lean (and stiffer) clays occur on the natural levee of Bayou Lafourche, where existing Louisiana 1 is located. Obviously, building and maintaining Relocated 1 will be difficult since it is not located on a natural levee.[11]

The soil boring data of both the Corps and Highway Department indicates that soft organic clays occur in relatively thick deposits (+50.0 ft.) at many locations south of Cut Off. A dividing line of sorts is indicated at the Raccoon Bayou channel (no longer functioning) located on USGS maps as being southwest of Cut Off. North of this channel the soil conditions appear more favorable for construction purposes. Peat occurs in the Bully Camp area; however, at 12' to 15' a layer of sand or silty sand is frequently encountered south of Bully Camp. Embankments to the south of the Bully Camp area and also to the west of Golden Meadow subside steadily, and have to be "retopped" frequently.

An area south of Golden Meadow that had been diked and drained was abandoned because the levees subsided too rapidly to make the maintenance required worth while. A levee closer to the natural levee of Lafourche subsequently was constructed and maintained satisfactorily.

During a siege of high water in the early fall of 1973, after the film for this study had been obtained and interpreted, sections of the forty arpent levee on the west side of Lafourche failed at Bully Camp and west of Golden Meadow. As a result, some of the land labeled "drained fresh water marsh or pasture" on the maps of this study has experienced salt water encroachment.

Examination of the NASA aerial imagery clearly revealed preexisting old channels of Bayou Lafourche or its tributaries. Also, likely existing bog (deposits of very soft compressible soils) areas were noted between channels where ponds previously existed. These bog areas are labled with the letter "B" on the fold-out soils map.

North and west of Golden Meadow, along the forty arpent line drainage canal, the color transparencies indicated a sharp contrast between the drained and undrained portion of the marsh. Three distinct old channels were visible between the forty arpent line and existing Highway 1 and are indicated on the soils map. Relocated 1 tracks rather closely one of these channels for some distance, before the channel veers to the west and becomes obscured in a maze of potential bog areas. Fortunately, Relocated 1 does not cross this area. Two previous pond sites east of bore holes 42 and 43 were dry at the time the imagery was obtained, but could be discerned as potential bog areas. The natural levee of Bayou Lafourche was visible in the imagery in open areas, but became obscured west of Golden Meadow by buildings. In general, old channels and their associated natural levees of stiffer clays were readily located using the color aerial photography. The levees could be used as barrow sites for obtaining relatively stiff material for embankment construction.

Another old channel was detected south of Bully Camp marsh. This area, and Bully Camp marsh itself, will probably be the most difficult terrain to cross with Relocated Highway 1. Deep deposits of soft organic clays and peat characterize this area. Such soils are well known to be difficult foundation materials to contend with in engineering projects; although recently, methods to analyze their behavior have been developed.[15] Soil conditions are better for construction north of the old channel which corresponds to Raccoon Bayou on U.S.G.S. maps (1964).

North of the Raccoon Bayou channel and west of LaRose, other old channels paralleling Bayou Lafourche are visible. Although these channels probably do not carry large amounts of water during rains, the possibility exists that alteration of drainage by Relocated Highway 1 might cause flooding in this area. This comment applies also along other parts of the corridor, where the embankment of Relocated 1 might act as a barrier to drainage of water from the populated natural levee of Bayou Lafourche.

4. Conclusion

Additional factors dealing with construction of Relocated 1 which were not discussed herein include effects of auto exhaust[16] (which increase in volume at higher speeds made possible by improved roads), traffic noise,[6] and economic and industrial impact on the area.[4, 13]

Obviously, Relocated 1 will cut across many individuals' private property, since the original land grants were narrow and long in a direction perpendicular to Bayou Lafourche (the French Arpent Survey System). Access to the "back part" of this property would be an added concept to consider in a more complete study of location of Relocated Highway 1.

For the particular route considered, impact of Relocated 1 would seem to be relatively insignificant on the wetlands environment, except in the Bully Camp marsh area, because the corridor is over previously drained marsh land. An elevated roadway across the Bully Camp marsh would be desirable, based on both environmental and engineering considerations. In addition, access to the marsh would not be hindered by such construction. Preservation of Oakridge Park and access to the marsh west of Golden Meadow is also highly desirable. Construction and maintenance of Relocated Louisiana 1 Highway off of the natural levee of Bayou Lafourche undoubtedly will be difficult.

In summary, the proposed route for Relocated Highway 1 has been partially evaluated on the basis of interpretation of imagery supplied by NASA, limited ground truth work, and supplemental data. The imagery was very useful for mapping of vegetation and land-use determination; and useful when supplemented by conventional soil borings for soil classification. Other types of remote sensing data exist,[14] but the imagery employed was adequate for the task undertaken. The use of this type of photography appears to offer definite advantages over the conventional use of black and white photography alone, for a much greater amount of detail can be gathered from the infrared and color photography. Then, this detail can be interpreted relatively economically on the basis of limited ground truth work.

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Personal Correspondence with Wayne Plaisance, Dredging and Engineering Contractor, Golden Meadow, La., June, 1973.

APPENDIX A

COMMON NAME AND SCIENTIFIC NAME
OF PLANTS MENTIONED IN VEGETATION SECTION

PLANTS MENTIONED IN VEGETATION SECTION

Plants are listed alphabetically by common name, followed by the scientific name.

TREES

American elm
Ulmus americana

American sycamore
Platanus occidentalis

Bald cypress
Taxodium distichum

Black willow
Salix nigra

Chinaberry
Melia azedarach

Chinese tallow tree
Sapium sebiferum

Live oak
Quercus virginiana

Nuttall oak
Quercus nuttallii

Sugarberry
Celtis laevigata

Red maple
Acer rubrum

Sweet gum
Liquidamber syvaraciflua

Tupelo gum
Nyssa aquatica

Water locust
Gleditsia aquatica

Water oak
Quercus nigra

SHRUBS

Buttonbush
Cephalanthus occidentalis

Eastern baccharis
Baccharis Halimifolia

Elderberry
Sambucus canadensis

Marsh elder
Iva frutescens

Palmetto
Sabal minor

Poison ivy
Rhus radicans

Prickly Ash
Zanthoxylum clava-herculis

Swamp bay
Persea palustris

Virginia creeper
Parthenocissus quinquefolia

Wax myrtle
Myrica cerifera

HERBS

Alligatorweed
Alternanthera philoxeroides

Bermuda Blue grass
Cynodon dactylon

Bulltongue
Sagittaria falcata

Coontail
Ceratophyllum demersum

Daisy fleabane
Erigeron philadelphicus

Dewberry
Rubus trivialis

Duckweed
Lemna minor

Giant cutgrass
Zizaniopsis miliaceae

Giant ragweek
Ambrosia trifida

Great bulrush
Scirpus validus

Goldenrod
Solidago sp.

Johnson grass
Sorghum halepense

Maidencane
Panicum hemitomon

Lizard's tail
Saururus cernuus

Narrow-leaved cat-tail
Typha angustifolia

Nettle
Lamium purpureum

Oystergrass
Spartina alterniflora

Pickerel weed
Pontederia cordata

Roseau cane
Phragmites communis

Salt grass
Distichlis spicata

Soft rush
Juncus effusus

Spike rush
Elecocharis

Spanish moss
Tillandsia usneoides

Sugar cane
Saccharum offcinarum

Water hyacinth
Eicchornia crassipes

Water pennywort
Hydrocotyle ranunculoides

Wiregrass
Spartina patens