WEST HACKBERRY PLANTINGS AND SEDIMENT ENHANCEMENT (C/S-19)

PROGRESS REPORT NO. 1
for the period
April 1, 1994 to August 15, 1995

Project Description/Status

The West Hackberry Plantings and Sediment Enhancement Demonstration Project was designed to evaluate the ability of vegetative plantings and hay bale fences to abate wind-driven erosion along various shorelines in a deteriorated marsh located about 6 mi west of Hackberry, Louisiana. In April 1994, installation of 6,000 linear ft of hay bale fencing was completed. In June 1994, approximately 4,750 trade gal size plantings of California bullwhip (*Scirpus californicus*) were planted. The fences and plantings were installed in three groups (A, B, and C) along the eastern, western, and southern shorelines of a large, shallow, interior marsh pond, using different configurations of fences and plantings (figure 1).

The project objectives are to restore, protect, and enhance about 300 acres of inland wetlands using vegetation plantings to minimize wetland erosion and provide for restoration, and to encourage sediment deposition through the use of hay bale fences. The specific goals are to reduce wind-driven wave erosion of marsh shorelines using *Scirpus californicus* plantings, increase sediment deposition adjacent to hay bale fences, and increase the amount of emergent and submerged aquatic vegetation.

Monitoring Design

Color-infrared photography will be flown once at preconstruction and at year 3, for use in documenting shoreline movement and determining ratios of vegetated-to-nonvegetated areas. Shoreline markers will be installed at 100-ft intervals along shorelines west of Group A fences 5 and 6, and in a reference area just to the south of Group A, to document shoreline movement once at preconstruction, and at years 3, 5, and 10. A 5% sample of the vegetative plantings, consisting of 16 randomly selected plots of 16 plants each, will be monitored for percent survival, species composition, and percent cover, at 1 and 6 months, and at years 1, 3, 5, and 10. Sediment deposition along the hay bale fences will be monitored along 18 transects established across and perpendicular to a subsample of 6 of the enclosures, and in a reference area away from the fences, once at pre-construction, and at years 3, 5, and 10. In addition, the effect of salinity levels on planting success will be evaluated using data collected from an adjacent restoration project at Rycade Canal.

Results/Discussion

Hay bale fences: In May and June 1994, hay bale fences were selected and tagged for elevational transect surveys, the reference sites were located and marked, and the shoreline markers were deployed along the sections of shoreline to be surveyed. In July 1994, elevational transects were surveyed across selected hay bale fences and the reference site. See figure 2 for locations of selected fences, and figures 3 and 4 for typical elevational profiles. In addition, two sections of shoreline were surveyed to record the current position. By this time, the Group A and C hay bale fences were empty, while some hay remained in the Group B fences. In December 1994, Group A fence A3 was modified and refurbished with hay bales, and fence A2 was refurbished with hay bales wrapped in plastic geogrid fabric. Within two weeks, all of the hay was washed out of the enclosures. In March 1995, the Natural Resource Conservation Service and Cameron Parish installed discarded Christmas trees in fences A3-A6. As of 26 July 1995, about 73% of the Christmas trees had remained intact in the enclosures. The next elevational transect survey is scheduled for July 1997. Observations to date suggest that hay bale fencing, as designed and deployed in this environment, is rather ineffective at abating wave energy. The use of hay bales consisting of longer lengths of straw, in combination with a wrapping of geogrid fabric of a smaller mesh size, may have provided for greater success with hay bales, at least for the Group B and C fences, which are situated in more protected locations than the Group A fences.

Vegetative Plantings: In July 1994, sixteen 16-plant sampling plots were randomly selected and delineated for use in monitoring the plantings. The 1-mo postplanting monitoring of the sampling plots, conducted on 1 August 1994, revealed that 77% of the original plantings had survived (figure 5). The 6-mo postplanting monitoring of the plots, conducted on 2 February 1995, revealed that 59% of the plantings had survived. On 26 July 1995, 1-yr postplanting monitoring of the plots revealed that 55% of the plantings had survived. The average percent cover of bullwhips in a m^2 plot associated with each 16-plant sampling plot was 5% at one month, 9% at six months, and 47% at 1-yr postplanting (table 1). From the preliminary data, it can be concluded that California bullwhip plantings can be established in this environment. Their effectiveness in minimizing wetland erosion cannot be determined until subsequent shoreline surveys are conducted.

Prepared on September 18, 1995, by Karl A. Vincent.

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Construction Start:	November 1, 1993	
Construction End:	December 15, 1994	

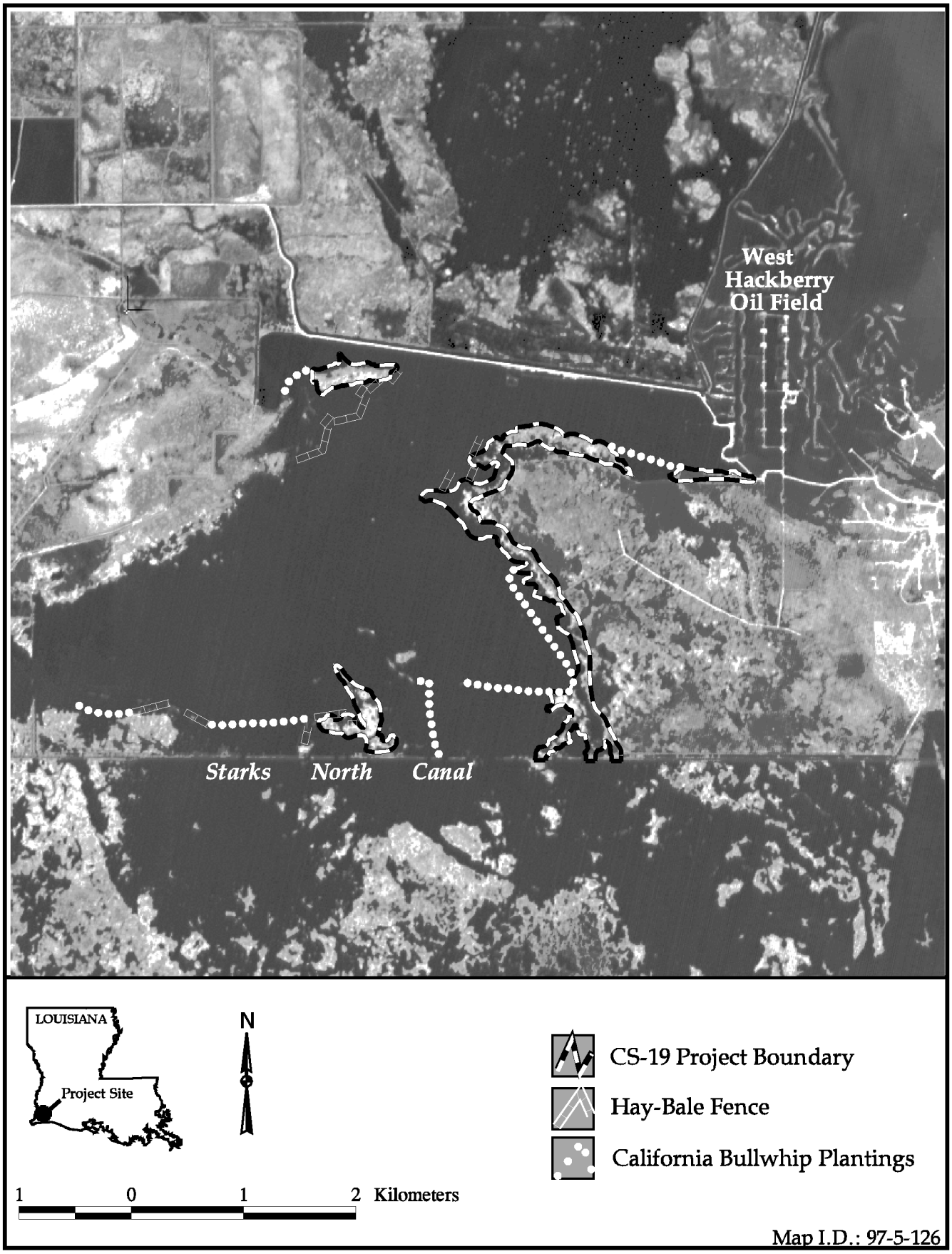


Figure 1. West Hackberry Plantings and Sediment Enhancement (CS-19) project area showing locations of restoration features.

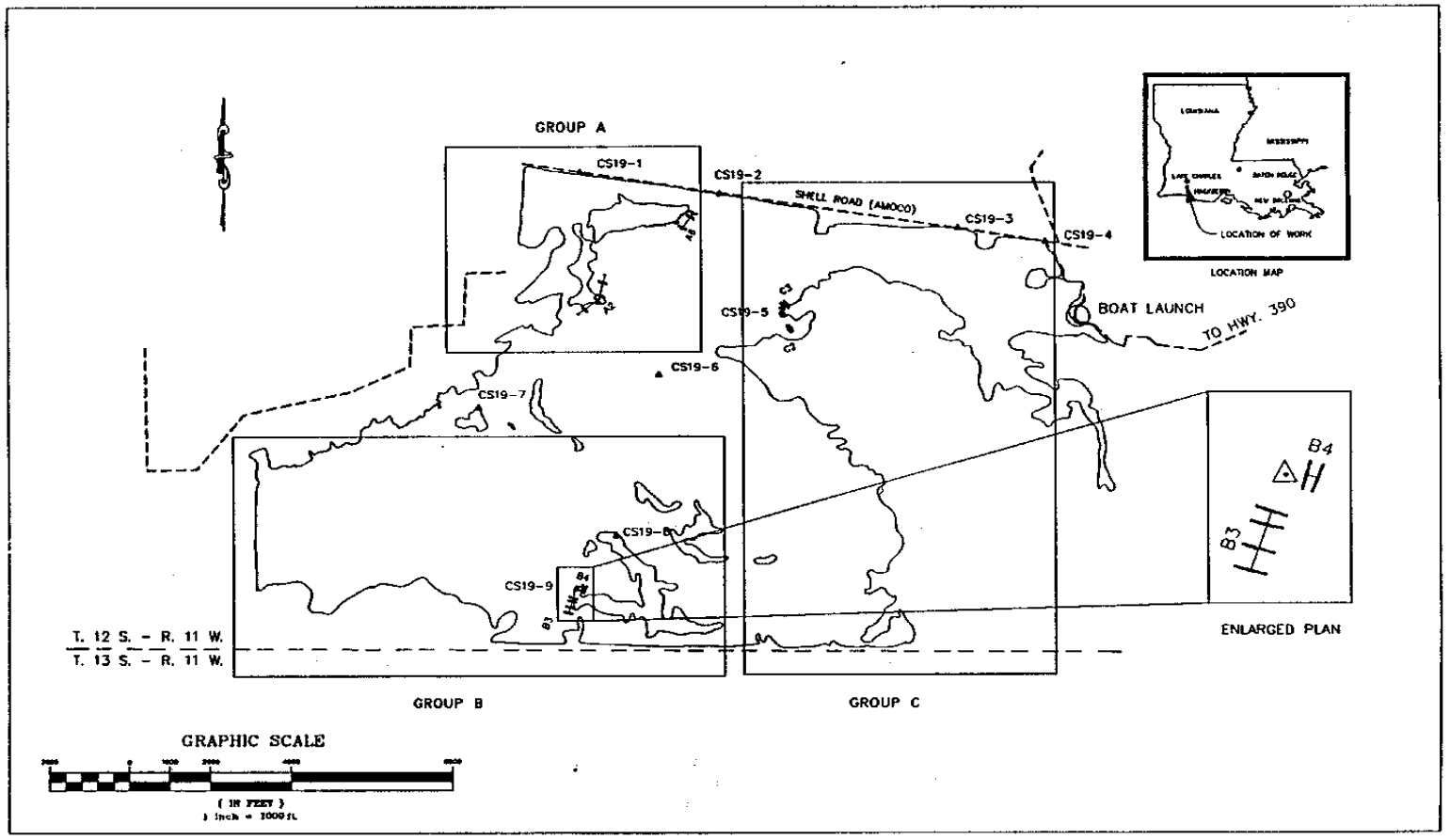
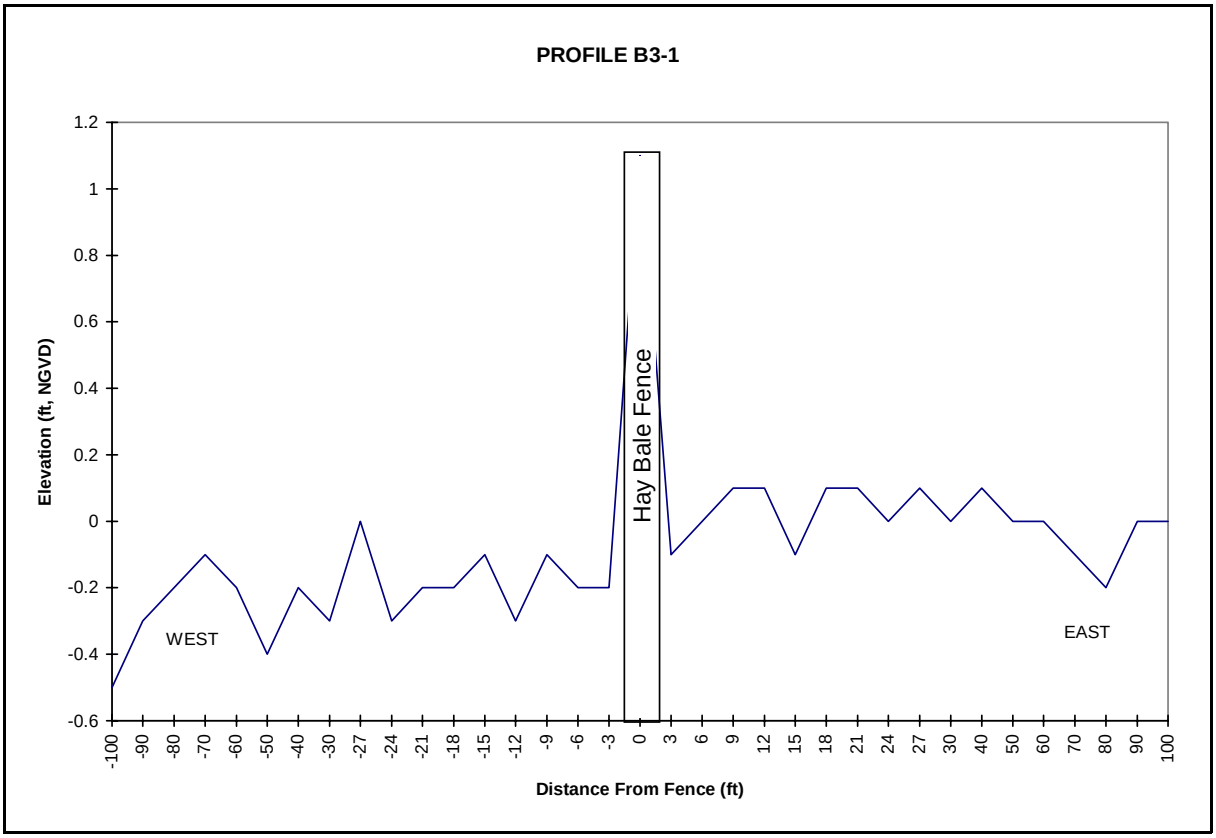


Figure 2. West Hackberry Plantings and Sediment Enhancement (C/S-19) project area map showing locations of hay bale fences and shorelines selected for surveying.



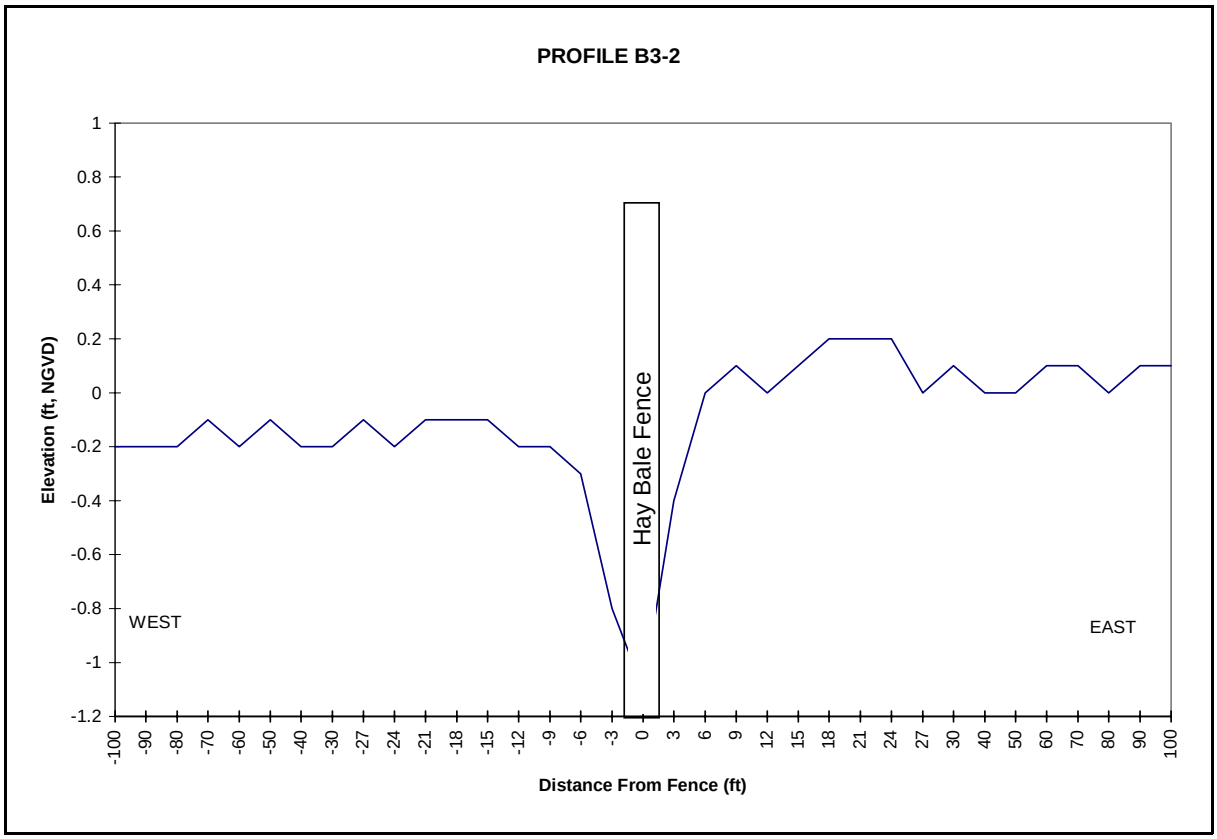
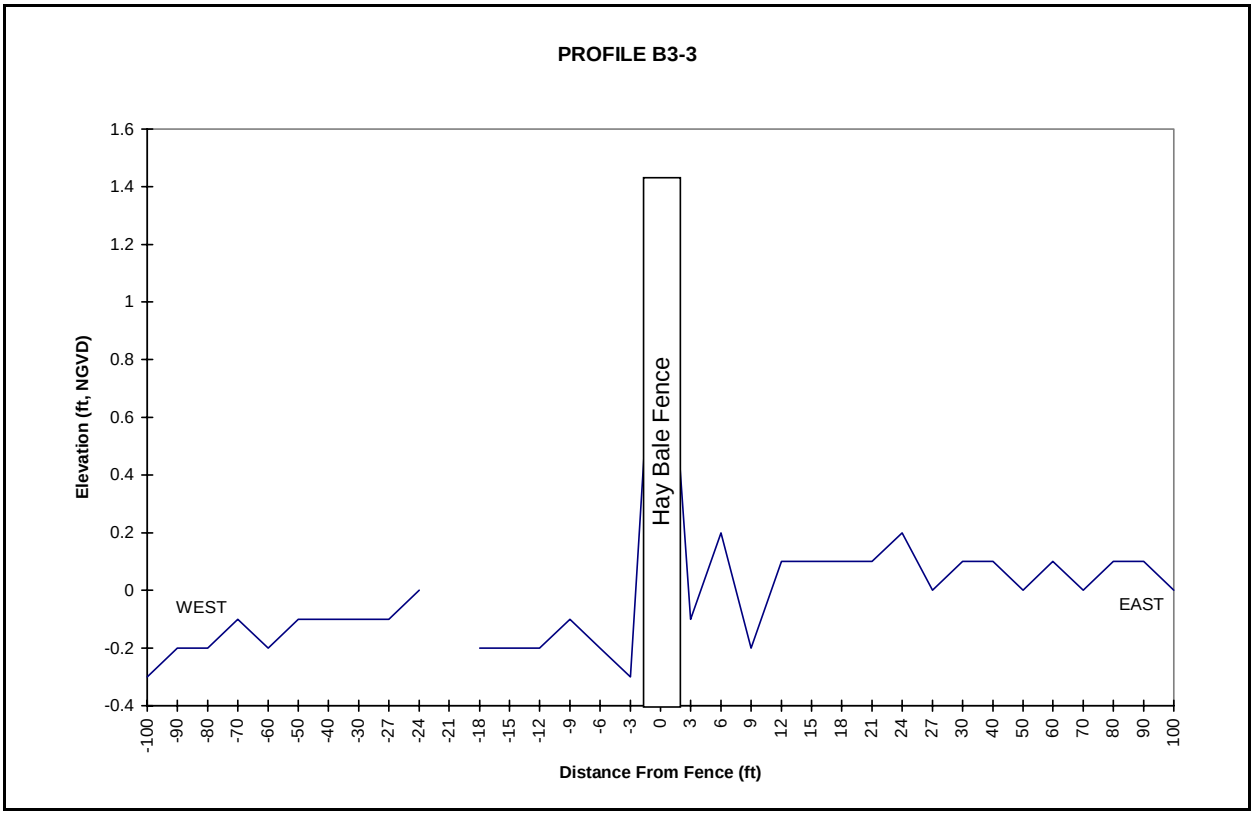


Figure 3. Elevational profile transects 1 and 2 across hay bale fence B3 in the West Hackberry Plantings and Sediment Enhancement (C/S-19) project area, Cameron Parish, Louisiana, surveyed July 1994. (See figure 2 for locations of fence and transects.)



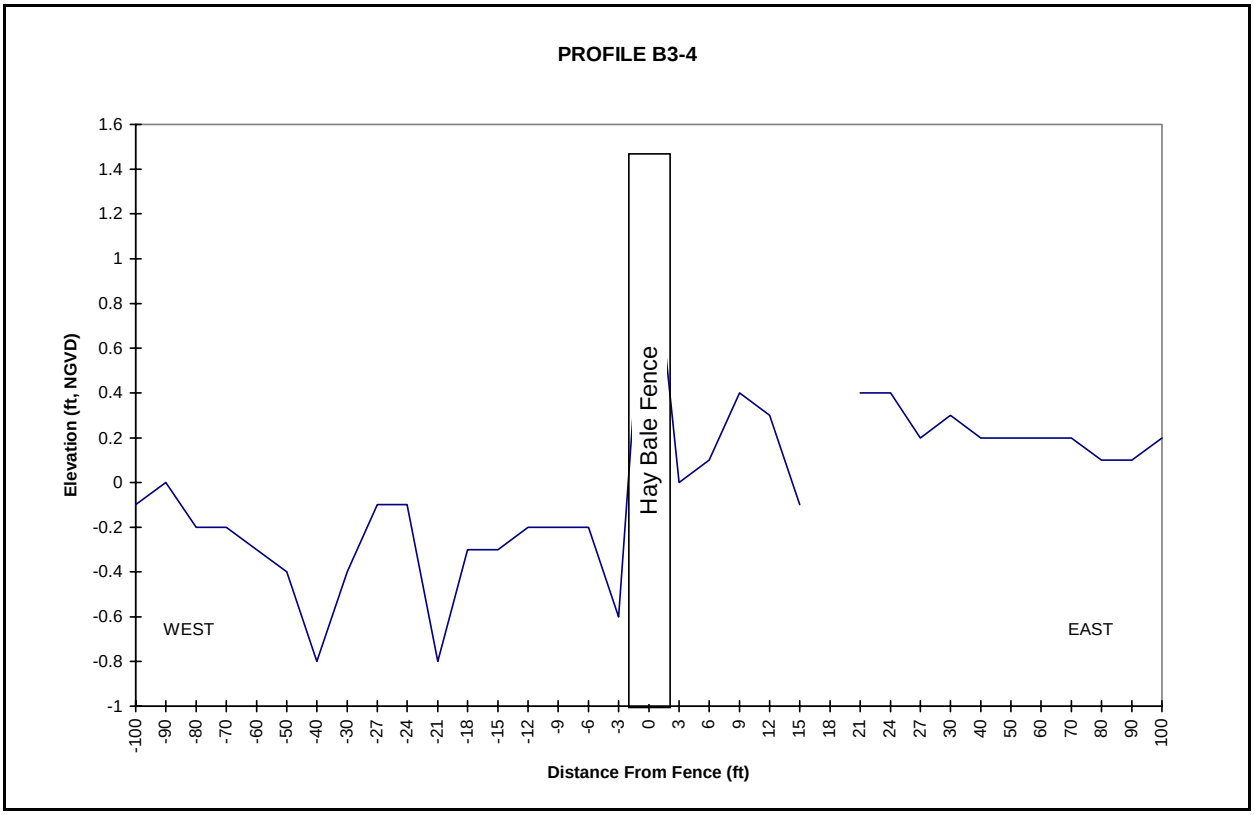


Figure 4. Elevational profile transects 3 and 4 across hay bale fence B3 in the West Hackberry Plantings and Sediment Enhancement (C/S-19) project area, Cameron Parish, Louisiana, surveyed July 1994. (See figure 2 for locations of fence and transects.)

Table 1. West Hackberry Plantings and Sediment Enhancement (C/S-19) project. Postplanting survival and percent cover of California bullwhip plantings in 16 sampling plots, from August 1994 to July 1995.

	1 Month		6 Months		12 Months	
Plot	**% Survival (entire plot)**	**% Cover (1-m^2 plot)**	**% Survival (entire plot)**	**% Cover (1-m^2 plot)**	**% Survival (entire plot)**	**% Cover (1-m^2 plot)**
A1–1	88	5	50	5	50	25
B1–1	75	5	69	20	69	100
B2–1	75	5	75	18	75	100
B2–2	94	5	94	15	94	100
B2–3	100	5	94	5	94	100
B2–4	94	5	75	0	63	0
C1–1	75	5	31	3	19	3
C1–2	94	5	69	3	63	3
C1–3	38	5	38	0	25	0
C2–1	38	5	0	0	0	0
C2–2	56	5	25	0	19	0
C2–3	63	5	50	10	44	50
C2–4	94	5	81	10	81	100
C2–5	94	5	75	40	75	100
C3–1	69	5	50	5	50	25
C3–2	88	5	69	10	69	40
Mean	77%	5%	59%	9%	55%	47%