**Project Planning and Preparation**

**Project Planning Map**
Large-scale (1:7200) maps of the study area were prepared to delineate salt-water-accessible canals, channels, and other waterways where centerline depths were to be surveyed. Planned waterway centerlines were drawn by Lee County Marine Services Program personnel with knowledge of travel routes actually used by boaters. USGS 1-meter DOQQs served as the map base, and other map themes included the locations and characteristics of signs, vertical benchmarks, hydrologic areas, tide gauges, locks, and boat lifts. Hydrologic areas are defined by project personnel to guide the placement of tide gauges and the scheduling of depth survey work. Their inclusion on the planning map was important for complex areas, as exemplified by the City of Cape Coral (Figure 3). The maps served to plan the work schedule, monitor field progress, and annotate areas as they were completed.

![Figure 3. Hydrologic Areas](image)

**Tide Gauge Siting**
During collection of bathymetric data, the water surface elevation relative to mean lower low water (MLLW) varied with local tides, freshwater flows, and environmental effects (e.g., wind). To correct for these effects, all bathymetric data was collected near a gauge or between pairs of gauges. Gauge sites were selected in accordance with NOS and USACE standards required for tidal correction of bathymetric data (National Ocean Service 1999; U.S. Army Corps of Engineers 2001). Definition of hydrologic areas and the spatial distribution of project tide gauges were determined in consultation with Dr. D. Max Sheppard, a Professor in the University of Florida Coastal and Oceanic Engineering
Program (Figure 4). Other factors considered for gauge locations included the availability of safe, secure sites and nearby monuments of known elevation, to which gauges could be referenced.

**Survey Vessel Outfitting**
Survey equipment was securely mounted on the vessel before initiating fieldwork (Figure 5). A 17-foot Key West was used for the bathymetric survey (Figure 5G). A special side mount for the Bathymeter 500MF transducer fits in a rod holder on either the port or starboard side (Figure 5A). The DGPS antenna was attached directly above the transducer mount and, thus, directly over the Bathymeter 500MF transducer (Figure 5A and C). A custom-fabricated mount held the Bathymeter 500MF instrument on the inside, forward, port side (Figure 5D); a custom fabric cover protected the Bathymeter 500MF from spray. The DSM212H DGPS was mounted on the inside back cover of the Bathymeter 500MF. The Horizon DS150 transducer was transom mounted and the DS150 display unit placed on the console, visible to the boat operator. A swivel chair for the equipment operator, forward of the console, replaced the original passenger seat cushion (Figure 5E). A swivel mount, adapted from a commercial monitor stand, held the AMREL laptop forward of the chair (Figure 5B). This mount was bolted to the aft bulkhead of the foredeck. A custom canvas dodger, with a roll-up clear plastic forward window, protected the entire work area from spray and rain and provided shade to improve the laptop computer display visibility (Figure 5G). Two custom 12V outlets, in addition to the cigar lighter on the console, provided power for the survey equipment. A dual-battery system, with a second battery added in parallel with the original boat battery, proved a reliable source of clean instrument power.
FIGURE 4. TIDE STATION LOCATIONS
FIGURE 5. SURVEY EQUIPMENT INSTALLATIONS

A. Bathy 500-MF Sounder, Transducer, and DGPS Antenna
B. Data Collector’s Work Station
C. Bar Check
D. Data Collector During Soundings
E. Data Collector’s Chair and Bathy Sounder Mount
F. Intinities Portable Tide Gauge and Stilling Well
G. Key West 17-foot Boat