

MEMORANDUM FOR All Regulatory Branch Personnel

**SUBJECT: SWG-Standard Operating Procedures (SOP); Recording Jurisdictional Delineations Using Global Positioning Systems (GPS)**

U.S. Army Corps of Engineers Regulatory Guidance Letter 90-6 requires documentation sufficient to allow a reasonably accurate replication of the delineation at a future date. Galveston District (SWG) Policy Statement 98-01 defines reasonably accurate as within 0 to 2 meters. Significant advances in GPS technology allow the recording of differential GPS positions to sub-meter accuracy. This SOP addresses the optional use of GPS equipment for surveying jurisdictional delineations pursuant to Section 10 of the Rivers and Harbors Act and 404 of the Clean Water Act within SWG. The following are procedures for preparing GPS surveys for verification by a representative of the Galveston and Corpus Christi Regulatory Branch field offices:

1. Identification and delineation of wetlands must follow the criteria described in the "1987 Corps of Engineers Wetland Delineation Manual". In the field, sample point locations and survey points should be flagged, staked, or marked appropriately.
2. Documentation of the GPS equipment used must be provided to aid in verifying the accuracy of the survey. The GPS unit must be capable of sub-meter accuracy at each survey point. This accuracy will only be achievable by utilization of differential GPS techniques (either real-time or post-processed).
3. All data must be recorded and submitted as NAD 1983 UTM coordinates. The appropriate UTM zone(s) must be included.
4. The identification of the GPS reference point (a fixed point at a known location) used in the DGPS real-time or post-processed survey to which the survey is tied, also in NAD 1983 UTM coordinates, must be provided.
5. A table listing the attribute data for all vertices of each polygon, line, or data point surveyed and mapped must be provided. The table must include the following information for each point surveyed:
  - a) Unique number and/or name
  - b) NAD 1983 UTM coordinate
  - c) Number of satellites (minimum 4)
  - d) PDOP (position dilution of precision) value of 6 or less.
  - e) 2D RMS (root mean square) calculation. The GPS unit must produce a 2D RMS sub-meter accuracy (within 1 meter of the indicated position 95% of the time.)
  - f) Distances between each consecutively numbered survey point.
6. As an additional measure of accuracy, after all of the wetland boundary points have been surveyed, 10% of the points surveyed should then be repeated. This redundancy will allow us to compare the same point surveyed at two different times and consequently assess the accuracy. Also, one or more property corners and/or monuments should be located by the GPS survey and compared to an existing survey.

7. The wetland survey map must be submitted on 8.5 x11 size paper and as an Arcview (or compatible file) shape file format on a CD-ROM. A large scale, copy of the survey map must also be presented to the Corps representative for field verification purposes. The wetland survey maps must include the following information:

- a) Standard mapping conventions (e.g. north arrow, scale, legend) and features, which facilitate the correlation of map locations with ground features.
- b) A vicinity map.
- c) Reference block which identifies the project, surveyors and date.
- d) Identity, location and size of all Sec. 10 and 404 waters/wetland limits within the property boundaries. Acreage not examined for wetlands should be clearly indicated. Include MHTL, HTL, OHWM where appropriate.
- e) Consecutively numbered delineation boundary points, line segments, and sample points.
- f) The seal and signature of a Registered Professional Land Surveyor (RPLS), certifying each point surveyed to a sub 2-meter accuracy, **when required by SWG**. RPLS seal and signature will be required when: 1) the attribute data requirements listed above are not met; or 2) when delineations are of a complex or controversial nature (including but not limited to delineations involving unauthorized activities, complex forested wetlands, known endangered species, or known cultural resources).

8. The surveyed jurisdictional boundary may be field verified by a representative of SWG accompanied by the surveyor who prepared the information. When feasible, distances between selected GPS survey points will be measured for accuracy. All errors must be corrected before the map will be verified.

  
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