Appendix 1.

Appendix 1. Seagrass Classification System

The seagrass classification system that has been used for a large extent of the seagrass mapping of the northern Gulf of Mexico was developed beginning in 1990 at the "Seagrass Mapping Meeting" hosted by the Environmental Mapping and Assessment Program (EMAP) of the U.S. Environmental Protection Agency. The development of the classification scheme was a collaboration among the U.S. Fish and Wildlife Service's (now in the U.S. Geological Survey) National Wetlands Research Center (NWRC) in Lafayette, La.; the National Oceanic and Atmospheric Administration's (NOAA) Center for Coastal Fisheries and Habitat Research in Beaufort, N.C.; and the Florida Department of Environmental Protection's Florida Marine Research Institute (FMRI) in St. Petersburg, Fla. The classification scheme was presented in 1992 at the "Seagrass Monitoring and Research in the Gulf of Mexico Workshop" at the Mote Marine Laboratory in Sarasota, Fla.

The seagrass classification scheme developed was designed for use with natural color aerial photography at an optimal scale of 1:24,000 or larger (Handley, 1996). At 1:24,000 scale for both the aerial photography and the base maps, the minimum mapping unit is nominally 0.4 ha (1 acre); however, at this scale seagrass units have been delineated to 0.2 ha (0.5 acre) consistently. The seagrass classification scheme was developed as a hierarchical system (fig. 1). General consensus of the seagrass mapping community was that the simpler the system, the greater the chance of consistency and improved accuracy in the mapping results, the easier the use with multiple scales of aerial photography and emulsions, and the greater the opportunity for replication of the mapping over several time periods. The intent of the scheme is to describe the morphology of the seagrasses present (percent of ground cover with respect to spatial extent), not the biomass density (shoots per square meter) of the seagrasses within the beds. While interpretation of seagrass densities has been performed with inconsistent results, morphological classification of spatial structure (i.e., continuous versus patchy) of seagrass habitats has been possible to map accurately and with consistency (Handley, 1994).

The scheme begins with determining the presence or absence of submerged aquatic vegetation—either seagrass or algae on aerial photographs. The imagery signatures of seagrass and algae are generally identical; as a result algae is indicated as present only if groundtruthed or known by expert opinion, and otherwise the signature is considered to be seagrass. The seagrasses are further subdivided into two classes—continuous beds and patchy beds. The definition of a continuous bed is an area of seagrass over 0.4 ha (1 acre) in size with less than 15% bare sediment observed within the delineated area. Patchy beds are defined as scattered units of seagrasses that are less than 0.4 ha (1 acre) in size each and have 15% or more bare sediment observed between and among the patches. Thus, numerous patches are aggregated into a single area. The patchy class is further subdivided into subclasses based on the percent ground cover of patches within the area delineated and in 5% increments: very sparse patchy seagrass (PSG1) (0%–10%, very sparse); sparse patchy seagrass (PSG2) (15%–40%, sparse); moderate patchy seagrass (PSG3) (45%–70%, moderate); and dense patchy seagrass (PSG4) (75%–85%, dense). The U.S. Department of Agriculture (USDA)

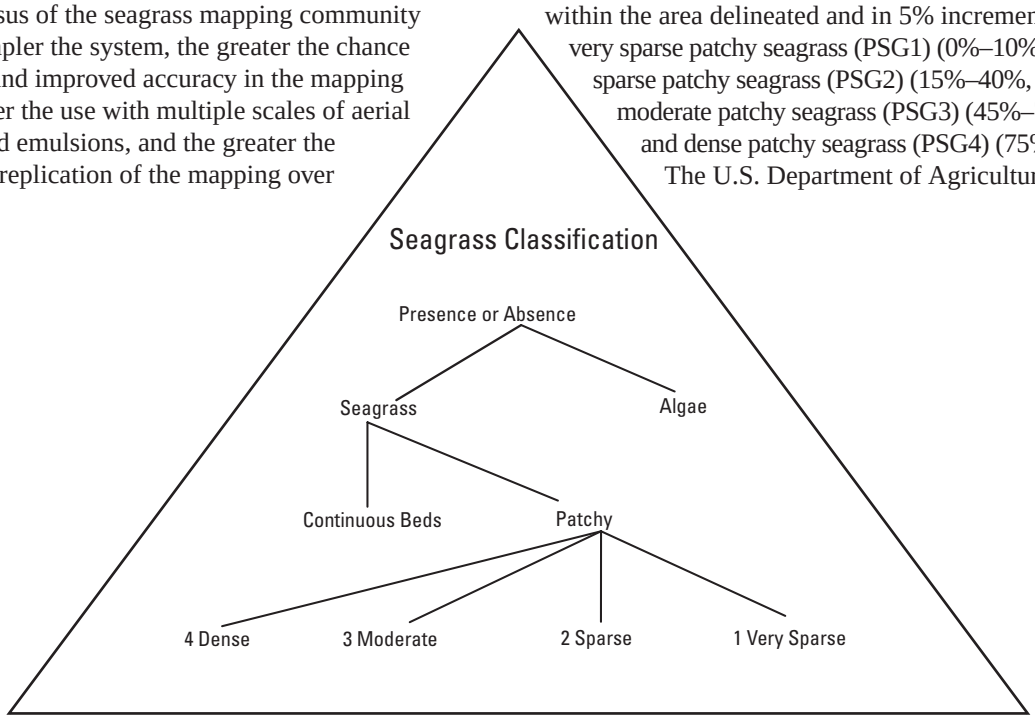

Figure 1–1. Seagrass classification scheme used in U.S. Fish and Wildlife Service and U.S. Geological Survey mapping projects.

Forest Service's percent crown cover density scale (Paine, 1981) has been modified to be used as the optical measure to determine percent cover at multiple scales of aerial photography used in the seagrass mapping projects (fig. 2).

If this seagrass classification scheme is used to map seagrass distributions, it will result in a hierarchical scheme by using a consistent methodology and proven source of imagery. This scheme does not provide a reference to the actual seagrass biomass of the continuous or patchy beds. For example, there can be sparse (less than 50 shoots per square meter) continuous beds; sparse (less than 50 shoots per square meter) continuous beds with areas of dense (greater than 50 shoots per square meter) seagrasses within them; and of course, sparse (less than 50 shoots per square meter) and dense (greater than 50 shoots per square meter) patchy beds.

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Paine, D.P., 1981, Aerial photography and image interpretation for resource management: New York, John Wiley & Sons, 422 p.

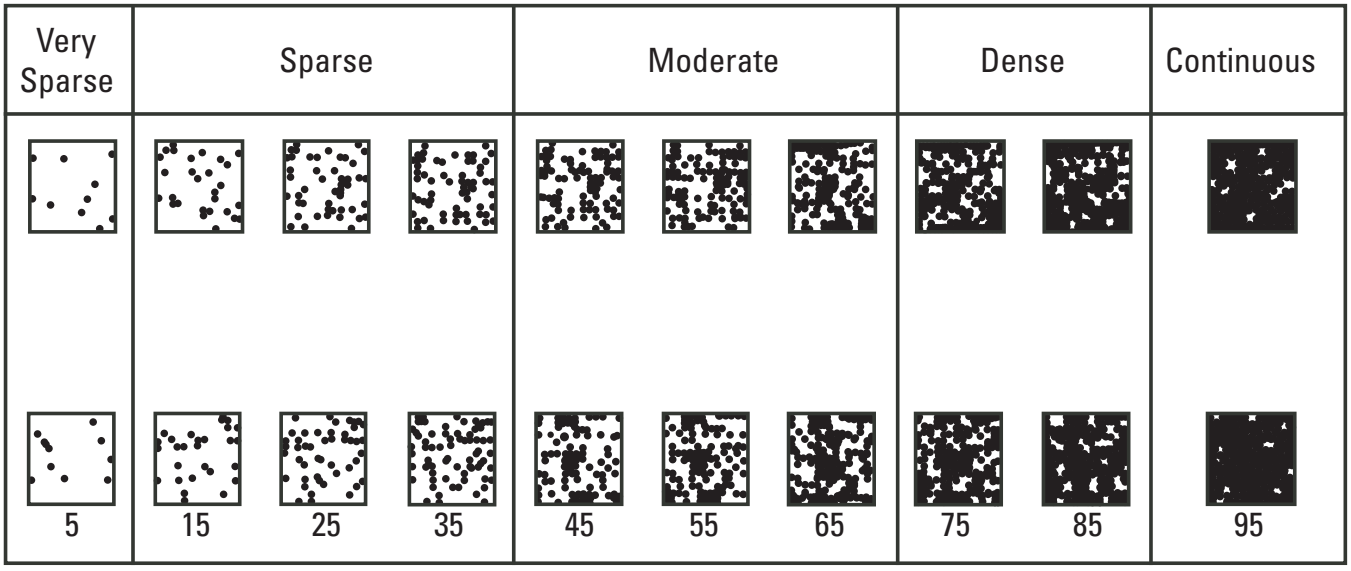

Figure 1–2. Percent cover (5% increments) of patch density and continuous seagrass for photointerpretation.

Photographs courtesy of the following:

Pages 2, 36, 37, 53, 75, 258, 259: T. Michot, U.S. Geological Survey.
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