The source regions of region-0 (R0), region-1 (R1), and region-2 (R2) field-aligned currents (FACs) were statistically determined using DMSP particle precipitation and magnetometer data. Each current within a FAC sheet originates from more than one region in the magnetosphere, depending on the latitude and magnetic local time (MLT). R2 originates mostly from the central plasma sheet (CPS) and boundary plasma sheet (BPS) in the morning; and CPS, BPS, and inner magnetosphere in the afternoon; all of which are on closed field lines. Near noon, some R2 may originate from low-latitude boundary layer (LLBL), which is located near the magnetopause and can be open or closed. R1 mostly maps to BPS, hence on closed field lines, in morning and afternoon, but near noon, it maps mostly to LLBL. LLBL source region can be found more frequently in the dawn-noon sector than noon-dusk sector. On the other hand, R0 is located mostly on open field-lines and is associated mostly with mantle precipitation. However, the mantle precipitation has a dependency on the polarity of R0. Within up-flowing R0, sometimes an upward field-aligned electric field, which accelerates electron downward and retards ion precipitation, modifies mantle distribution to look more like those of polar rain or BPS. This electric field has the opposite polarity to the background electric field that maintains charge-quasi neutrality and that limits some solar wind electrons from entering the magnetosphere in the mantle and polar rain regions. Implications to current generation mechanisms are discussed.