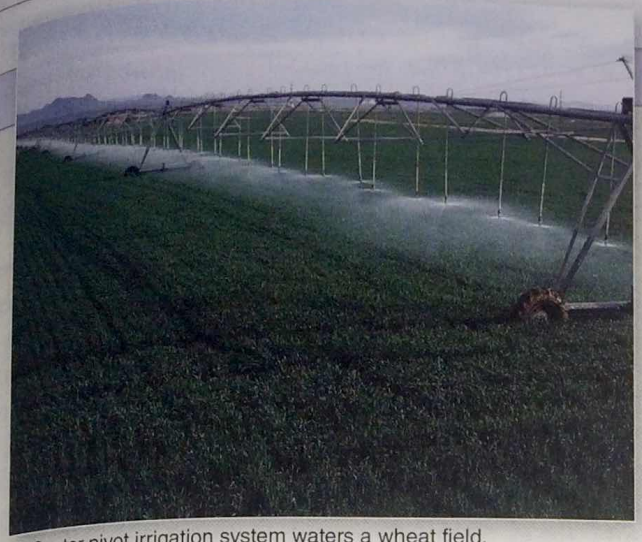
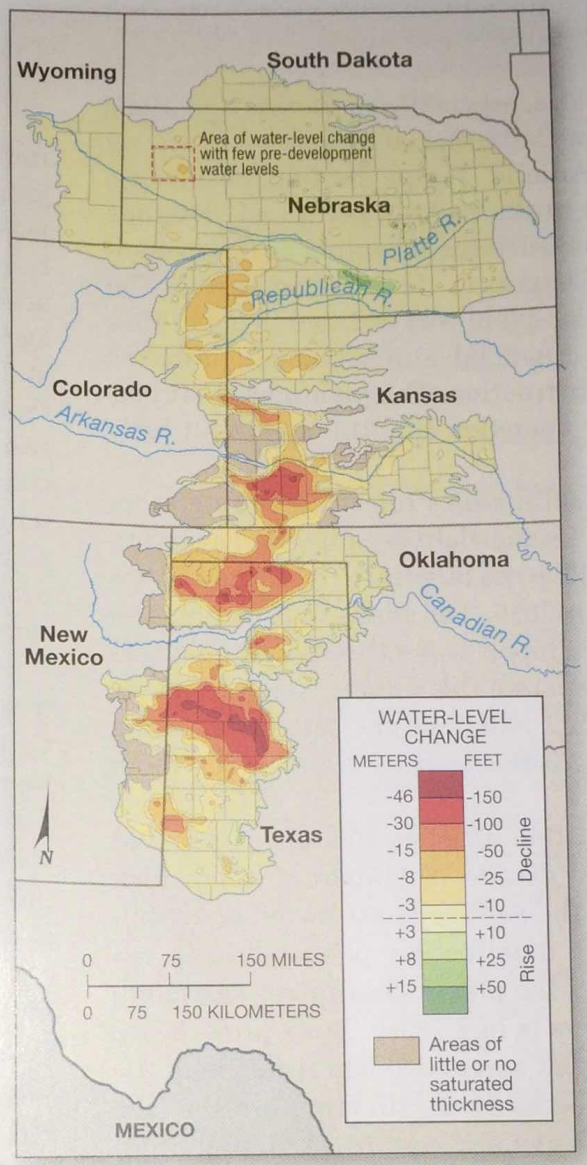


(a) Center-pivot irrigation system waters a wheat field.

(b) A pattern of quarter-section circular fields results from center-pivot irrigation systems near Dalhart, Texas. In each field, a sprinkler arm pivots around a center, delivering about 3 cm (1.18 in.) of High Plains Aquifer water per revolution.

▲**Figure 9.2.2 Center-pivot irrigation.** [(a) Gene Alexander, USDA/NRCS. (b) USDA National Agricultural Imagery Program, 2010.]



◀**Figure 9.2.3 Water-level changes in the High Plains Aquifer, 1950 to 2011.** The color scale indicates widespread declines and a few areas of water-level rise. [Adapted from "Water-level and storage changes in the High Plains aquifer, predevelopment to 2011 and 2009–2011," by V. L. McGuire, USGS Scientific Investigations Report 2012–5291, 2013, Fig. 1; available at http://ne.water.usgs.gov/ogw/hpwlms/.]

the southern High Plains. Present irrigation practices, if continued, will deplete about half of the High Plains Aquifer (and two-thirds of the Texas portion) by 2020. Eventually, farmers will be forced to switch to non-irrigated crops, such as sorghum, and these are more vulnerable to drought conditions (and will also yield smaller economic returns). Add to this the approximate 10% loss of soil moisture due to increased evapotranspiration demand caused by climatic warming for the region by 2050, as forecast by computer models, and we have a portrait of a major regional water problem.