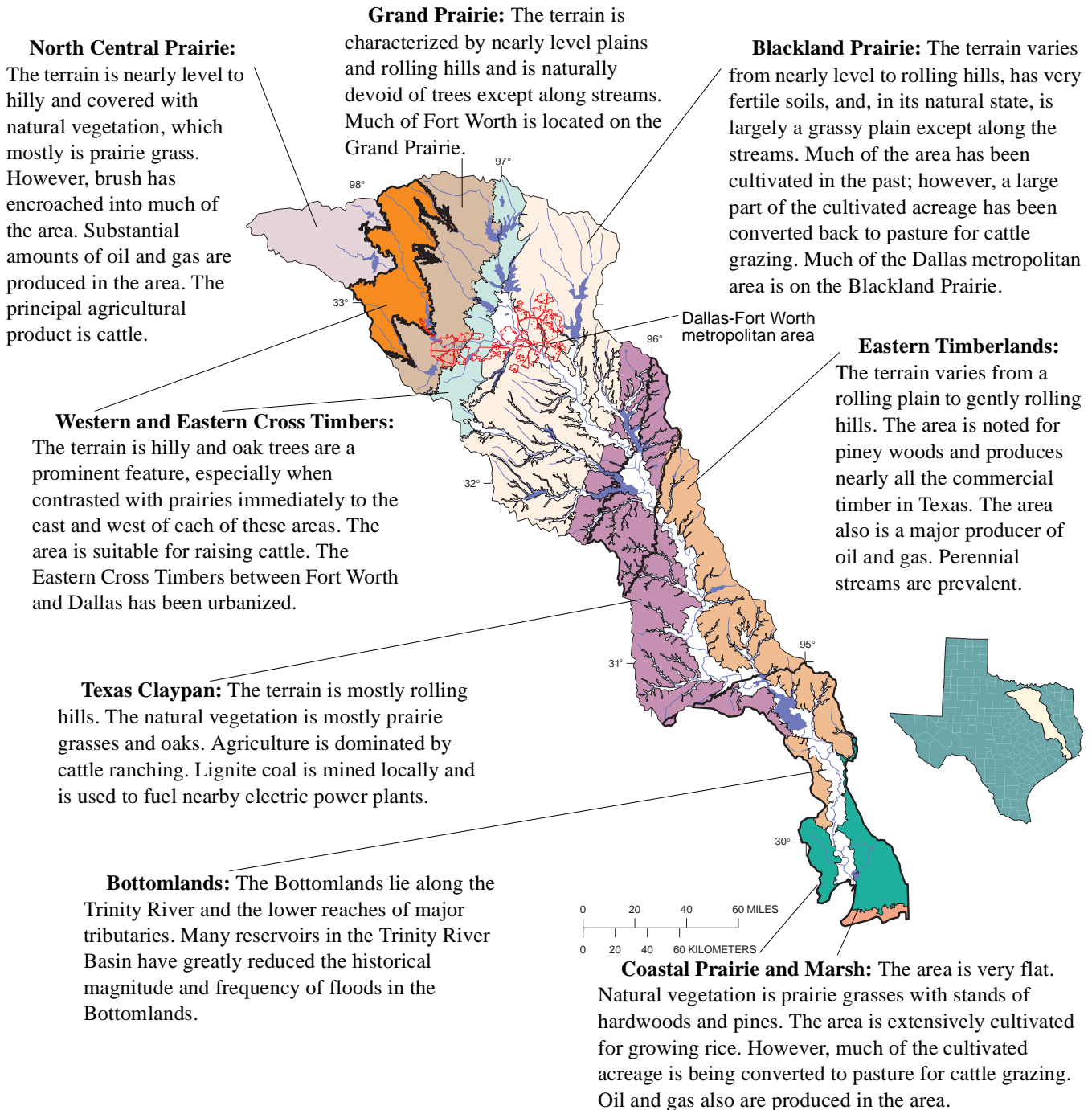


ENVIRONMENTAL SETTING AND HYDROLOGIC CONDITIONS IN THE TRINITY RIVER BASIN

The environmental setting is an integration of many physical and hydrologic features and human activities. Physical and hydrologic features include location, topography, physiography, geology, soils, climate, natural vegetation, streams, and aquifers. A classification of Integrated Land Resource Units characterizes the physical and hydrologic features (Ulery and others, 1993). Past and current human activities, including construction of reservoirs, urbanization, farming, ranching, and oil and gas production, have greatly altered the natural environment in the Trinity River Basin.



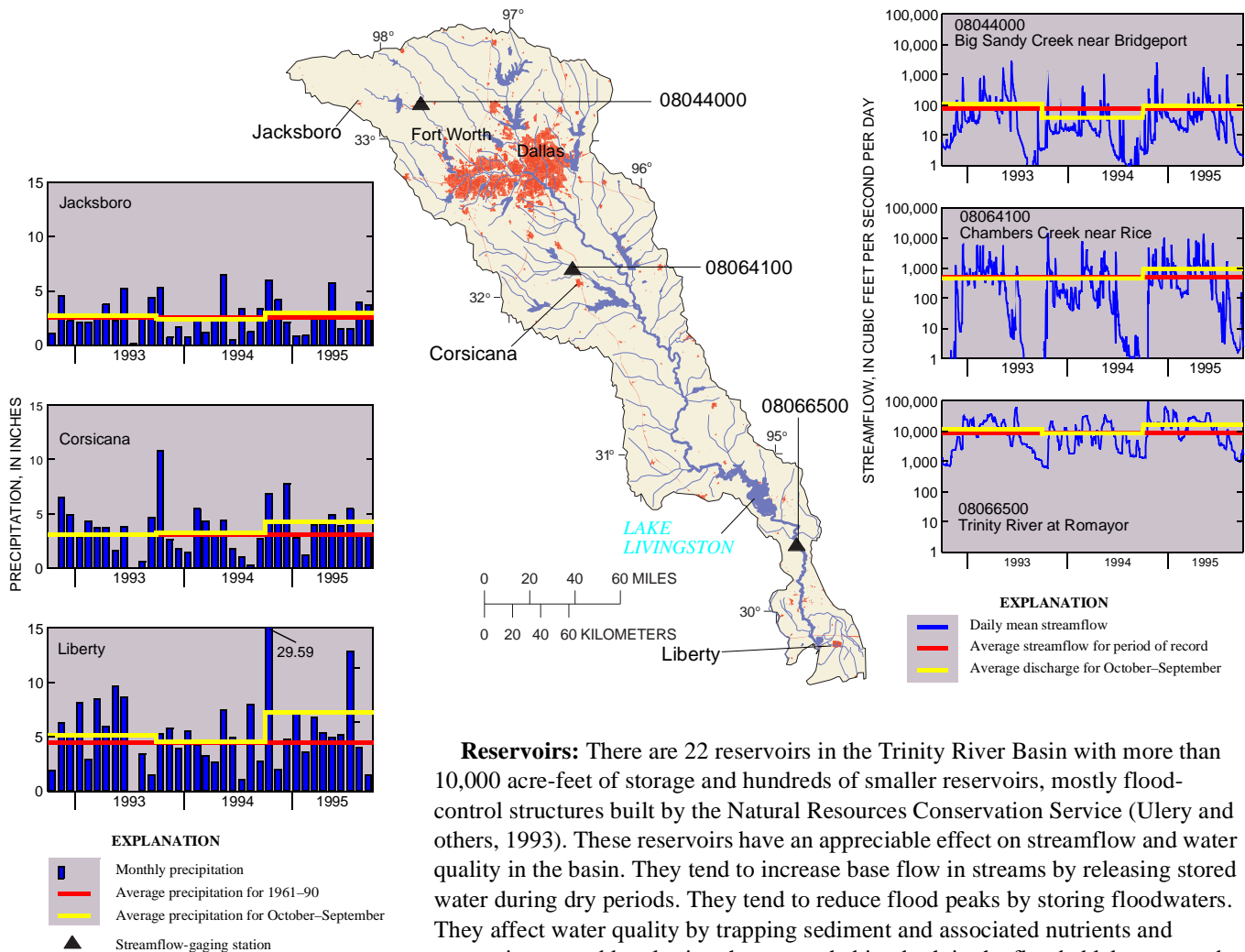
Surface water, almost entirely from reservoirs, supplies more than 90 percent of the water used in the basin. With the large population and concentration of businesses and industries in the Dallas-Fort Worth area, many reservoirs have been built for water supply and flood protection. Relatively little water is used for irrigating crops. Aquifers outcrop in all or parts of the Western and Eastern Cross Timbers, Eastern Timberlands, Texas Claypan, and Coastal Prairie and Marsh. Ground water is used for municipal and domestic supply in some of the smaller towns and in rural areas.

ENVIRONMENTAL SETTING AND HYDROLOGIC CONDITIONS IN THE TRINITY RIVER BASIN

Hydrologic conditions in the Trinity River Basin are best characterized by precipitation and streamflow. Precipitation varies considerably across the Study Unit, with average annual rainfall ranging from about 27 inches in the northwestern part to about 52 inches in the southeastern part. Streamflow generally is proportional to precipitation and the size of the watershed, except downstream from reservoirs and point sources such as wastewater-treatment plants. To characterize the hydrologic conditions in the Trinity River Basin during the March 1993–September 1995 intensive sampling phase, monthly precipitation and daily streamflow from October 1992 to September 1995 at selected stations are graphed and interpreted.

Precipitation: Essentially all the precipitation in the Trinity River Basin is rain. At the three selected precipitation sites across the basin, rainfall was about normal in 1993 and 1994 and about one-third greater than normal in 1995. The greatest flooding occurred in October 1994 in the southern part of the study area where 18.5 inches was recorded in 1 day and more than 26 inches in 3 days. The rainfall data suggest that water-quality data collected during and shortly after the October 1994 flood would reflect unusual hydrologic conditions.

Streamflow: Two stream configurations are in the Trinity River Basin; one is tributary streams and the other is the main stem of the Trinity River. Much of the water in tributary streams is captured by reservoirs and becomes a water supply. Water in the main stem provides water to Lake Livingston, also used for water supply, and to coastal bays and estuaries. The hydrographs for two tributaries, Big Sandy Creek and Chambers Creek, show streamflow decreases to relatively low levels each year during the summer. Flow in the Trinity River at Romayor, about 70 miles upstream from the mouth, is controlled by releases from Lake Livingston. The hydrographs indicate that data collected during the sampling period are representative of normal conditions, except during 1995 in the lower reach of the Trinity River when flows were well above average.



Reservoirs: There are 22 reservoirs in the Trinity River Basin with more than 10,000 acre-feet of storage and hundreds of smaller reservoirs, mostly flood-control structures built by the Natural Resources Conservation Service (Ulery and others, 1993). These reservoirs have an appreciable effect on streamflow and water quality in the basin. They tend to increase base flow in streams by releasing stored water during dry periods. They tend to reduce flood peaks by storing floodwaters. They affect water quality by trapping sediment and associated nutrients and contaminants and by altering the stream habitat both in the flooded lake area and downstream.