

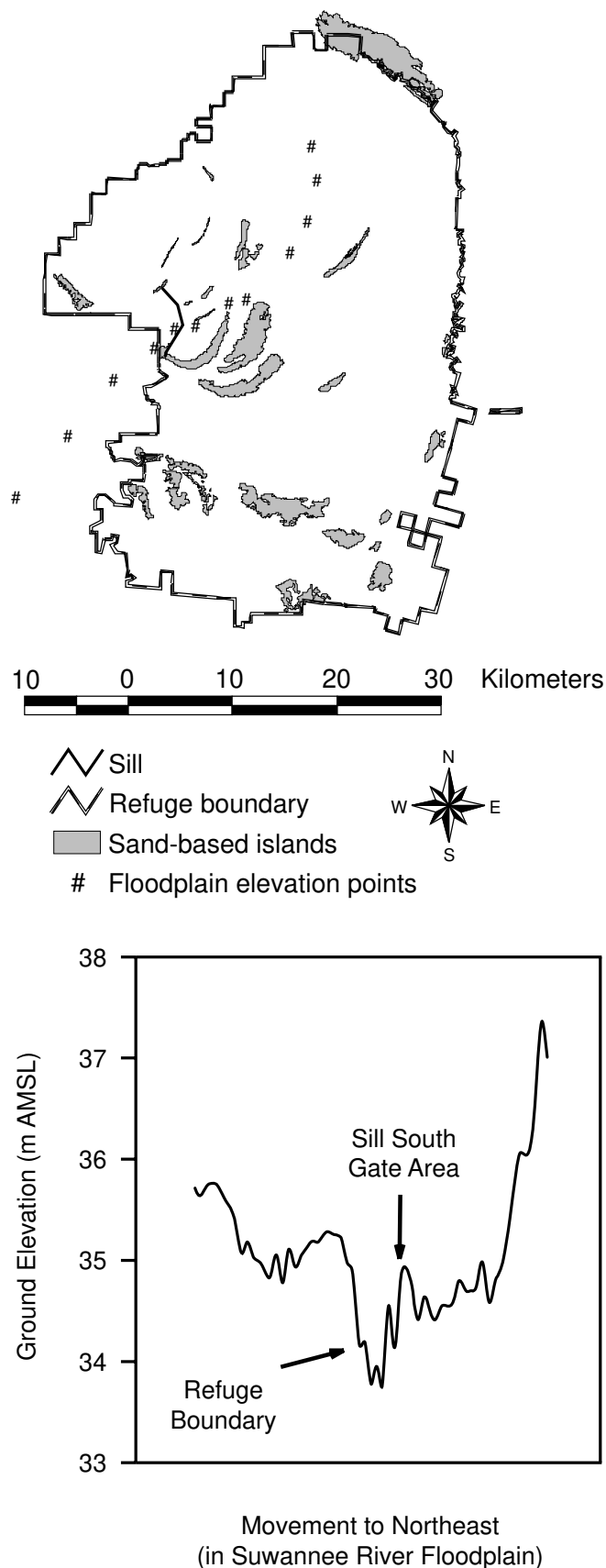


Figure 5—Elevation changes in the Suwannee River channel and floodplain in the Okefenokee National Wildlife Refuge and southwest of the Suwannee River sill.

Manipulations of evapotranspiration (ET) rates to examine potential effects of vegetation change on swamp water levels indicate that regional differences exist in the influence of this process on the swamp hydrology (fig. 4). Changes in ET volumes had significant effect throughout the swamp, particularly in basins outside the Suwannee River floodplain. Regional differences in vegetation distributions and topographic relief drive these responses. The higher topographic gradient in the river floodplain emphasizes changes in outflow volumes in the western swamp, whereas the prevalence of open water, aquatic and herbaceous prairie and the low topographic gradient are probably responsible for the importance of ET in the water budget in the remainder of the swamp.

The Sill's Effects on Wildfire Occurrence

More fires were reported in the Okefenokee Swamp during the with-sill period (151) than during the century prior (98) to its construction. Burned area decreased after sill construction, although this decrease was probably not due to the sill since water levels were low or at drought levels when most of the fires were ignited, and the fires occurred outside of the low-water and drought impoundment areas. The decrease was more likely due to fire suppression efforts and the absence of severe drought during 1960-1993 (Loftin 1998). Since 1855, 37 fires were reported in the area affected by the sill impoundment; 18 of these fires were prior to sill construction, and 11 were in the watersheds of the southwestern creeks (Loftin 1998). Most of the wildfires (25) in the sill-affected area ignited during June-October, when lightning strikes are most common and water levels rapidly decline in the absence of precipitation (Loftin 1998). Greatest impoundment usually occurs during winter months, when thunderstorms and lightning activity are infrequent, and water level accumulation occurs with reduced levels of evapotranspiration. The sill increases water levels during dry periods only in the immediate river floodplain of the southwestern swamp (fig. 4). Fire exclusion throughout the swamp will never be achieved with the present sill due to the limited affected area (18% of the swamp at high water levels) and seasonality of impoundment. Because the swamp hydrologic system is so tightly linked with area rainfall and evapotranspiration, the sill cannot impound enough water during the period when its impoundment effects are most needed to counteract drought and arrest wildfire spread.

The Sill's Effects on Swamp Vegetation

Types of vegetation changes occurring in the sill impoundment area mirror those in the remainder of the swamp, although change rates differ (Loftin 1998). Wet forest initially increased in the river floodplain affected area during 1952-1977 and was persistent during the next 13 years, whereas shrub, prairie and upland pine coverages were nearly halved during 1952-1990 (Loftin 1998). These changes occurred at rates slower than the surrounding swamp during 1952-1977 and then greater than the surrounding swamp during 1977-1990 (Loftin 1998). Shrubs flooded during the initial impoundment did not survive unless located on elevated surfaces. The apparent increase in proportion of