mode of formation, which is largely controlled by the geology and hydrology of the area. Descriptions of the types of sinkholes are presented below.

2.5.1.2.1.3.2.1 Solution Sinkholes

Solution sinkholes occur in areas where limestone is exposed at the land surface or is mantled by only a thin layer of cover (Figure 2.5.1-240). Solution is most active at the limestone surface and along joints or fractures or other openings in the rock that permit water to move easily into the subsurface. Large voids commonly do not form because subsidence of the soil layer occurs as the surface of the limestone dissolves, resulting in a gradual downward movement of the land surface and in development of a depression that collects increasing amounts of surface runoff as its perimeter expands. This type of sinkhole generally develops as a bowl-shaped depression with the slope of its sides determined by the rate of subsidence relative to the rate of erosion of the walls of the depression from surface runoff. Surface runoff may carry sand and clay particles into the depression, resulting in an impermeable seal in the bottom of the sinkhole. Due to these impermeable seals, marshes and lakes form covering these sinkholes. This process produces an undulating topography characterized by shallow depressions and is common over large parts of Florida. The LNP site lies completely within the area dominated by solution sinkholes (Figure 2.5.1-237). (Reference 2.5.1-317) This type of sinkhole is recognized and is likely to develop on the LNP site over a long timeframe as slow dissolution of the carbonate (dolostone) surface occurs..

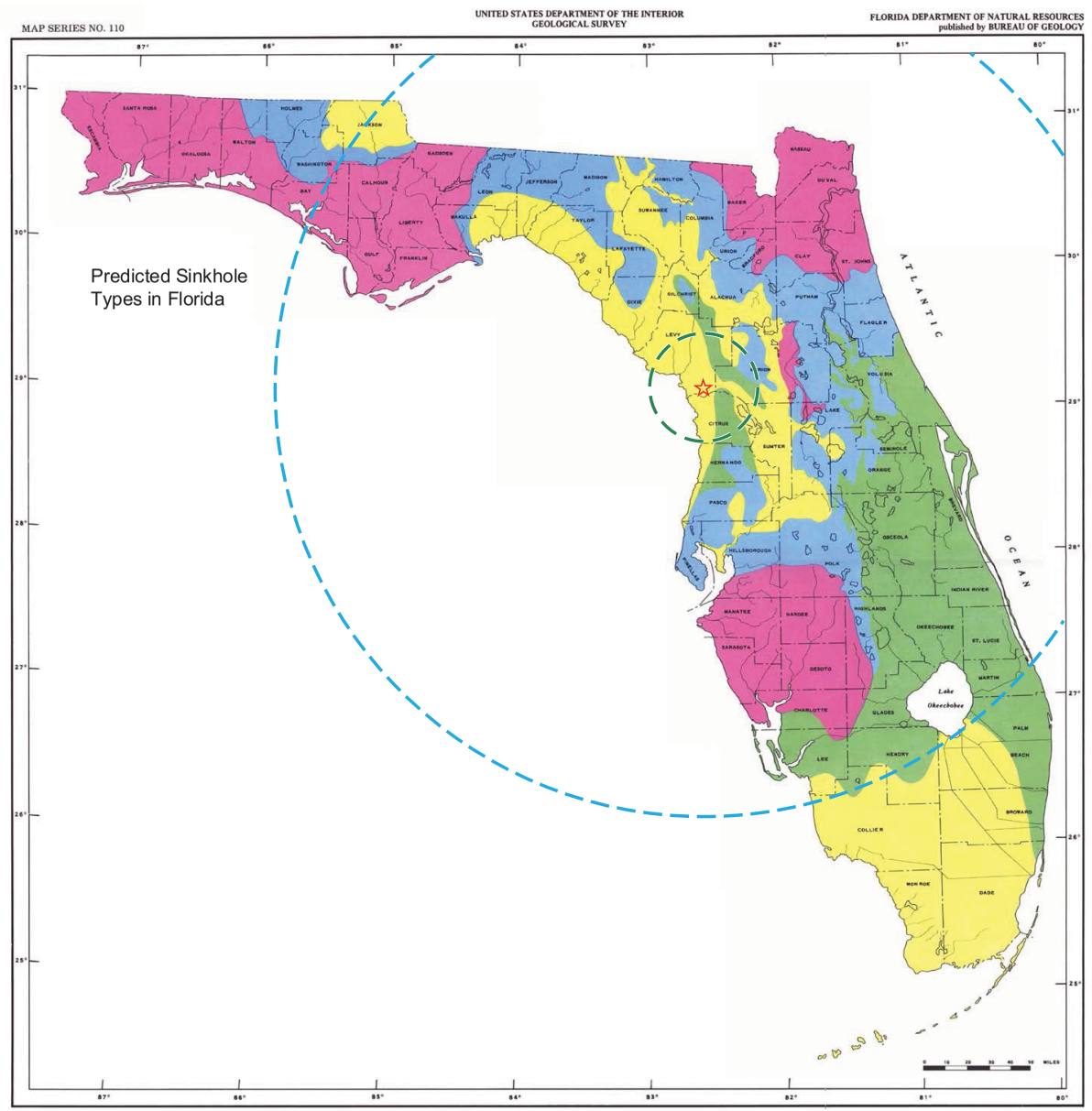
2.5.1.2.1.3.2.2 Cover-Subsidence Sinkholes

Cover subsidence sinkholes commonly develop where the cover material is relatively cohesion less, permeable, and individual grains of sand move downward to replace other sand grains that have moved to occupy space formerly held by the dissolved limestone (raveling process) (Figure 2.5.1-241). Where the limestone is buried beneath a sufficient thickness of unconsolidated material, few sinkholes develop. Areas where the sand cover is as much as 15 to 30 m (50 to 100 ft.) thick may develop cover subsidence sinkholes that are only a few feet or meters in diameter and depth. (Reference 2.5.1-317) The limited size is due to the fact that the solution cavities in the limestone cannot develop to appreciable size before they are filled with sand. Thousands of cypress heads in west-central Florida occupy depressions formed by cover subsidence sinkholes. (Reference 2.5.1-320) This type of sinkhole occurs east of the LNP site on the Brooksville Ridge (Figure 2.5.1-237).

2.5.1.2.1.3.2.3 Cover-Collapse Sinkholes

Cover-collapse sinkholes occur where a solution cavity develops in the limestone to a size such that the overlying cover material can no longer support its own weight (Figure 2.5.1-242). Cover-collapse sinkholes provide dramatic local changes in topography. They may occur in any area of soluble rocks; however, they are less likely to occur in areas of deeply buried rocks. Cover-collapse sinkholes generally occur in areas where the limestone is near the land surface

LNP COL 2.5-1



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LEGEND

- LNP Site
- 320-km (200-mi) Radius from Site
- 40-km (25-mi) Radius from Site
- AREA I. BARE OR THINLY COVERED LIMESTONE
  Sinkholes are few, generally shallow and broad, and develop gradually. Solution sinkholes dominate.
- AREA II. COVER IS 30 TO 200 FEET THICK
  Consists mainly of incohesive and permeable sand. Sinkhole are few, shallow, of small diameter, and develop gradually. Cover-subsidence sinkholes dominate.
- AREA III. COVER IS 30 TO 200 FEET THICK
  Consists mainly of cohesive clayey sediments of low permeability. Sinkholes are most numerous, of varying size, and develop abruptly. Cover-collapse sinkholes dominate.
- AREA IV. COVER IS MORE THAN 200 FEET THICK
  Consists of cohesive sediments interlayered with discontinuous carbonate beds. Sinkholes are very few, but several large diameter, deep sinkholes occur. Cover-collapse sinkholes dominate.

Source: Upchurch and Randazzo (1997), modified from Sinclair and Stewart (1985, FGS Map Series 110)

0 50 100 150
Kilometers

0 50 100
Miles

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Units 1 and 2
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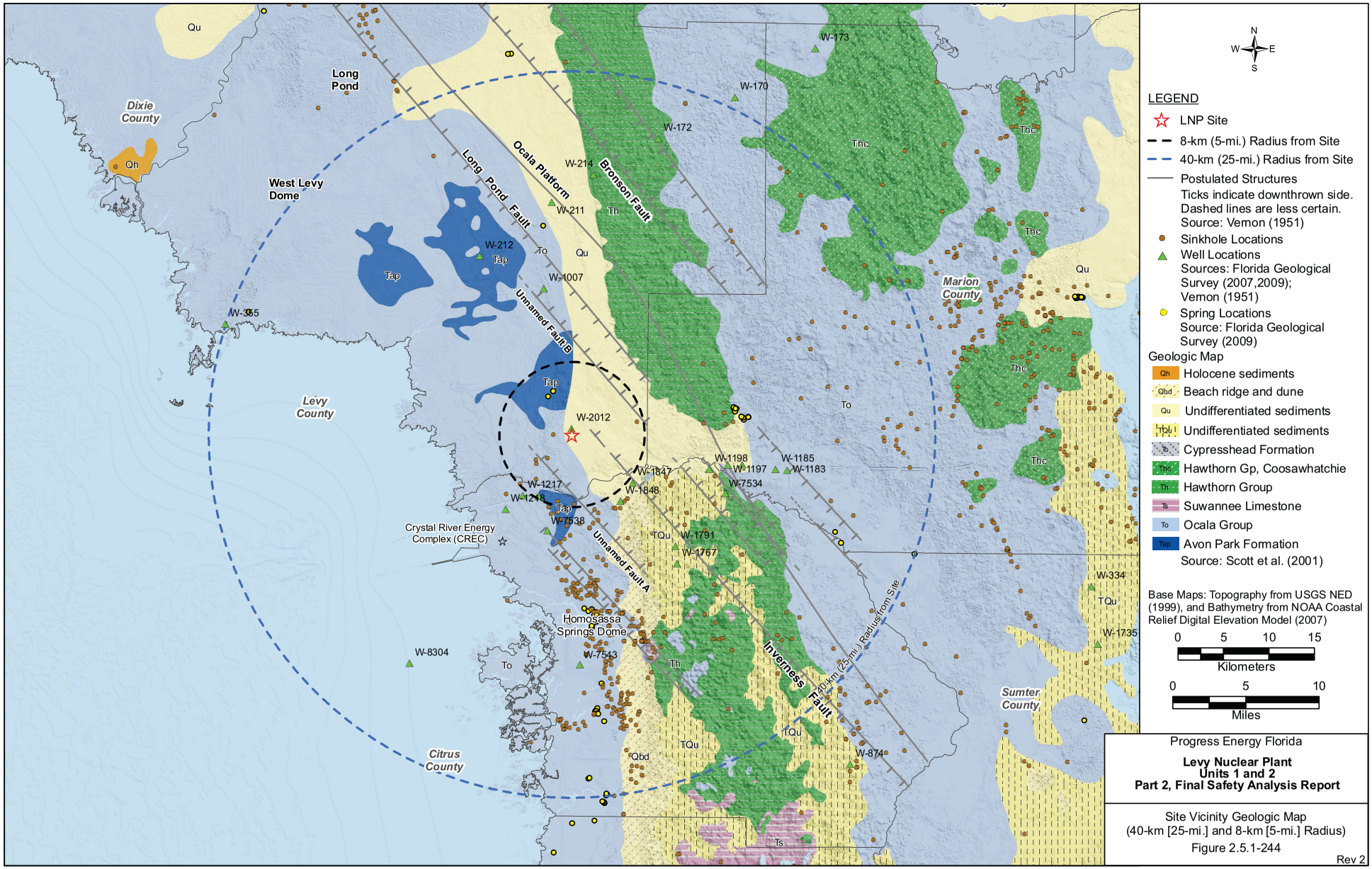
Sinkhole Types Map

Figure 2.5.1-237

Rev 2



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Site Vicinity Geologic Map
(40-km [25-mi.] and 8-km [5-mi.] Radius)
Figure 2.5.1-244

Rev 2