The Upper Wisconsin Dells

Location. The gorge of the Wisconsin River from the dam at the city of Wisconsin Dells northward for 6 km, in Juneau, Adams, Columbia, and Sauk Counties, sec. 28 and 33, T14N, R6E and sec. 3 and 4, T13N, R6E (Wisconsin Dells North, Wisconsin, Quadrangle 7.5-minute series, topographic, U.S. Geological Survey, 1975) (fig. 1). The gorge is most easily seen by boat. Boats can be rented in the Wisconsin Dells area, and tour boats travel the length of the gorge at frequent intervals during the tourist season.

Authors. Lee Clayton and John Attig, 1990.

Terminology. The word "dells" (or "dalles") has been used in Wisconsin for narrow rock-walled river gorges, many of which were cut during the drainage of glacial lakes. The name "Wisconsin Dells" (and the shortened form, "Dells") has been used at least three different ways: (1) the sandstone gorge of the Wisconsin River, consisting of the 6-km-long Upper Dells north of the Wisconsin Dells dam and the 4-km-long Lower Dells south of the dam (fig. 1), (2) the Wisconsin River gorge plus an ill-defined network of associated gorges such as Witches Gulch, Coldwater Canyon, the gorge around Blackhawk Island, and the gorge in Rocky Arbor State Park (all shown in fig. 1), and (3) the city of Wisconsin Dells (shown in lower right corner of fig. 1; formerly Kilbourn).

The Wisconsin River gorge. The width of the Wisconsin River gorge in the Upper Dells ranges from 15 m at The Narrows (the area shown near the middle of fig. 1) to 200 m south of Blackhawk Island and 0.7 km north of Witches Gulch. It is about 20 m deep (down to the water surface) in most places, but it was about 30 m deep before the Wisconsin Dells dam was built.

Before the Ice Age, the rivers of central Wisconsin flowed generally to the east-southeast. During the Wisconsin Glaciation (and perhaps during earlier glaciations as well), the Green Bay Lobe of the Laurentide Ice Sheet blocked the lower reaches of these rivers, forcing the drainage to shift southward along the edge of the glacier and establishing the course of the Wisconsin River as we see it today.

In preglacial time, the Upper Dells area was on the drainage divide between the Lemonweir River valley to the north and the Baraboo River valley to the south. During the height of the Wisconsin Glaciation, the glacier was a few kilometres east of the Upper Dells. At that time the Dells area was submerged under the water of glacial Lake Wisconsin, which formed when the central Wisconsin drainage was dammed by the glacier where it overrode the east end of the Baraboo Hills. Lake level in the Upper Dells area was at about 290 m (950 ft); only the highest hills shown on figure 1 were above water. The gorges in the Dells area were probably cut when glacial Lake Wisconsin drained catastrophically when its glacier dam failed.

Witches Gulch and Coldwater Canyon. Tour boats in the North Dells generally stop at two tributary gorges, Witches Gulch and Coldwater Canyon (fig. 1). They are a few tens of metres deep and only about 1 m wide in places. The gorges appears to be either a series of interconnected potholes or meander loops.

These and similar gorges on the east side of the Wisconsin River gorge could not have been cut by meltwater coming directly from the glacier, as has often been suggested, because any time the glacier was far enough west to send meltwater into this area, it was far enough west to cover the east end of the Baraboo Hills and dam glacial Lake Wisconsin, which completely covered the area of these gorges. Any time this area was exposed to subaerial erosion, the glacier margin had to have been far enough to the east that meltwater flowed southward along the margin east of the Baraboo Hills, completely missing the Dells area. It seems more likely that these gorges were cut by lake water rushing through the Dells area when glacial Lake Wisconsin catastrophically drained.

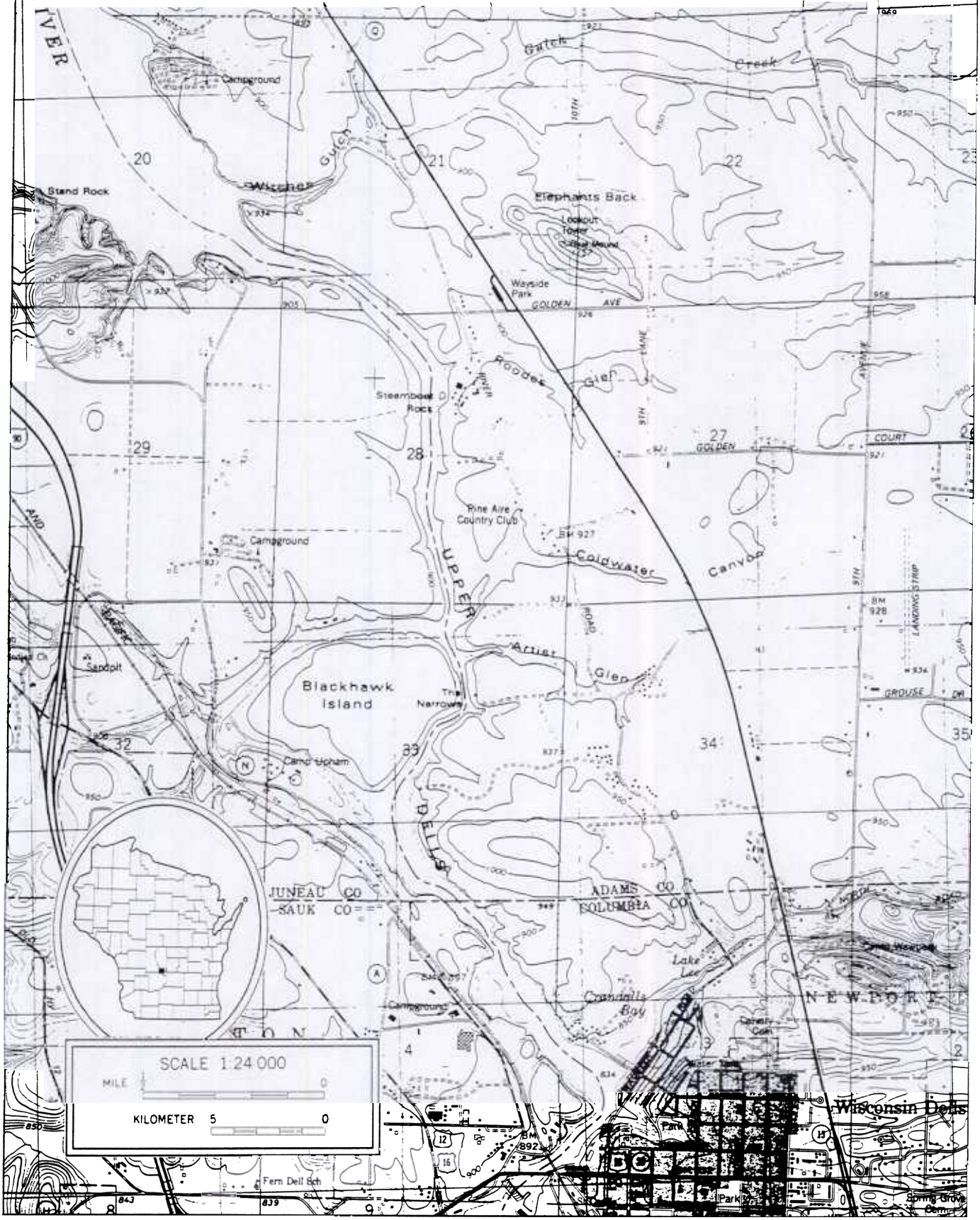

Figure 1. Location of the Upper Dells.

Blackhawk Island and the "Old Channel." The gorge around the west side of Blackhawk Island (fig. 1) has sometimes been called the "Old Channel." It is part of the Dells network of gorges. It joins the north end of the gorge in Rocky Arbor State Park (fig. 1), the south end of which joins Hulburt Creek gorge.

Stand Rock. Stand Rock (area shown in upper left corner of fig. 1) is generally the northernmost tour-boat stop in the Dells. It is a pinnacle of Elk Mound sandstone on the west wall of the Wisconsin River gorge.

Sandstone walls of the gorges. The walls of the Upper Dells gorges are composed of sandstone of the Elk Mound Group, deposited during the Late Cambrian Epoch. Elsewhere in southern Wisconsin, the Elk Mound Group is subdivided, from bottom to top, into the Mount Simon, Eau Claire, and Wonewoc Formations, but the distinction between these units is obscure in the Dells area. Twenhofel and others (1935, plate 151; Trowbridge, 1935, p. 135) considered the Upper Dells sandstone to be part of the Eau Claire Formation; Dott and others (1986) considered it to be part of the Galesville Member of the Wonewoc Formation; Clayton (1990) and Clayton and Attig (1990) considered it to be part of the Mount Simon Formation. The sandstone is poorly cemented and consists largely of unfossiliferous medium to fine quartz sand. The larger grains have undergone considerable rounding. Cross-bedding is conspicuous in the Dells; it is commonly high angled, trough shaped, and large scale, with the larger sets a few metres thick.

The sandstone in the Upper Dells has been studied by Fielder (1985) and Dott and others (1986). They concluded, on the basis of sedimentary structures (including adhesion-ripple bedding), that much of the sand was deposited in a coastal eolian environment.

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