

Geological Survey
And Appraisal of the
Paleontological Resources
of the
Cooper Reservoir Basin
Delta and Hopkins Counties
Texas

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Fondren Science Series: 6

SOUTHERN METHODIST UNIVERSITY PRESS

1964

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SOUTHERN METHODIST UNIVERSITY PRESS
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GEOLOGICAL SURVEY AND APPRAISAL OF THE PALEONTOLOGICAL RESOURCES OF THE COOPER RESERVOIR BASIN, DELTA AND HOPKINS COUNTIES, TEXAS

BOB H. SLAUGHTER*

INTRODUCTION

DURING May and June, 1964, the Shuler Museum of Paleontology of Southern Methodist University made a preliminary geological and paleontological survey of the Middle Sulphur River within the basin of the proposed Cooper Reservoir. The work was done under the sponsorship of the National Park Service (Southwest Region). The Quaternary deposits of the basin were mapped and tentatively correlated with similar ones previously studied in the valley of the North Fork of the Sulphur River. A molluscan fauna of Late Pleistocene age and bones from sub-Recent deposits were recovered and identified. Recommendations are made for two weeks of preliminary work on the Cretaceous and Paleocene bedrock of the basin during the summer of 1965; one month of professional collecting and study of these rocks during the summer of 1966; and two months of student observation of the dam excavation for possible Quaternary bone beds, also during the summer of 1966.

METHODS

Bedrock slopes and probable terrace flats were mapped with the use of topographic maps prepared by the Corps of Engineers (New Orleans Office). The lithologic sequences of each terrace and the floodplain were recorded from observations at exposures and from core samples taken with a hand soil auger. Feeder creeks crossing these terraces and the floodplain were examined, and a few erosional exposures located with the aid of air photographs were visited.

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BEDROCK DEPOSITS

The area of the Cooper Reservoir is underlain by rock units listed below.

<i>Group</i>	<i>Formation</i>	<i>Age</i>
Midway	Wills Point Kincaid	Tertiary
Navarro	Kemp Corsicana (?) Nacatoch Neylandville	Cretaceous

The formations crop out in ENE belts from which they dip to the SSE at 50 to 100 feet per mile. The outcrop belts cross the area somewhat diagonally so that the upper Neylandville, the lower Wills Point, and all of the intervening formations occur within the reservoir boundaries. The outcrop pattern is complicated by faults of the Mexia-Talco System, which passes through the reservoir basin. The Corsicana is shown with question because it may not be developed and recognizable in the area.

The units are poorly known by modern standards, particularly in the Cooper area. Only one, the Nacatoch sandstone, has a type section. Any extensive, clean exposure—such as that of the dam excavation—should reveal a definitive section for these units.

The Navarro Group contains a richly concentrated invertebrate fauna, which was monographed by Stephenson (1941). Five of his localities will be covered by the lake water or endangered through associated activities of lake construction.

Both the Navarro and Midway are known to contain glauconitic and phosphatic lentils from which vertebrate remains may be expected.

STRATIGRAPHY AND PALEONTOLOGY OF THE TERRACES

SECOND TERRACE ABOVE THE PRESENT FLOODPLAIN (T-2)

The T-2 terrace stands some 40 feet above the present floodplain and is well developed at all points except the southeastern slope of the basin. The alluvium averages about 20 feet in thick-

ness. The sediments range from pebble gravel (Wentworth Scale) at the base through whitish sandy clay to dark waxy clay and loam at the surface. Although several fair exposures were observed, no fossils were found. Topographic maps seem to indicate that this terrace may be equivalent to the Prairie Terrace of the Red River, which was considered by Doering (1963) as representing the last major interglacial or interstadial, *circa* 45,000-25,000 B.P. Terraces presumably of similar age on the Trinity and Sabine rivers have proven to be very fossiliferous. Much of the material to be used in the dam construction will be taken from this terrace where it is preserved just north of Doctor's Creek. The alluvium of the T-2 terrace is easily recognized where bedrock is the Neylandville Formation of Upper Cretaceous age, but along the northern rim of the basin it is difficult to distinguish from the underlying Nacatoch.

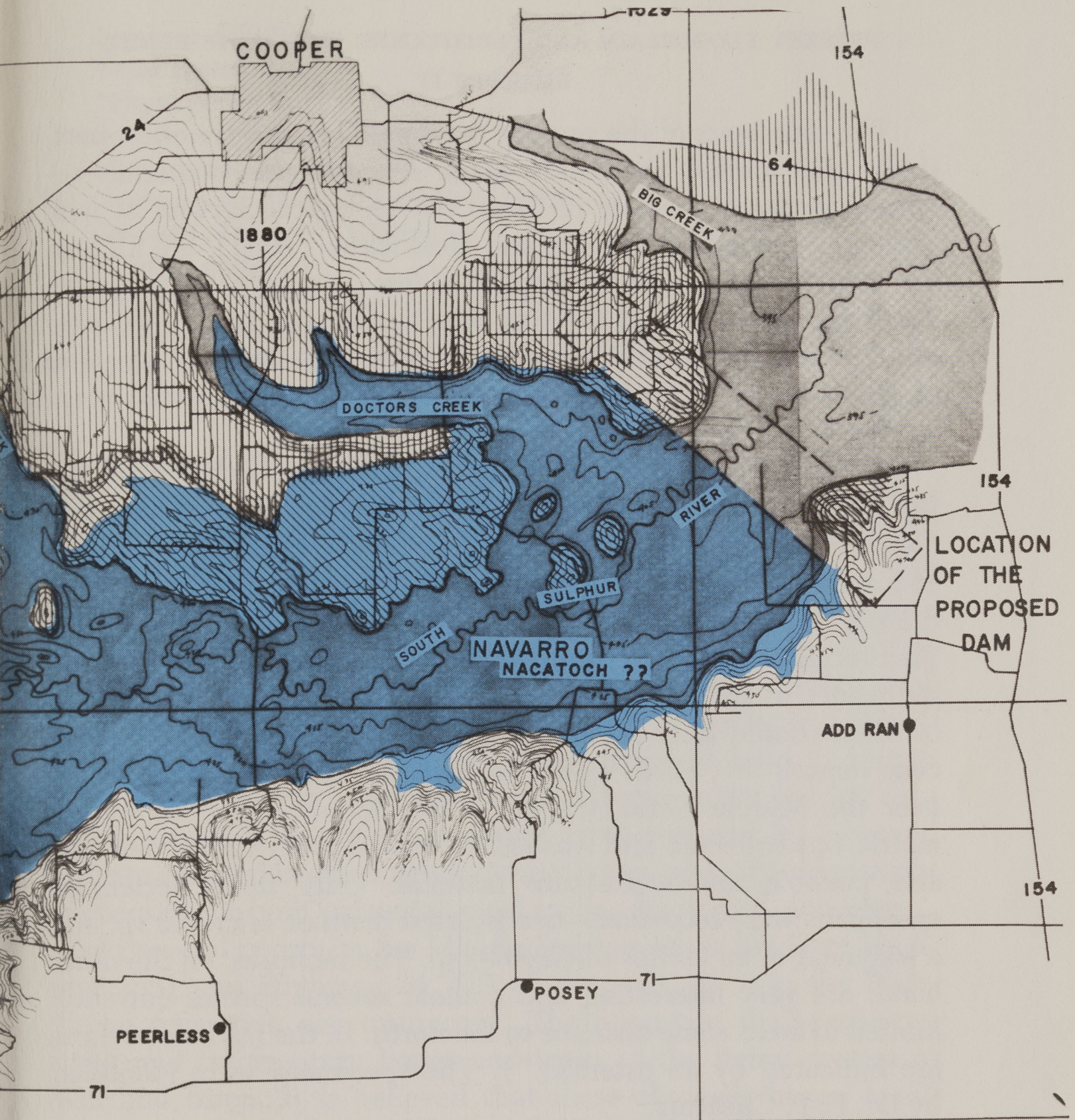
FIRST TERRACE ABOVE THE PRESENT FLOODPLAIN (T-1)

The T-1 terrace stands some 20 feet above the present floodplain and is well developed between John's Creek and Doctor's Creek. These sediments are sandier than those typical of the T-2 terrace and are capped by red clay and gray loam; otherwise the two terraces are quite similar in appearance. The greatest difficulty in distinguishing the T-1 from the T-2 is in areas where the T-2 has been eroded to gentle slopes. The red clay and gray loam also cap these eroded slopes of the T-2. Even so, the T-2 deposits are usually better indurated and thus can be identified upon close examination without consideration of differential elevation. No identifiable bones were recovered.

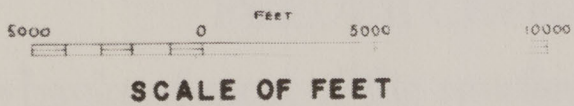
The T-1, like the T-2, will be excavated to some extent in the vicinity of Doctor's Creek during construction.

Archaic points were recovered from the upper portion of the T-1 at several places, indicating an age of approximately 2,000 to 6,000 B.P. for the sediments. Points were found on the west side of the road just north of the river on Harper's Crossing and in typical T-1 deposits that apparently lap upon the eroded slope of T-2 deposits exposed in road cuts of Highway 1531, .9 miles north of Highway 71. All Archaic sites noted seemed to occur at the top of the red sandy clay.





- LEGEND —
- FLOOD PLAIN
 - T-2 TERRACE
 - T-1 TERRACE



QUATERNARY DEPOSITS OF THE COOPER RESERVOIR BASIN DELTA & HOPKINS COUNTIES, TEXAS

PREPARED BY —
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PRESENT FLOODPLAIN AND PLEISTOCENE SEDIMENTS BURIED
BENEATH IT

The sediments of the present floodplain are, for the most part, dark waxy gumbo and sandy loam. Archeological materials reported by the University of Texas Archeological Survey, as well as those reported by Gilmore and Hoffrichter (1964), are all pottery and appear to date the deposit at less than 2,000 years in age. The bones recovered at the Ray Site by Gilmore and Hoffrichter all represent species still living in the area, with the one exception of *Bison bison*. More bone is available here but does not seem worthy of salvaging.

A Pleistocene valley fill is buried six feet below the top of the Recent floodplain. The current gradient is believed to be less than the Pleistocene floodplain, as this deposit is still buried downstream and is exposed only at the west end of the basin. Even here, only the upper ten feet of the at least twenty-foot-thick fill is exposed. This formation is easily distinguished from the overlying Recent sediments, as they are yellow and gray mottled clay. A thin lens of concentrated tests of small mollusks was found in the Pleistocene deposit fifty yards upstream from the Highway 1531 bridge over the Middle Fork. A total of two hundred pounds of the matrix was collected and washed for the recovery of the mollusks and possible microvertebrate material. Only three vertebrate specimens were recovered—two isolated teeth of *Microtus* sp. and a fragment of an incisor of *Geomys* sp. The mollusks, on the other hand, are very interesting and contain several species currently limited to areas some distance to the north. In the list below, these are indicated by an asterisk (*). The specimens were identified by Dr. E. P. Cheatum.

MOLLUSCAN FAUNAL LIST

- Pisidium nitidum* Jenyns
- Sphaerium striatinum* (Lamarck)
- **Amnicola integra* (Say)
- **Somatogyrus depressus* (Tryon)
- **Pomatiopsis lapidaria* (Say)
- Helisoma anceps* (Menke)
- Helisoma trivolvis* (Say)
- **Lymnaea exilis* (Lea)

Lymnaea dalli Baker
Physa anatina Lea
 **Physa gyrina* Lea
Carychium exiguum (Say)
Gastrocopta contracta (Say)
Gastrocopta pellucida hordeacella (Pilsbry)
Pupoides albilabris (Adams)
 **Vertigo ovata* Say
Euconulus fulvus (Muller)
Hawaiiia minsucula (Binney)
Retinella indentata Say
Strobilops texasiana (Pilsbry & Ferriss)

Cheatum and Allen (1963) reported all of these species from the Ben Franklin local fauna, which is situated in the Sulphur River Formation along the Sulphur River's North Fork (Slaughter and Hoover, 1963). This, plus the identical structural situation and lithologic similarities, indicates that both the Pleistocene deposit on the Middle Sulphur River and that of the Sulphur River Formation belong to the same period of valley filling, which took place between 12,000 and 9,000 B.P. Some archeological objects and quantities of faunal material were recovered from the North Fork exposures, but exposures in the Cooper basin are not currently extensive enough to warrant further work. If, however, damsite excavation offers new exposures, they should be thoroughly checked for both paleontological and archeological materials.

At several points on the Middle Sulphur River between Highway 1531 and Highway 24, fills of channels cut into the Pleistocene formation are transected. These contain well-preserved wood and fragmentary bones and teeth of the living species of deer and bison. It is believed that these channels began to fill about 2,000 B.P.—the same time as similar events took place in the valley of the North Fork. It is highly probable that these fills are the source of artifacts recovered from bars and float in the stream bed, though none have been found *in situ*. A large fauna of 2,000-year vintage would be interesting, but no concentrations worthy of quarrying were found.

FEEDER CREEK DEPOSITS

The banks of most of the smaller feeder creeks are masked with

very recent colluvium, and nothing but bones of domestic animals were found. The one exception is the valley of Moore Creek near the south end of the proposed damsite. In this valley excessive downcutting has exposed a valley fill that may or may not be related to the creek itself. The deposit is thirty feet thick, with twenty-five feet presently exposed. It is made up of yellow clay with occasional tiny pebble lenses and overlain with five feet of dark sandy soil. A large bison metatarsal was recovered from this deposit 200 yards downstream from the Harper's Crossing Road. It was approximately twenty feet below the surface and partially mineralized. It is very large for the living *Bison bison* but may be within the size range of that species. It is also well within the size range for the smaller extinct species, *B. antiquus* and *B. occidentalis*. How these sediments fit into the sequence of the main valley is unknown, except that the deposit cannot be the same age as the T-2 terrace. Although no specific proposal is made to work this deposit further, it should be checked periodically for the possibility of recovering something that will clarify its chronologic position.

CONCLUSION

Damsite excavation will offer an almost unique opportunity to collect from several Paleocene and Cretaceous formations in an area where little is known of their fauna. Because of their generally extensive soil and alluvial cover, only one of the rock units of the Cooper area, the Nacatoch sandstone, has a type section. The damsite excavation may be expected to expose clean and complete sections of two or more of these bedrock units. Careful description of these will provide detailed and definitive sections that will serve as types for these units.

Section description should be accompanied by sample collections for future micropaleontological and sedimentological studies, which are extremely valuable in a situation such as this where samples are precisely tied to type stratigraphy.

Also, damsite excavation will surely reveal rich pockets of invertebrate macrofossils which should be collected to provide reference material for distribution to universities and museums. Stephenson's Navarro localities in the Cooper area should be revisited

and collected for the same reason. It may prove desirable to bulldoze these localities to increase the yield.

Glauconitic-phosphatic beds are often unusually rich in vertebrate remains. Although frequently fragmentary, such remains provide a good idea of the fauna and environment. There are several horizons in the Cooper area at which glauconitic beds should occur. Rich localities should be sought by further prospecting of the valley sides prior to excavation and by surveillance of the dam-site during excavation.

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