PALEONTOLOGICAL IMPORTANCE
OF THE
COOPER RESERVOIR BASIN
TEXAS
CRETACEOUS AND TERTIARY

J. D. Powell

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SOUTHERN METHODIST UNIVERSITY PRESS
DALLAS
PALEONTOLOGICAL IMPORTANCE OF THE COOPER RESERVOIR BASIN, TEXAS: CRETACEOUS AND TERTIARY

J. D. POWELL

INTRODUCTION

The area within the proposed Cooper Reservoir lies along the South Sulphur River in southern Delta and northern Hopkins counties, Texas. During July, 1965, the writer, under the patronage of the Shuler Museum of Paleontology, Southern Methodist University, conducted a geologic survey of the area. The purpose of this survey was to examine and identify bedrock (exclusive of Quaternary deposits) beneath the proposed reservoir and to collect fossils wherever found.

The results of the study are to be used in planning and executing additional work during the actual building of the reservoir and the accompanying dam (see map).

PREVIOUS INVESTIGATIONS

Various geologists, mostly those who contributed pioneer efforts in East Texas—E. T. Dumble, R. T. Hill, L. W. Stephenson—mentioned the late Cretaceous and early Tertiary bedrock of Delta and Hopkins counties only by implication. Their reason for this apparent slighting of the area was lack of exposure of the stratigraphic units. Hunt County to the west and Lamar and Red River counties to the north and east contain good outcrops of the rock units in question. A few localities (Stephenson, 1941, p. 10) produced some macro-invertebrate fossils from the lower part of the Navarro clays. No trace of the exposures exists today because

* Arlington State College. The work was done by Dr. Powell as a Research Associate of the Shuler Museum of Paleontology, Southern Methodist University.
of colluvium and soil and vegetation cover. Many of these localities (those north of Cooper) are outside the area of investigation; others are now hidden because of changes in stream courses.

Recent investigations of the Cooper area include those by the U.S. Army Corps of Engineers, who have made excellent maps of the proposed reservoir area, damsite, etc. These maps were especially valuable to the writer in his investigation of the extent of excavation of the damsite and the proposed lake level. Bob H. Slaughter (1964) of the Shuler Museum of Paleontology, Southern Methodist University, conducted an appraisal of the palentological resources of the area with major emphasis on Quaternary river terrace deposits. The present study was conducted after Slaughter's preliminary work revealed the need for it.

METHODS

The accompanying map (pp. 6-7) is an adaptation and modification of the general county highway map of Delta and Hopkins counties prepared by the Texas Highway Department, edition of 1957 (revised to 1964). Air photos of approximately the same scale as that of the map (1" = 1 mile) and photos of a scale 1" = 660' were consulted in prospecting for outcrops of Cretaceous and Tertiary bedrock exposures.

All of the county roads and many others in the proposed reservoir areas were covered by the writer in his prospecting. Many of the streams were walked, a procedure which provided good areal coverage. Significant outcrops, faults, and other localities are shown on map.

Collection of fossils and matrix was done with the aid of a hand soil auger.

STRATIGRAPHY

As was previously reported (Slaughter, 1964, p. 4), the reservoir area is underlain by the following stratigraphic units:

Tertiary System:

Midway Group

Wills Point Fm.

Kincaid Fm.
The accompanying map (pp. 6-7) shows the probable areal distribution of the above rock units in the reservoir area. Certain localities are numbered and given special attention below.

Exposures of all the rock units in the area are poor. Most of the areas of outcrop shown on the map are covered by soil and were located only through the use of high altitude aerial photographs.

**Navarro Group.** The Navarro Group in this area is known only from scattered exposures in gullies or road ditches. The Corsicana marl of the Navarro Group (Slaughter, 1964, p. 4) was not recognized, probably because of facies change.

Clays referred to the Neylandville are exposed just north of Cooper and southwest of that town in ditches along county roads. The latter exposures are badly weathered and no fossils remain. Those exposures north of Cooper (locality 3) are sufficiently distant from the proposed reservoir not to be disturbed by any associated activity. No other exposures of the Neylandville were seen. Others mapped but not marked by a locality number (see map) were inferred from air photographs, and field checking of those spots indicated no significant exposures. Hand-auger holes in these areas revealed nothing but reworked and extremely weathered clays.

The presence of the Nacatoch Formation is inferred from occurrences of sand in soils and stratigraphic position. The writer was not able to find any exposure of definite Nacatoch. Some concretions of calcareous gray sandstone occurring as float are probably referable to the Nacatoch.

The Kemp Clay is by far the most conspicuously exposed formation of the Navarro Group in the reservoir area. It crops out along the north slope of Hurricane Ridge in northern Hopkins County and south of the South Sulphur River. Here a few gullies and road ditches expose fairly fresh fossiliferous clay containing irregular calcareous septarian concretions. The concretions are
not known to contain fossils. The enclosing clays, however, are richly fossiliferous, containing a few fragments of molluscs and a distinctive microfauna of foraminifers and ostracods, some of which are listed below.

**Foraminiferida:**
- *Haplophragmoides* sp. aff. *H. excavata* Cushman & Waters
- *Nodosaria affinis* Reuss
- *Vaginulina cretacea* Plummer
- *Anomalina* sp.

**Ostracoda:**
- *Alatacythere* spp.
- *Cythere? acutocaudata* Alexander
- *Cythere huntensis* Alexander
- *Cytheridea* sp.

The clays of the Kemp were nowhere found to be glauconitic or phosphatic. Distinctive white nodules up to 1 cm. in diameter (probably, in part, the clay mineral alunite) occur close to the top of the Kemp near the proposed damsite (locality 5).

Laboratory work on rock samples and phosphatic nodules indicates a possible alternative conclusion regarding the Navarro as mapped (K) in the vicinity of localities 1, 2, and 6. Here the (K), instead of being Kemp clays as expected, may prove to be Neylandville that has been faulted up against the Midway. The writer has not yet found any way to measure the throw on the faults. The possibility that the Nacatoch is faulted out in the damsite excavation is also suggested by the same evidence. These alternatives are expressed here so that they may be checked during the actual excavation of the damsite.

**Midway Group.** The Midway Group is known only from the southern side of the proposed reservoir, along the crest of Hurricane Ridge in Hopkins County. Exposures are poor and scattered, occurring mostly in the road ditches and gullies.

Faulting drops the Midway rocks into juxtaposition with the upper Navarro clays along Hurricane Ridge. In some cases this faulting may be the cause of Hurricane Ridge through the formation of a reverse fault-line scarp. This faulting will probably be important to further investigation of bedrock in the damsite area.

The lower formation of the Midway Group, the Kincaid, is not
known to be well exposed in the Cooper area. Phosphatic nodules commonly occur in other areas at the base of the Kincaid. These are dark, irregular sideritic phosphates of iron, commonly with small white traces of borings and coatings of glauconite pellets. These same nodules occur at localities 2 and 4, where they can be seen in the road ditches. These nodules, along with matrix found in cavities in the nodules, are typical of the rock types found in the Littig Member of the Kincaid Formation to the southwest. In most places the Littig is a highly glauconitic, phosphatic sandstone, and marl containing abundant fish remains. The writer believes that damsite excavations in the vicinity of locality 5 and other activities associated with the construction of the reservoir will uncover fresh Littig phosphates containing abundant fossil fish debris.

Above the Kincaid Formation lies the Wills Point Formation. The Wills Point is best exposed in the west road ditch just north of Peerless (locality 6) in Hopkins County. Here the formation is a silty micaceous shale, containing lignite-bearing calcareous silty concretions. No fossils have been found in the Wills Point in the reservoir area.

RESULTS AND RECOMMENDATIONS

One of the primary purposes of the present study was to collect macro-invertebrates from Stevenson’s (1941) localities in the Navarro Group that might be covered by lake water or damaged by construction activities. These localities were visited but were found to be deeply buried by recent fill and soil. Further prospecting throughout the proposed reservoir area produced much of the information set forth earlier in this report. In view of the shortage of good exposures of the Cretaceous and Tertiary bedrock, the collections of microfauna and matrix from these localities is considered significant.

Another result of this study was the possible location of good basal Kincaid phosphatic zones for collection of fossil vertebrate debris. These localities are well marked on the accompanying map and should be observed periodically during the construction so that any exposed fossils can be collected.

Finally, investigations around the proposed damsite exca-
vations reveal that part of the Kincaid Formation (Midway Group), all of the Kemp Clay, and probably the Nacatoch and upper Neylandville formations of the Navarro Group will be exposed during the operations. The Kemp is known from the present work to be highly fossiliferous. The other units mentioned will probably contain good fossils when finally uncovered, especially the Nacatoch, if it is not faulted out.

The absence of good quantities of macrofossils in the reservoir area is due to lack of exposure of the bedrock. This fact reinforces the proposals of Slaughter (1964, p. 10), who suggested that the damsite excavation be observed closely during construction so that no rich deposits of fossils be missed. The present writer feels that fossil occurrences in the damsite area will be locally rich but well scattered and that constant surveillance of the site will not be necessary. Also, the matrix of the formations to be exposed is mostly clay, and therefore less effort will be required in removing any good material.

LITERATURE CITED


STEPHENSON, L. W., 1941, The larger invertebrate fossils of the Navarro Group of Texas: Univ. of Texas Pub. 4101.