

## **3.6 Paleontological Resources**

The environmental issue associated with paleontological resources is the potential loss of scientifically important fossils during mining.

The study area for direct and indirect impacts to paleontological resources comprises the proposed disturbance area within the permit boundary. The paleontological resources cumulative effects study area is the same as the direct/indirect study area in addition to the surface disturbance associated with past and present actions and RFFAs (see Section 2.7).

### **3.6.1 Affected Environment**

The Wilcox Group in the study area consists of sediments from point bars, channels, distributary channels, levees, crevasse splays, and overbank and lignite deposits (Pastor, Behling, and Wheeler, LLC 2009). These deposits consist of medium- to fine-grained sands, clays, carbonaceous clay, and lignite seams. Lignite deposits are thought to have been formed from plant material that accumulated over long periods of time in the relatively quiet, low energy, interchannel areas separating the channel facies of the fluvial systems.

The overlying Carrizo Formation is found in two intervals in the study area and consists of a lower unit composed of very fine- to medium-grained quartz sand, and an upper thinner unit of interbedded sand, silt, and clay.

Alluvial and older terrace deposits are present in the northern portions of the study area. They are associated with the Sabine River valley (Pastor, Behling, and Wheeler, LLC 2009).

Fossils are not common in the Wilcox Group or Carrizo Formation in the Sabine Uplift area. However, where present, they can be numerous and include fossilized invertebrate and plant species (Berry 1937; Dumble 1918; Murray and Thomas 1945). Pulses of marine deposition have been correlated through the use of fossils, and fossilized plant species have provided indications of past climates during the deposition of Wilcox Group and Carrizo Formation sediments. Invertebrate fossils commonly consist of pelecypods and gastropods; single-cell foraminifera also occur. Plant fossils consist of a wide variety of tree, shrub, and flowering plant species that would be typical in a tropical or subtropical environment. These fossils are widespread throughout the Eocene-age rocks in the southeastern U.S. and would not be unique to the study area. Fossil resources are not expected to be present in the alluvial and terrace deposits.

### **3.6.2 Environmental Consequences**

#### **3.6.2.1 Proposed Action**

Under the Proposed Action, surface disturbance on or within the Wilcox Group or Carrizo Formation may directly impact fossils, if present. This impact either would destroy or effectively eliminate fossils that could be used for correlation or scientific purposes. However, even though fossils may be numerous where present, there is no information that fossils that potentially may occur in the Wilcox Group or Carrizo Formation in the proposed Rusk Permit Area have high scientific value. Also, given the widespread distribution of the fossils that potentially may be present, there is a low probability for unique fossils to occur. There are no laws in Texas regarding the protection of paleontological resources, and since there are no federally managed lands in the Rusk Permit Area, federal rules regarding the protection of paleontological resources would not apply.

#### **3.6.2.2 No Action Alternative**

Under the No Action Alternative, the proposed Rusk Permit Area would not be developed, and the associated potential effects to paleontological resources would not occur. Currently authorized operations at the South Marshall Permit Area of the South Hallsville No. 1 Mine and potential mine-related effects to paleontological resources would continue through approximately 2027.

### **3.6.3 Cumulative Impacts**

The past and present actions and RFFAs are identified in Section 2.7 and shown in **Figure 2-12**. Past and present actions and RFFAs in the paleontological cumulative effects study area have resulted, or would result, in approximately 78,316 acres of surface disturbance. The proposed Rusk Permit Area incrementally would increase the cumulative disturbance by approximately 14,392 acres. Portions of the total cumulative disturbance have, or would, occur on or within the fossil-bearing Wilcox Group and Carrizo Formation, with the resulting potential for cumulative impacts to fossil resources. However, as noted in Section 3.6.2.1, Proposed Action, the fossils in these geologic units are not anticipated to be unique or of high scientific value.

### **3.6.4 Monitoring and Mitigation Measures**

No monitoring or mitigation is being considered for paleontological resources.

### **3.6.5 Residual Adverse Effects**

Residual adverse effects to paleontological resources would include the possible loss of potential fossil resources in the proposed disturbance area. However, it is anticipated that these fossils, if present, would not be considered unique or of high scientific value.