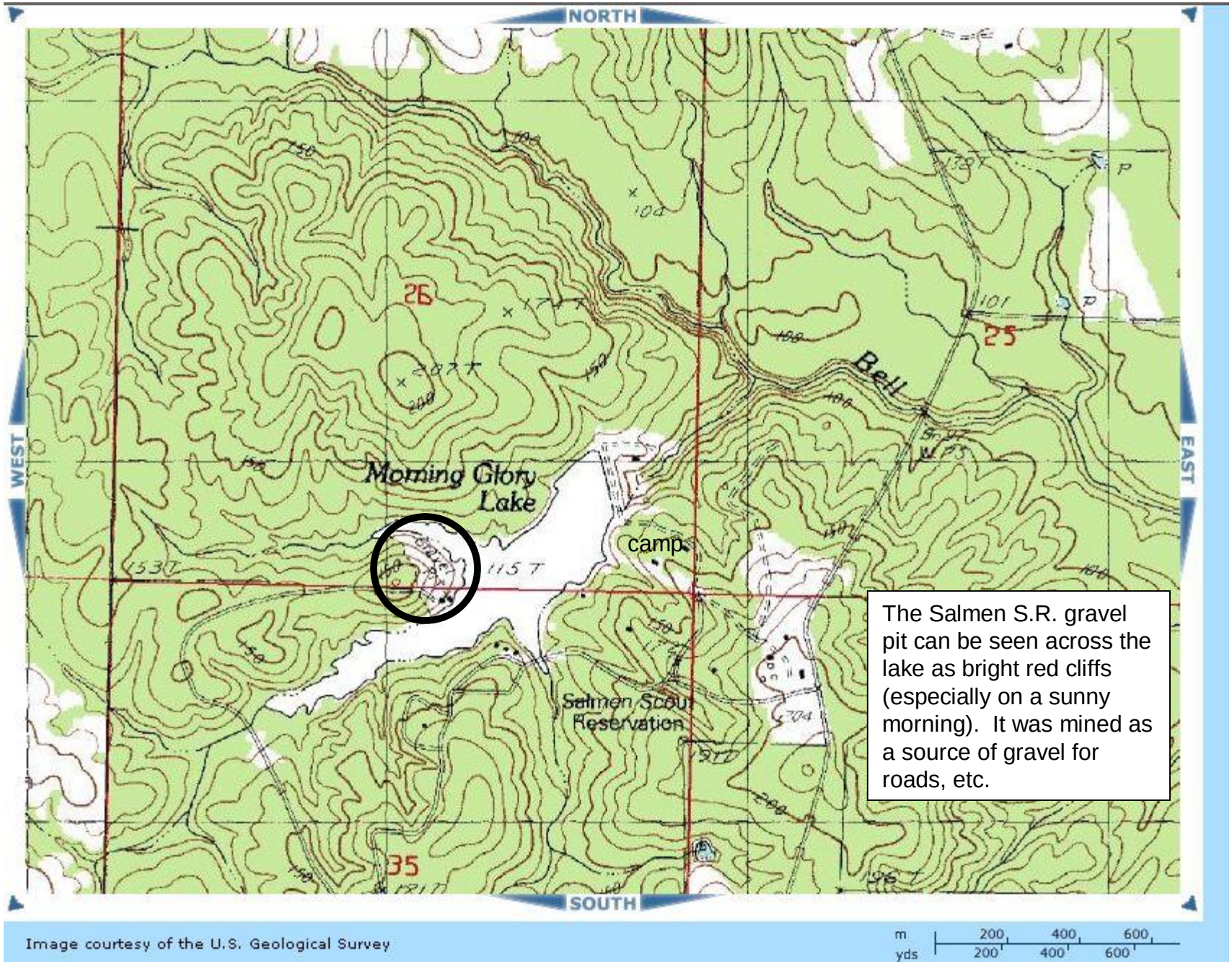
Salmen Scout Reservation, home to Camp V-Bar,

Is also home to a mining operation, the ‘clay pit’ visible as reddish cliffs across the lake (to the left) from the V-Bar lakefront.

Gravel and sandy clay from the Citronelle formation were extracted for building roads in the local county, Hancock County, Mississippi.

Although the ‘pit’ is known to most scouts as a destination for sunrise hikes or rappelling, it is also a remarkably interesting geological outcrop, that shows how a river deposited sands and gravels over a million years ago. Erosion that has occurred since people started digging in the area has also formed some interesting features.

Zoomed-in view across lake from near lifeguard tower

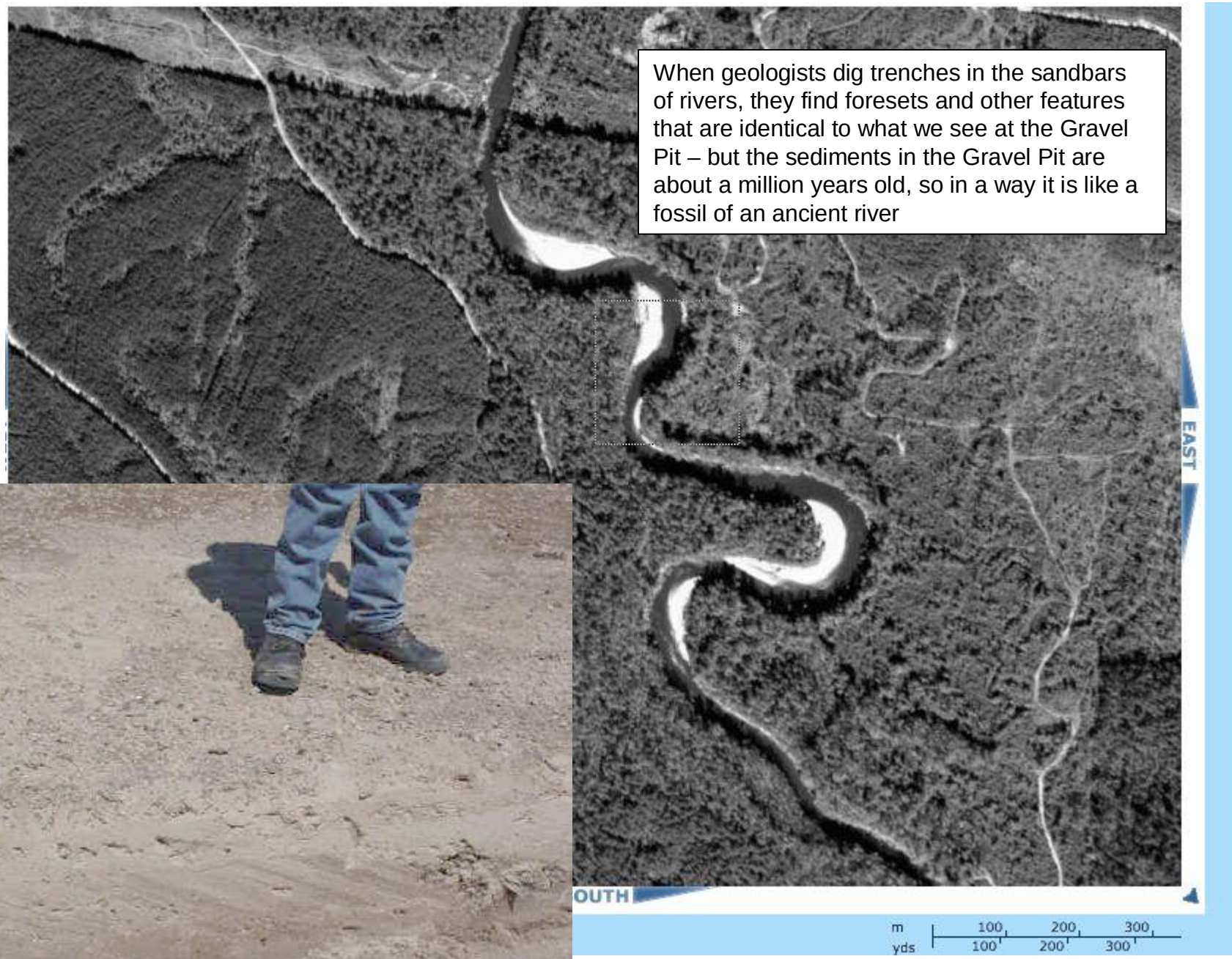


The Salmen S.R. gravel pit can be seen across the lake as bright red cliffs (especially on a sunny morning). It was mined as a source of gravel for roads, etc.

The gravel pit is a great place to observe ancient patterns of sedimentation in the material in the ‘cliffs’ left behind by the mining operation, and deposition of sands going on today in the low areas between the cliffs

In the cliffs you can see numerous thin beds of gravel. Especially interesting to geologists are the faint diagonal stripes known as ‘foresets’

When geologists dig trenches in the sandbars of rivers, they find foresets and other features that are identical to what we see at the Gravel Pit – but the sediments in the Gravel Pit are about a million years old, so in a way it is like a fossil of an ancient river



Here are some more trench pictures from a modern river

You can tell which way the water was flowing

When the water is flowing toward you, you get get a more complicated cross cutting pattern.

You can find this in the Camp Salmen pit, on some of the cliff faces that run east-west.

By looking at the foresets in the pit, you can tell that the river that deposited the cliff rocks flowed towards the south (which makes sense, because that's towards the sea)

Here is an area in the gravel pit with crosscutting beds. This differs from the river that they were trenching in that it has lots more gravel because it was carrying more gravel down its bed (there was lots of gravel upstream?).

This cliff has many thin gravel beds. Each one of these likely represents a flood in the river, each one younger than the bed below it. The gravel itself sometimes has fossils from the age of fishes 320-480 million years ago. It came form hundreds of miles to the north. They are made from a very hard rock called ‘chert’ which travels well.

Meanwhile, back to the present… humans disturbed the ground's surface, and gullies started to erode. This freed up sand grains that washed down the gullies than spread out into fan-shaped deposits where the flowing rainwater came down out of the gullies and slowed down. These fans compete and interact each other. We might find similar features in ancient rocks.
The gullies occurred where the road down into the pit was fairly steep. Up there erosion is cutting down the surface of the land, but just downhill, deposition is building up the surface of the land!

So what's the story here…

First, 320-480 million years ago, before the first dinosaur, there were shallow seas hundreds of miles to the north of here. Sometimes these seas laid down a very hard type of rock called 'chert' which sometimes had fossils of critters that lived during that time.

Then about a million years ago erosion had cut down to the level of these cherts, and pieces of it started washing down south towards the sea. As it washed down it became very worn and rounded pebbles.

One of the rivers carrying down these pebbles flowed through Camp Salmen. Over many thousands of years, it built up a thick pile of sand, clay, and gravel. Each layer was probably left by a flood in the river.

After the river diverted elsewhere, the sediments dried, and got stiff enough that they became soft rocks. Iron compounds in the material reacted with oxygen and became bright red.

Humans found that this was a place that had an unusual amount of gravel compared to nearby areas, and started to mine it for use in making roads and general paving. As they mined it they left steep, nearly vertical cliffs. It looks like they stopped mining it quite a few years ago.

Gullies started to erode where the road into the pit was steep. They carry sand out into the wide flatter area that has been mined-out. There is a fan of sand at the mouth of each gully. Lots of other interesting sand features caused by flowing water can be seen after a rain (before they get destroyed by footprints)

Now the cliffs are used for morning hikes and rappelling!