Distribution Patterns of Sand and Gravel Pits in Northwestern Indiana

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Introduction

Observations made during reconnaisance work on sand and gravel deposits in eighteen counties in northwestern Indiana in the summer of 1949,[1] indicate that distribution patterns do not follow closely the mapped moraines. The present study sets forth principles and attempts limited interpretation of the pit pattern.

The position of the pits on the map represent sand and gravel deposits that are under relatively thin overburden. Other deposits undoubtedly are present within and below the ground moraines, the recessional and end moraines, and the outwash aprons. Much of the gravel in the thinly covered upland has been found and exploited. These gravel deposits are now mostly worked out and are small compared with the deposits scattered along the outwash trains.

Deposits of sand and gravel associated with glacial sluiceways and recessional and ground moraines have been discovered mainly by chance. Digging of post holes for fences and power lines, digging and drilling of water wells, and construction of drainage ditches and highway grades are the common means of discovery. Thus the pit pattern herein presented shows the locations of the most easily found deposits.

General Observations on Patterns

Large vacant areas on the map do not necessarily mean that gravel is absent. Inadequate prospecting, thick overburden, distance from population, or a veneer of sand covering the outwash may have contributed to a scarcity of pits. Such areas are in Newton, Jasper, and Pulaski Counties.

Pits, though associated with end moraines in northwest Indiana, generally are not congregated at the outer edges of the moraines, but tend to be scattered across and behind the moraines. In the Valparaiso, Maxinkuckee, and Packerton moraines, pits are opened on the outwash side, within, and on the ground moraine side. This condition is especially well exemplified in the vicinity of Plymouth in Marshall County.

The pits are in widely spaced concentrations along the larger moraines. Most of these pit groups are in areas that have many kames

[1] Field project of the Division of Geology, Indiana Department of Conservation.

and eskers. Many more such districts may be present, but they are scattered due to burial by over-riding ice or readvance of later ice. A typical example is five miles northeast of Logansport in Cass County.

The lithology of the underlying rock plays an important part in the spacing of the pits. Where end moraines are built from ice moving over limestone and dolomite, plentiful gravel aggregates, and thus more pits, are present in the outwash. In the eastern part of the area, especially in Howard and Miami Counties, the gravels are mainly Silurian limestone, dolomite, and chert. Comparison of aggregates with rock in place by means of fossils and lithology are definite aids in estimating transport of bedrock to gravel pits. The distinctive lithology of the thin bedded Kokomo Limestone makes recognition possible in the deposits along Wildcat Creek. Transport of the greater percentage of the aggregates varies from zero to twenty miles. Shales in the path of ice movement furnished an abundance of clay, but only small quantities of gravel. Pits associated with the Valparaiso moraine in Porter County are in an area of clay drift and are characterized by shaly aggregates. The fragments in the aggregate are from the Devonian shales in the Lake Michigan Basin.

Interlobate areas formed large sluiceways that carried gravel far out beyond terminal moraines. The coarse gravel was carried at least

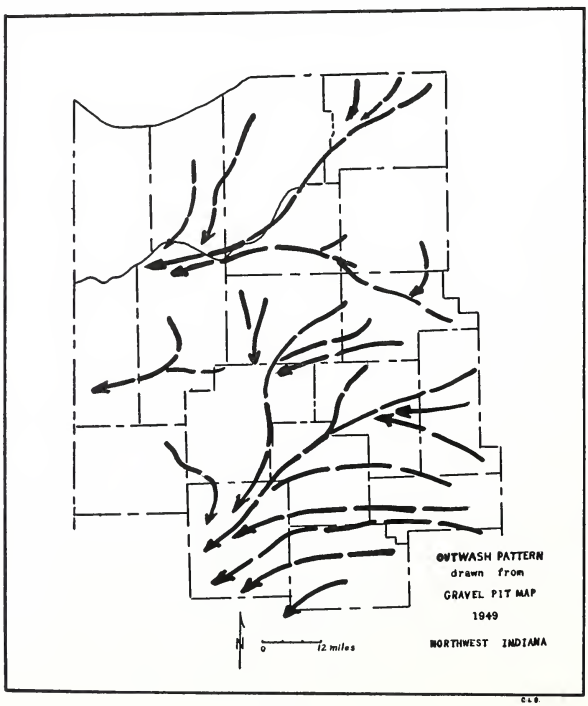

Fig. 1. Map of outwash pattern for northwest Indiana.

twenty miles. The fine gravel and sand may have been carried much farther. The Kankakee sluiceway had a number of strong tributaries entering the main torrent, which main torrent, as indicated by terraces and pits, extended southwestward from South Bend in the present Kankakee Valley. The pattern of the pits indicates that at least one main tributary originated in the vicinity of Culver from Maxinkuckee ice, and entered the Kankakee sluiceway via southern Starke County. The Wabash Valley was another major sluiceway. However, part of the gravel came from reworked outwash of the Packerton ice, and from minor sluices flowing westward across Howard, Carroll, and Clinton Counties.

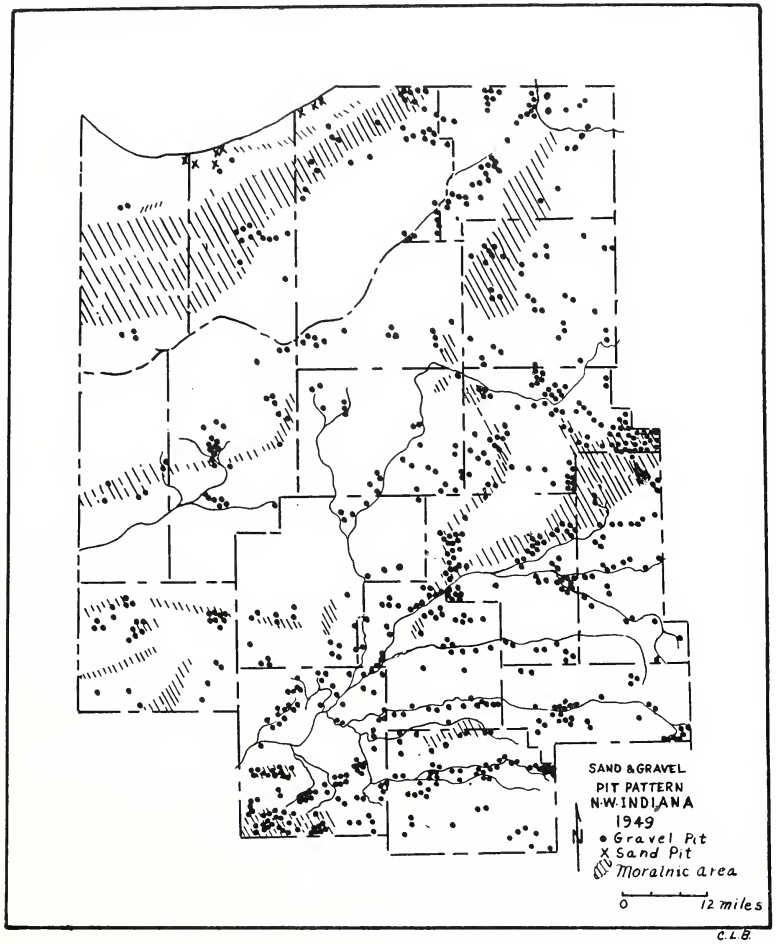

Fig. 2. Map of northwestern Indiana showing locations of sand and gravel pits, and the morainic area.

Undesirable materials in the aggregate such as shale fragments, weathered chert, and ocherous clay are deposited along sluiceways for distances as much as fifty or more miles. The great volume of water and the low specific gravity of the chert, clay, and shale fragments account for their dissemination. In the southeastern part of the area, Wildcat Creek flows across till and drift that contains cherty limestone. Most of the pits scattered along Wildcat Creek in Clinton and Tippecanoe Counties contain a small percentage of weathered chert. These cherts were carried down the Wabash sluice for fifty or more miles.

The pattern formed by all pits, active, inactive, and abandoned, shows several definite outwash areas. (Fig. 1). The lines of outwash generally simulate the present drainage pattern, but exceptions are found when locations of old glacial channels are interpreted from the positions of the pits on the map. One outstanding example is a line of pits across southern Starke County in the Kankakee Basin.

Conclusions

Gravel pits in northwest Indiana follow the present drainage pattern rather than the morainic pattern. Though more pits have been operated in morainic districts, the largest pits are located in front of the moraines along the outwash trains. Maps, such as Fig. 2, showing the location of all pits, active, inactive, and abandoned, are tools for studying patterns of outwash.