US EPA RECORDS CENTER REGION 5
518519
930286

E-8. Recharge Area Identification

As discussed earlier in Part A, potential groundwater recharge sites were identified by the Michigan State University Geology Department in the LMA. The sites were rated as marginal or good depending on 1) how they may be utilized for artificial recharge purposes and 2) how susceptible the sites may be to groundwater contamination. A good groundwater recharge area is defined as an area which has predominantly sand and gravel soils overlying sandstone bedrock. Marginal sites have more clay composition within the drift or more shale present at the bedrock surface.

The information assembled during the recharge area analysis study was compiled, via a computer mapping program as a series of maps which include the following:

Figure A-2, page	8	Areas of Probable Groundwater Recharge to the Saginaw Formation
Figure E-3, page	62	Surface Geology
Figure E-5, page	69	Thickness of Drift
Figure E-6, page	70	Bedrock Elevation
Figure E-18, page	88	Subsurface Sand and Gravel
Figure E-20, page	90	Lithology of Bedrock Surface

All of the probable areas for groundwater recharge defined as "good" in Figure A-2 were submitted to an on-site verification process utilizing the following methods:

1. On-site reconnaissance of potential recharge sites for the purpose of locating resistivity stations. The electrical resistivity method was used to identify soil and bedrock types (sand, clay, shale, sandstone).

2. Soil borings were performed to verify areas identified by resistivity tests as having good recharge potential.

3. Install observation wells for the purpose of assessing water levels and water flow patterns.

A summary of the results obtained from the above study is presented for each site below.

All of the sites listed in Table E-5 are identified in Figure A-2. Note that the areas identified as "good" recharge areas in Delhi and Meridian Township are also designated as areas which have favorable supplies of water in Figure E-8 and E-9. These areas will also require recharge area preservation ordinances in order to protect the groundwater aquifer.

Table E-5

OBSERVATIONS OF RECHARGE AREAS IDENTIFIED IN FIGURE A-2

Site #	Glacial Drift	Groundwater	Bedrock Interface	Potential for Recharge	Comments
1	Unsorted sand & gravel to bedrock (82-86')	Shallow Water Table (Unconfined)	Silty Sandstone Sandy Shale	Good	Hydraulic connection between water table & bedrock aquifer
2	Interbedded sands and clays extend to bedrock (16-37')	Saturated drift	Shale-Sandstone variation	Marginal	Hydraulic connection varies
3	Sands, Inter-bedded sands and clays	Shallow water table (Unconfined)	Weathered - silty sandstone	Good	Groundwater at the landfill site has become contaminated
4	Unsorted sand & gravel-occassional interbedded silt & clay (37-57')	Shallow water table (Unconfined)	Silty sandstone Sandstone becomes cleaner & courser downward	Good	Hydraulic connection connection between water table & bedrock aquifer
5	Interbedded sand & clay to bedrock (35-54') 3-8' clay till overlies bedrock in some areas	Shallow Water Table (Unconfined)	Weathered-silty sandstone sandstone becomes cleaner & coarser with depth	Marginal	Poor hydraulic connection
6	Unsorted sands with gravel to bedrock (26-38')	Shallow Water Table (Unconfined)	Weathered-silty sandstone sandstone becomes cleaner & courser with depth	Good	Hydraulic connection between water table & bedrock aquifer

	bedrock (26-38')		sandstone becomes cleaner & courser with depth		& bedrock aquifer

Table E-5

OBSERVATIONS OF RECHARGE AREAS IDENTIFIED IN FIGURE A-2 (cont'd)

Site #	Glacial Drift	Groundwater	Bedrock Interface	Potential for Recharge	Comments
7	Sand extends 18-22' with 2-3' of clay till overlying the bedrock in most of the area	Shallow Water Table (Unconfined)	Silty sandstone sandstone becomes cleaner & coarser with depth	Marginal	Poor hydraulic connection because clay
8	Sand and gravel extends 35-50' to bedrock in the east part of the site	Shallow groundwater table (Unconfined)	Silty sandstone	Good	Direct hydraulic connection of sand and gravel on east portion of site only
9	Clays mixed with sand extend from surface to depths from 40-100'	Shallow groundwater table	Weathered sandstone	Poor	No direct hydraulic connection because of clay
10	Appears to have sand and gravel along south side	Shallow groundwater table (Unconfined)	Silty sandstone	Marginal-good	Need on-site soil boring work
11	Interbedded sand & gravel and clay	Shallow groundwater table (Unconfined)	Probable sandstone	Marginal	The clay and shale in the area will hinder recharge

7/14/86

Randy – Blue shaded areas represent where well log information indicates the presence of soil conditions conducive to groundwater recharge. However, these areas (Blue) should be viewed with caution since they also contain well logs where info does not show recharge capability.

This map, together with figure A-2 (page 8) from the LMA Groundwater Mgt. Plan (TCRPC, March 1982), represent the best available info on the potential & probable occurrance of groundwater recharge in the Lansing Metro Area

Gary Nobl

[redacted]

(Groundwater)
Verified Recharge Sites
#1
#2
#4
#6
#8 (West ½ of site)

INGHAM COUNTY, MICHIGAN

Eskers

LEGEND
TOWNSHIP & CITY HALLS
COUNTY PARKS
COUNTY SEAT
STATE CAPITOL
US TRUNKLINE
STATE TRUNKLINE
INTERSTATE FREEWAY
COUNTY LINE
TOWNSHIP LINE
SECTION LINE

N

SCALE 1" = 4000

PREPARED BY THE

INGHAM COUNTY HEALTH DEPARTMENT

Recharge Area Studies 1981-83

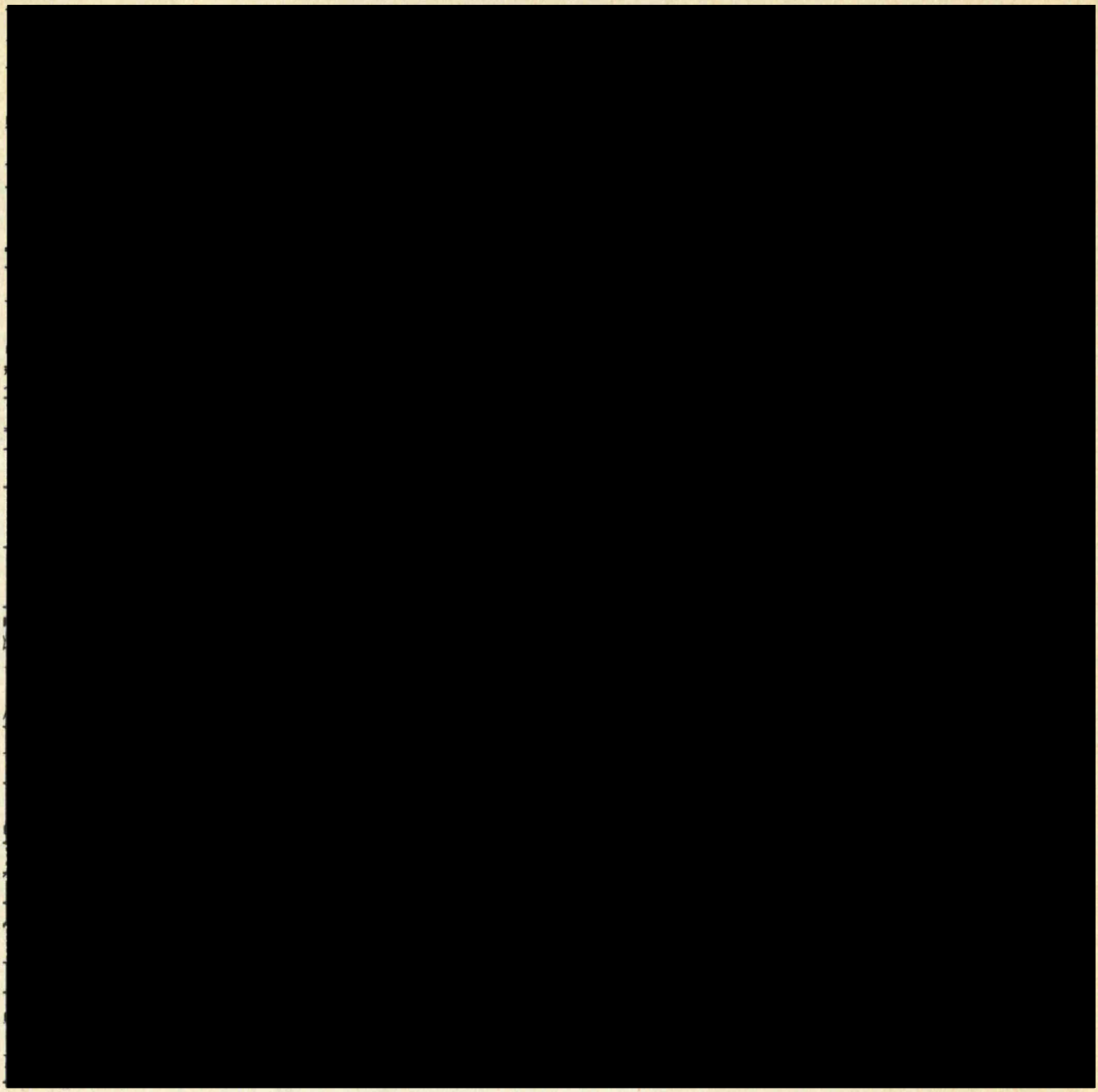
- Farmland of local importance including soils with rapid infiltration rates, [SOIL CONSERVATION SERVICE, USDA]
- Keck Consultants' onsite studies, [208 WATER QUALITY PROGRAM]
- Tri-County Regional Planning Commission, [208 WATER QUALITY PROGRAM]
- Monaghan and Larson, [MICHIGAN STATE UNIVERSITY GEOLOGY DEPARTMENT]

1 Locations where the Ingham County Health Department obtained groundwater samples from on-site private wells.

FIGURE A-2

AREAS OF PROBABLE GROUNDWATER RECHARGE TO THE SAGINAW FORMATIO

LANSING METROPOLITAN AREA



Refer to Table E-5, Page 94
for Detail Site Information

LEGEND

- Potentially Good Recharge Area
- Marginal Recharge Area
- Areas Verified as a Good Recharge Area
- 0 On-Site Investigation Occured

Figure E-15
MUNICIPAL AND USGS WELL LOCATIONS

* Rock Well

• Drift Well

o USGS Observation Well

□ Lake Lansing Supplemental Water Supply Test Well