MNDNR Tier One Metadata Record
Stockpile database - Stkpile.mdb

Field	Description
Main ID Information	
Title	Mesabi Range Stockpile Inventory Database
Filename	stkpile.mdb
Abstract	The data contained in this database is for two study areas only. This database was created using a structured data modeling methodology, beginning with a Business Object Model. That was then converted into a Conceptual/Logical Data Model, which in turn was used to develop the Physical Data Model. Diagrams of the models can be found in the appendices section of the project report. Relationships between the tables may be viewed in Access 97 using the 'relationships' button or using the menu choice: tools, relationships. The resulting components of the database are listed below. TABLES The core of the database consists of 34 related tables and three domain tables for lookup values. Field Observation of Stockpile Stockpile Material Type Geoglot and Stockpile Info Stockpile Mine of Origin Information Source Stockpile Photo Location Legal Description Test Name and Sample Number Legal Entity Test Results-Abrasion Mined/Piled Stockpile Material Test Results-Chem Assays Natural Ore Mine Test Results-Clay Lumps Observation Test Results-Fine Agg Photo Test Results-FlatElong Property Ownership Test Results-LtWt Particles Sample Test Results-SGA-Coarse Sample Composition Test Results-SGA-Fine Stockpile Test Results-Sieve Stockpile Legal Description Test Results-Soundness Stockpile Material Info Source Test Type Stockpile Material Property Ownership Test Type Determination Stockpile Material Sample Acquisition X, Y Coordinates ColorLookup ExposureLookup Means of Ownership There are seven summary tables used for import into ArcView for mapping purposes. Mapping ownership Minerals Mapping points-Observation Mapping ownership PLS/Stockpile pieces Mapping points-Photo Mapping ownership Surface Mapping points-Sample Mapping ownership whole stockpiles

There are two miscellaneous reference tables.

Calumet Stockpiles
Virginia Stockpiles

FORMS
There are five forms that can be used to browse the data, though the forms were originally designed for data entry. Note: Some of the fields on the forms contain numeric codes instead of words. Use the drop down arrow on the right side of the field to look up what the code means. For example, see the 'Material Type' field on the 'Browse Stockpile Composition' form.

Browse Company Contact Info	-View contact person's name and phone number for company, county, etc. when available
Browse Sample Results	-View all test results by sample number
Browse Stockpile Composition	-View information about stockpile material by Stockpile ID number (as referenced on plates III and IV) and stockpile name
Browse Stockpile Ownership*	-View ownership information for each piece of stockpile as divided up by Public Land Survey forty acre parcels or government lots.
Browse Surface/Mineral Ownership*	-View ownership information by forty, government lot or metes and bounds description

* The forms showing ownership, particularly stockpile ownership, can be quite confusing. If there are specific questions about what the information means, please get in touch with a contact person.

QUERIES AND REPORTS
There are 12 queries and four reports in the database that serve as examples of commonly requested information that were created during the project. The queries should be especially helpful for those who would like a "road map" of how the relationships work between some of the tables.

Queries:	Reports:
Check mineral own dataentry	Check Stockpile Ownership dataentry
Check Ownership dataentry	CheckOwnership
Check Stockpile Ownership dataentry	Sieve/Gradations Results
Check surface own dataentry	Test Results-Chem Assays
Example-get mineral ownership	
Example-get surface ownership	
Example-Single Samples and Test Name	
Example-Single Samples by Material Type	
Example-'State' owned stockpiles	
Example-Stockpile info (complex)	
Example-Stockpile with Material type	

The database was designed to mirror the real-world, complex relationships that exist in the world of stockpiles. Who owns it, what is there, where is it–these are all questions that have answers in the data and in the related ArcView shapefiles.

Place Keywords	Stockpile, Mesabi Iron Range, Virginia, Calumet, Minnesota

Theme Keywords	Stockpile Inventory, Surface Ownership, Mineral Ownership, Iron Content, Aggregate, Stockpile Composition, Stockpile Ownership
Time Period of Content	July 1, 1999 thru June 30, 2001
Parent Theme	none
Spatial Extent of the Data	Part of St. Louis County, in the area around the town of Virginia and part of Itasca county, in the area around the town of Calumet.
Contact Person	Jill Bornes for data structure questions. (Vicki Hubred for questions related to ownership or Heather Anderson for questions related to geology)
Contact Person Organization/Division	Minnesota Department of Natural Resources, Division of Lands and Minerals
Contact Person Position	Information Technology Specialist
Contact Address	500 Lafayette Road, Box 45
Contact City	St. Paul, MN
Contact Zip Code	55155-4045
Contact Voice Phone	651-296-4807 (same for all three contacts)
Contact Fax Phone	651-296-5939

Additional ID Information

Originator	Minnesota Department of Natural Resources, Division of Lands and Minerals
Purpose	This database was created as part of a Legislative Commission on Minnesota Resources (LCMR) project titled: Mesabi Iron Range Water and Mineral Resources Planning. This LCMR project initiates the effort to provide the people of the Range with technical data that will assist them in planning and developing this landscape. This portion of the project focuses on Stockpile Ownership, Composition, and Use. The project's purpose is to collect data on stockpile ownership and material composition within two study areas. The data may be used to determine the suitability of stockpile materials for future uses. The large volume of stockpiled material on the Mesabi Iron Range has great potential for re-use. Certain materials have the potential to be used as aggregate, while some materials have the potential to be mined for iron units with the development of new processing techniques. Helping to sustain the mining industry and local communities by utilizing stockpiles requires the development of information on stockpile ownership and composition. This is a first attempt to join and reconcile the complexity of ownership data on mining properties with data defining and categorizing stockpile material types. Because each data set has distinct geographic boundaries, the difficulty in combining them is compounded. Disparate data sets needed to be gathered, organized, linked, and then stored. To accomplish these tasks the project was broken down into five parts: • Ownership Research • Stockpile Inventory • Database Design • Stockpile Access

	• Potential Material Use
	Ownership involved title research to determine the mineral, surface, and stockpile ownership. The stockpile inventory was based upon pre-existing information gathered from various mining companies and field work. For the purposes of this project, a "stockpile" is defined as any earthen material piled during the process of mining. This includes tailing basins, overburden piles, and rock dumps. If the material had another intended use, such as material used for a dike, overpass, or road base, that material is not considered to be a stockpile for purposes of this project. The various aspects of ownership research and the stockpile inventory were organized and linked in a database designed in Microsoft Access 97. To further facilitate the use of stockpiled material, accessibility was examined by mapping vegetation and mining roads. The potential use of stockpiles was summarized by past leasing experience and through sampling analysis of different types of stockpiled material.
Progress	Complete
Currentness Reference	The LCMR project ran from July 1, 1999, through June 30, 2001. Most of the research/data gathering/testing was conducted from June 2000 through May 2001.
Maintenance Frequency	None planned
Access Constraints	N/A
Use Constraints	N/A
Associated Data Sets	ArcView shapefiles: Cstyarea, Vstyarea, Cstkpile, Vstkpile, Obsvsite, Photosit, and Sampsite

Data Quality

Attribute Accuracy	Integrity constraints are placed on most relationships in the database
Logical Consistency	Fully normalized model, denormalized to facilitate application development
Lineage	Raw data was collected and entered into the database. There are two exceptions to this statement. One, the public land survey data used in the creation of two tables 'Legal Description' and 'Stockpile Legal Description' is held by the Minnesota Department of Natural Resources, from the GIS Core Library in St. Paul. Two, the stockpile outlines were, in part, taken from a Mesabi Range Mining features coverage (still in progress at the Minnesota Department of Natural Resources, Division of Lands and Minerals, Hibbing).

Spatial Reference

Horizontal Coordinate Scheme	UTM
Ellipsoid	GRS80
Horizontal Datum	NAD83
Horizontal Units	meters
Altitude Datum	N/A
UTM Zone Number	15

Data Organization

Native Dataset Environment	Microsoft Access 97	
Transfer Size	1.91 mb	

Entities -- Attributes

Entity-Attribute Overview	
Entity-Attribute Detailed Citation	Tables listed in alphabetical order below

Table Name	Field Name	Key	Definition	Valid Values	Description
Field Observation of Stockpile					This table ties an observation comment to a particular stockpile and an x, y coordinate.
	ObsID	primary key	number (long), 4	7, 8, 9, 10, ...97	Unique identification number associated with every observation.
	ObsFeat		text, 15		The type of feature that is being observed.
				"geologic"	Observation about the geology (i.e., a stockpile, the grain size, a concentration of boulders).
				"physical"	Observation about the physical geography. Mostly things made by humans (i.e., roads, abandoned railroad tracks, bridges).
				"other"	Other features that are not geology or physical (i.e., vegetation).
	ExpsrTyp		text, 30		Further defines the type of exposures. This is the same list of values in the 'ExposureLookup' table.
				"surface"	Any exposure along the surface of a stockpile.
				"cut exposure"	Exposures that are the result of a stockpile being "cut" into by a bulldozer or backhoe.

Table Name	Field Name	Key	Definition	Valid Values	Description
				"dig"	Exposures from digging into a stockpile.
				"road cut"	Exposures along sides of roads.
				"anthill"	Exposure of stockpile material by observing ant hills.
				"road"	Exposure along a road or noting that a road exists at a location.
	ObservTx		text, 200		Observation comments
	ObsWypt	foreign key (links to 'Observation')	number (long), 4	1, 15, 16, 20, ...195	The GPS waypoint number associated with a geographic location.
	StudyArea	foreign key (links to 'Observation')	text, 10	"Calumet" or "Virginia"	Project study area where observation was made.
	StkplID	foreign key (links to 'Mined/Piled Stockpile Material')	number (long), 4		Unique identification number for each stockpile. (Used interchangeably with "Stkp_Uniq")
	XYIDNm	foreign key (links to 'X, Y Coordinates')	number (long), 4	10, 11, 13, ...308	Unique identification number for each x, y coordinate.
Geoglot and Stockpile Info					Reference/summary table used to enable data entry for stockpile ownership. Contains list of all stockpiles on a given forty acre parcel or government lot.
	Stkp_Uniq	foreign key (links to "StkplID" in 'Mined/Piled Stockpile Material' table)	number (long), 4	113, 114, 302, 305, ...	Unique identification number for each stockpile. (Used interchangeably with "StkplID")
	StkName		text, 50	"1009", "Cretaceous Ore Dump No. 2", "Columbia Fine Tailings", ...	Local name for stockpile. Usually named by mining company/builder of stockpile. (See 'Stockpile' table)

Table Name	Field Name	Key	Definition	Valid Values	Description
	MatTyp		text, 35	"Glacial Overburden", "Taconite Rock (boulders)", ...	Stockpile material type as defined for this project. (See 'Stockpile Material Type' table for definitions)
	STKPLSID	primary key	number (double), 8		Unique identification number for each piece of stockpile per forty acre parcel or government lot. (E.g. For the part of stockpile 353(stkp_uniq) in the SWNW of section 15, stkplsid = 7132. For one part stockpile 347 (stkp_uniq) in the SWNW of section 15, stkplsid = 7126 and the other part of stockpile 347 in the SWNW of section 15, stkplsid = 7123.)
	GEOGLOT		number (double), 8		A 14-digit composite identifier that uniquely defines a portion of land to the government lot level. (Consists of fields: COUN, TOWN, RDIR, RANG, SECT, FORT, GLOT from 'Legal Description' table)
	Entered		yes/no		Indicator that ownership information was entered for this stockpile piece into 'Stockpile Material Property Ownership' table.
Information Source					Table contains information sources used in the course of the project.
	InfoSrcID	primary key	number (long), 4	1-9	Unique identification number for the nine different information sources.

Table Name	Field Name	Key	Definition	Valid Values	Description
	InfoSrc		text, 30		Information sources used to make determinations about stockpile characteristics or material type.
				"Field Check"	In the field observations.
				"1997 color infrared air photo"	1997 and 1995 color infrared air photos, 1:15,840 scale. The following photos were used in Virginia: 1997 SLS-18-9, SLS-19-9 SLS-18-10, SLS-19-10 SLS-18-11, SLS-19-11 The following air photos were used in Calumet: 1995 ITA-34-45, ITA-34-46, ITA-34-47, ITA-35-48, ITA-35-49, ITA-35-50, ITA-35-51, ITA-36-45, ITA-36-46, ITA-36-47, ITA-36-48, ITA-37-47, and ITA-37-48.
				"1961 black & white air photo"	1961 black and white aerial photography. This set was acquired only for the Virginia study area, 1:15,840 scale. CIR-34A-1, CIR-34A-2, CIR-34A-3, CIR-34A-4, CIR-34A-5, CIR-11A-152, CIR-11A-153, CIR-11A-154, and CIR-11A-155,

Table Name	Field Name	Key	Definition	Valid Values	Description
				"USX Plates"	These plates were used in both study areas. They were produced by the United States Steel Corporation and published in 1967. The plates gave some indication about the material type of stockpiles and the name of some stockpiles. Plates 5, 6, 24 and 25 were used.
				"GNIOP Plates"	These plates were used for both study areas. They were produced by Great Northern Iron Ore Properties in 1955 and 1959. The plates give some indication about stockpile material type and stockpile names.
				"company"	Information gathered directly from mining companies and/or stockpile owners.
				"MN-DNR records"	All information about state owned stockpiles, from the Minnesota Department of Natural Resources, Division of Lands and Minerals.
				"1947 black & white air photo"	1947 black and white aerial photography. This set was acquired only for the Virginia study area, 1:15,840 scale. 8-53, 8-54, 8-55,7-137, 7-138, and 7-139.

Table Name	Field Name	Key	Definition	Valid Values	Description
				"1966 black & white air photo"	1966 black and white aerial photography. This set was only acquired for the Calumet study area, 1:15,840 scale. ITA-5-53-94, ITA-5-53-95, ITA-5-53-96, ITA-5-53-97, ITA-5-36-41, ITA-5-36-42, ITA-5-36-43, ITA-5-36-44, ITA-5-36-45, ITA-4-37-139 ITA-4-37-140, ITA-4-37-141, ITA-4-37-142, and ITA-4-37-143.
Legal Description					Public land survey legal description for lands in the study areas. Used to describe surface and mineral ownership parcels.
	LDID	primary key	number (long), 4		Unique identification number for each forty acre parcel or government lot.
	COUN		number (double), 8		Two digit County Code
				31	Itasca
				69	St. Louis
	TOWN		number (double), 8	56 and 58	Three digit township number, townships extend east to west.
	RDIR		number (double), 8		Range direction, ranges extend north to south.
				0	West
	RANG		number (double), 8	23, 24, 17	Two digit range number
	SECT		number (double), 8	3, 4, 5, 7, 8, 9, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29	PLS section number

Table Name	Field Name	Key	Definition	Valid Values	Description
	FORT		number (double), 8		A combination of a code for the quarter section and a code for the quarter of the quarter section. The FORT_DESC field contains the corresponding text for the numeric values in the FORT field, as seen in the description column below.
				0	Meandered water body (used in combination with GLOT = 99 to identify meandered water bodies)
				11	NENE
				12	NWNE
				13	SWNE
				14	SENE
				21	NENW
				22	NWNW
				23	SWNW
				24	SENW
				31	NESW
				32	NWSW
				33	SWSW
				34	SESW
				41	NESE
				42	NWSE
				43	SWSE
				44	SESE
	GLOT		number (double), 8		Two-digit government lot ID, if applicable (unique only within a section)
				0-7	Government lot number

Table Name	Field Name	Key	Definition	Valid Values	Description
				99	Meandered water body (used in combination with FORT = 0 to identify meandered water bodies)
	PARC		number (double), 8	0-3	Entry number, if quarter-quarter section has more than one entry (used when the parcel's ownership is divided by partial description/metes and bounds)
	METEBNDS		text, 250		Partial description for a portion of the quarter-quarter section.
	FORT_DESC		text, 40	See above, under FORT description	This field contains the corresponding text for the numeric values in the FORT field. This IS NOT necessarily the legal description for the parcel, especially in the case of government lots, where the FORT and FORT_DESC are for locational reference only. See the 'Description' column of the FORT field.
	GEOPARC		number (double), 8		A 16-digit composite identifier uniquely identifying each ownership parcel. (Consists of fields: COUN, TOWN, RDIR, RANG, SECT, FORT, GLOT, PARC, given in this order.)
	GEOGLOT		number (double), 8		A 14-digit composite identifier that uniquely defines a portion of land to the government lot level. (Consists of fields: COUN, TOWN, RDIR, RANG, SECT, FORT, GLOT, given in this order.)

Table Name	Field Name	Key	Definition	Valid Values	Description
	GEOFORT		number (double), 8		A 12-digit composite identifier that uniquely defines a portion of land to the forty acre level (1/4-1/4 section). (Consists of fields: COUN, TOWN, RDIR, RANG, SECT, FORT, given in this order.)
	GEOSECT		number (double), 8		A 10-digit composite identifier that uniquely defines a portion of land to the section level. (Consists of fields: COUN, TOWN, RDIR, RANG, SECT, given in this order.)
	GEORANG		number (double), 8		An eight-digit composite identifier that uniquely defines a portion of land to the township-range. (Consists of fields: COUN, TOWN, RDIR, RANG, given in this order.)
	RightofWay		text, 1	null or "y"	"y" indicates the parcel is a right-of-way
Legal Entity					List of owners and contact information
	LEID	primary key	number (long), 4	1 - 32	Unique identification number for each owner.
	LEName		text, 50	Some names need further explanation (not a complete list)	Name of owner.
				"Private"	One individual owner
				"Many private"	More than one individual owner
				"State-DNR"	State ownership, Department of Natural Resources administration
				"State-PCA"	State ownership, Pollution Control Agency administration

Table Name	Field Name	Key	Definition	Valid Values	Description
				"GNIOP"	Great Northern Iron Ore Properties
				"USX"	USX Corporation (formerly U.S. Steel Corporation)
				"Undetermined"	Parcel was not researched; or if mineral interest, nonregistered severed minerals when the State means of ownership is noted.
	rank		number (long), 4	1-32	Number used for data entry purposes, to move most common owners to top of a drop down list.
	ConFName		text, 15		First name of contact person
	ConLName		text, 20		Last name of contact person
	ConPhoneNm		text, 12		10-digit phone number of contact person
Mined/Piled Stockpile Material					Stockpile composition information. Table is not complete because a lot of information was unavailable.
	StkColorDS		text, 30	"red", "buff", "brown", and "red-brown"	Color of material observed only in glacial overburden stockpiles. This is the same list of values in the 'ColorLookup' table.
	StkComTx		text, 200		Various comments and observations made about an individual stockpile.
	MinGrnMod		text, 1		Modifiers used to approximate the minimum grain size (rock particle) observed within a stockpile
				"<"	Less than
				">"	Greater than

Table Name	Field Name	Key	Definition	Valid Values	Description
				"~"	Approximately
	MinGrnNm		number (double), 8	Ex: 1, 2, 3, 4, ...	Number used to quantify the diameter of the minimum grain size (rock particle) observed within a stockpile.
	MinGrnUt		text, 10		Unit of measurement used to describe the minimum grain size of a stockpile.
				"mm"	Millimeters
				"inches"	Inches
				"feet"	Feet
				"mesh"	Mesh is the size of a sieve's openings. This unit was used to quantify very small rock particles.
	MaxGrnMod		text, 1		Modifiers used to approximate the maximum grain size (rock particle) observed within a stockpile
				"<"	Less than
				">"	Greater than
				"~"	Approximately
	MaxGrnNm		number (double), 8	Ex: 1, 2, 3, 4, ...	Number used to quantify the diameter of the maximum grain size (rock particle) observed within a stockpile.
	MaxGrnUt		text, 10		Unit of measurement used to describe the maximum grain size of a stockpile.
				"mm"	Millimeters
				"inches"	Inches
				"feet"	Feet

Table Name	Field Name	Key	Definition	Valid Values	Description
				"mesh"	Mesh is the size of a sieve's openings. This unit was used to quantify very small rock particles
	AvgGrnMod		text, 1		Modifiers used to approximate the estimated average grain size (rock particle) observed within a stockpile
				"<"	Less than
				">"	Greater than
				"~"	Approximately
	AvgGrnNm		number (double), 8	Ex: 1, 2, 3, 4, ...	Number used to quantify the diameter of the average grain size (rock particle) observed within a stockpile.
	AvgGrnUt		text, 10		Unit of measurement used to describe the average grain size of a stockpile.
				"mm"	Millimeters
				"inches"	Inches
				"feet"	Feet
				"mesh"	Mesh is the size of a sieve's openings. This unit was used to quantify very small rock particles
	StkSortIn		text, 15	"poor", "moderately-poor", "moderate", "moderately-well", and "well"	Describes the degree of sorting of sediment grains. If a stockpile contains all the same sized sediment it is described as being well sorted. If a stockpile contains both large and small grains sizes, it is described as being poorly sorted.

Table Name	Field Name	Key	Definition	Valid Values	Description
	StkVolNm		number (long), 4	23450	Volume of a stockpile, this information was gathered through stockpile owners and/or mining companies.
	StkVolUt		text, 50	"tons" or "loose cubic yards"	Describes the unit of measurement for volume.
	StkEVolNm		number (long), 4	50000	Estimated volume of a stockpile calculated using Surfer® and the Mesabi Range Elevation dataset.
	StkEVolUt		text, 50	"tons" or "loose cubic yards"	Describes the unit of measurement for estimated volume of a stockpile.
	StkFePct		number (double), 8	42	Percentage of iron in a stockpile. All percentages are based on records kept by stockpile owners and/or mining companies.
	StkMagFePct		number (double), 8	42	Percentage of magnetic iron in a stockpile. All percentages are based on records kept by stockpile owners and/or mining companies.
	StkSilPct		number (double), 8	42	Percentage of silica in a stockpile. All percentages are based on records kept by stockpile owners and/or mining companies.
	StkAlPct		number (double), 8	42	Percentage of aluminum in a stockpile. All percentages are based on records kept by stockpile owners and/or mining companies.
	StkGravPct		number (double), 8		A gross estimation of the percent of gravel that may be present in a stockpile. All estimations are based on field observations.

Table Name	Field Name	Key	Definition	Valid Values	Description
	StkSandPct		number (double), 8		A gross estimation of the percent of sand that may be present in a stockpile. All estimations are based on field observations.
	AggPotIn		text, 50	"High", "Moderate", "Limited"	The overall rating a stockpile has for aggregate potential. This rating does not exclude any material from being used.
	StkplID	primary key	number (long), 4	113, 114, 302, 305, ...	Unique identification number for each stockpile. (Used interchangeably with "Stkp_Uniq")
	MatTypID	foreign key (links to 'Stockpile Material Type')	number (long), 4	1-11	Unique identification number for each stockpile material type. (See 'Stockpile Material Type' table for definitions)
Natural Ore Mine					Table contains a list of all potential natural ore mine/property names that were the original setting for stockpiled materials in the two study areas. Determinations are based on records kept by stockpile owners and/or mining companies.
	MineID	primary key	number (long), 4	1 - 62	Unique identification number for each mine/property name.
	MineName		text, 50	Ex. "Draper", "Walker-Hill #6", ...	Mine/property names data maintained by DNR Lands and Minerals divsion, published in the 2000 Skillings Minnesota Mining Directory.
Observation					Table refers to locations where observations were made. Observations are usually, but not always, tied to a particular stockpile.

Table Name	Field Name	Key	Definition	Valid Values	Description
	ObsWypt	primary key (composite)	number (long), 4	1, 15, 16, 20, ...195	The GPS waypoint number associated with a geographic location. Provides link to actual coordinate in the 'X, Y Coordinate' table.
	StudyArea	primary key (composite)	text, 10	"Calumet" or "Virginia"	Project study area where observation was made.
	FeatType		text, 16	"Photo", "Observation" or "Sample"	Type of feature related to a waypoint. Sometimes a photo and observation or photo and sample share the same waypoint number.
Photo					Table refers to locations where photos were taken. Photos are usually, but not always, tied to a particular stockpile.
	PhotoNm	primary key	number (long), 4	Ex: 19, 20, 21, ...347	Unique identifier that corresponds to photographs taken of the stockpiles. These photographs (in .jpg format) are included as part of the data from this project.
	FeatType		text, 16	"Photo", "Observation" or "Sample"	Type of feature related to a waypoint. Sometimes a photo and observation or photo and sample share the same waypoint number.
	PhotoWypt		number (long), 4	1, 15, 16, 20, ...195	The GPS waypoint number associated with a geographic location. Provides link to actual coordinate in the 'X, Y Coordinate' table.
	StudyArea		text, 10	"Calumet" or "Virginia"	Project study area where photo was taken.

Table Name	Field Name	Key	Definition	Valid Values	Description
Property Ownership					Surface and Mineral Ownership information, including: interest fractions, acres, link to owner name and link to legal description.
	PropOwnID	primary key	number (long), 4		Unique identification number for each property ownership record.
	PropType		text, 20	"surface" or "mineral"	Ownership record is for one of two property types.
	IntNumer		number (long), 4	Ex. 1, 8, 46, ...	Numerator of the undivided, fractional interest owned by the particular owner.
	IntDenom		number (long), 4	Ex. 1, 2, 108, ...	Denominator of the undivided, fractional interest owned by the particular owner.
	AcresNm		number (double), 8	40, ...	Number of acres each owner owns.
	StMeanOwn		text, 50		If the State is the owner, the way in which ownership was acquired by the state is noted. This is the same list of values as in the 'Means of Ownership' lookup table.
				"Trust Fund"	State granted ownership by the U.S. government
				"Acquired"	State acquired the property by purchase or gift
				"Exchange"	State acquired private land in exchange for State land

Table Name	Field Name	Key	Definition	Valid Values	Description
				"Reversionary Deed"	State has ownership of the property only until a specified date or event occurs. Upon this date or event, the property goes back to the owner who deeded the property to the State.
				"Tax Forfeit"	The surface or minerals were forfeited to the State for nonpayment of taxes (real estate taxes or severed mineral interest taxes)
				"Nonregistered Severed Minerals"	State will have absolute ownership of all minerals upon the completion of a forfeiture action. Forfeiture action taken due to mineral owner's failure to timely file required statement of severed mineral interest. The owner will be listed as "Undetermined" since the State's ownership is not absolute.
	LEID	foreign key (links to 'Legal Entity')	number (long), 4		Unique identification number for each owner.
	LDID	foreign key (links to 'Legal Description')	number (long), 4		Unique identification number for each forty acre parcel or government lot.
Sample					Table refers to locations where samples were taken. Samples are usually, but not always, tied to a particular stockpile. (Ex. SampleNm 11, 12 and 13 are not tied to a stockpile)

Table Name	Field Name	Key	Definition	Valid Values	Description
	SampleNm	primary key (links to 'Stockpile Material Sample Acquisition')	text, 4		Unique identifier that corresponds to samples taken from the stockpiles.
				"1" - "82"	Single sample numbers
				"A1" - "A8", "B9", "C10" - "C19", "D20" - "D29", "E30" - "E32"	Composite samples of single samples. E.g., "A1" consists of single samples "53", "54", "55", "56" and "57". A's represent coarse tailings, B's represent Cretaceous ore, C's represent fine tailings, D's represent glacial overburden, E's represent natural ore and taconite mixed-sized rock.
				"ZZ1" - "ZZ10"	Composite samples of composite samples. E.g., "ZZ1" consists of composite samples "A1", "A2", "A3" and "A4".
	SampType		text, 10	"single" or "composite"	See descriptions above for "SampleNm" field
	SampleNumeric		number (long), 4	1 - 82	Numeric version of "SampleNm" field. Used for sorting purposes.
	FeatType		text, 16	"Photo", "Observation" or "Sample"	Type of feature related to a waypoint. Sometimes a photo and observation or photo and sample share the same waypoint number.
	SampWypt		number (long), 4	3, ...41, ...174	The GPS waypoint number associated with a geographic location. Provides link to actual coordinate in the 'X, Y Coordinate' table.
	StudyArea		text, 10	"Calumet" or "Virginia"	Project study area where photo was taken.

Table Name	Field Name	Key	Definition	Valid Values	Description
Sample Composition					This table lists the make up of composite samples. (Composite samples being one sample made up of several other samples)
	SampCompID	primary key	number (long), 4		Unique identifier for each sample composition record.
	ComSampNm		text, 4	"A1", ..."D21", ..."ZZ7", ...	Composite sample numbers from "SampleNm" field in 'Sample' table
	SampleNm	foreign key (links to 'Sample')	text, 4	"1" - "82" or "A1", ..."D21", ...	Single sample numbers that are in a particular composite sample (E.g., Single samples "53", "54", "55", "56" and "57" make up composite "A1".) or composite sample numbers that are in a particular composite of composite sample (E.g., Composite samples "A1", "A2", "A3" and "A4" make up composite "ZZ1").
Stockpile					Basic stockpile information, including: stockpile ID (used extensively throughout database and on the project report plates), stockpile name (if applicable) and estimated exposed surface acreage.
	StkplID	primary key	number (long), 4	113, 114, 302, 305, ...	Unique identification number for each stockpile. (Used interchangeably with "Stkp_Uniq")
	StkName		text, 55	"1009", "Cretaceous Ore Dump No. 2", "Columbia Fine Tailings", ...	Local name for stockpile. Usually named by mining company/builder of stockpile.

Table Name	Field Name	Key	Definition	Valid Values	Description
	StkPhotoIn		yes/no	yes or no	Yes means the stockpile has been photographed. No means the stockpile has not been photographed.
	StkSampIn		yes/no	yes or no	Yes means the stockpile has been sampled. No means the stockpile has not been sampled.
	StkPitIn		yes/no	yes or no	Yes means the stockpile is in a pit. No means the stockpile is not in a pit.
	StkEAcre		number	5420	The estimated exposed surface acreage of a stockpile. If part of a stockpile is covered by another stockpile, the covered acreage is not included in this number.
Stockpile Legal Description					Public land survey legal description for lands in the study areas. Similar to the 'Legal Description' table used to define parcels for surface and mineral ownership purposes, *except* the legal description for stockpiles stops at the forty acre parcel or government lot level.
	GEOGLOT	primary key	number (double), 8		A 14-digit composite identifier that uniquely defines a portion of land to the government lot level. (Consists of fields: COUN, TOWN, RDIR, RANG, SECT, FORT, GLOT, given in this order, from 'Legal Description' table)
	COUN		number (double), 8		Two digit County Code
				31	Itasca
				69	St. Louis

Table Name	Field Name	Key	Definition	Valid Values	Description
	TOWN		number (double), 8	56 and 58	Three digit township number, townships extend east to west.
	RDIR		number (double), 8		Range direction, ranges extend north to south.
				0	West
	RANG		number (double), 8	23, 24, 17	Two digit range number
	SECT		number (double), 8	3, 4, 5, 7, 8, 9, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29	PLS section number
	FORT_DESC		text, 40	See below, under FORT description	This field contains the corresponding text for the numeric values in the FORT field. This IS NOT necessarily the legal description for the parcel, especially in the case of government lots, where the FORT and FORT_DESC are for locational reference only. See the 'Description' column of the FORT field.
	FORT		number (double), 8		A combination of a code for the quarter section and a code for the quarter of the quarter section. The FORT_DESC field contains the corresponding text for the numeric values in the FORT field, as seen in the description column below.
				0	Meandered water body (used in combination with GLOT = 99 to identify meandered water bodies)
				11	NENE
				12	NWNE
				13	SWNE

Table Name	Field Name	Key	Definition	Valid Values	Description
				14	SENE
				21	NENW
				22	NWNW
				23	SWNW
				24	SENW
				31	NESW
				32	NWSW
				33	SWSW
				34	SESW
				41	NESE
				42	NWSE
				43	SWSE
				44	SESE
	GLOT		number (double), 8		Two-digit government lot ID, if applicable (unique only within a section)
				0-7	Government lot number
				99	Meandered water body (used in combination with FORT = 0 to identify meandered water bodies)
Stockpile Material Information Source					Table that relates each stockpile with one or more information sources for the purpose of tracking how or why certain determinations about a stockpile were made.
	SMISID	primary key	number (long), 4		Unique identification number for each stockpile material information source record.
	InfoSrcID	foreign key (links to 'Information Source')	number (long), 4	1-9	Unique identification number for the nine different information sources.

Table Name	Field Name	Key	Definition	Valid Values	Description
	StkplID	foreign key (links to 'Mined/Piled Stockpile Material')	number (long), 4	113, 114, 302, 305, ...	Unique identification number for each stockpile. (Used interchangeably with "Stkp_Uniq")
Stockpile Material Property Ownership					Table contains ownership information for each piece of stockpile as intersected (or "chopped" up) by Public Land Survey (PLS) forty acre parcels or government lots. The PLS features are contained the 'Stockpile Legal Description' table.
	SMPOID	primary key	number (long), 4		Unique identification number for each stockpile material property ownership record.
	LEID	foreign key (links to 'Legal Entity')	number (long), 4		Unique identification number for each owner.
	SSTMeanOwn		text, 50	"Trust Fund", "Acquired", "Exchange", or "Tax Forfeit". (See valid values described in further detail under "STMeanOwn" in the 'Property Ownership' table)	If the State is the owner, the way in which ownership was acquired by the state is noted. This is the same list of values in the 'Means of Ownership' lookup table.
	StkPLSID	foreign key (links to 'Geoglot and Stockpile Info')	number (double), 8		Unique identification number for each piece of stockpile per forty acre parcel or government lot.
	StkOwnTx		text, 100	"Owner of stockpile in N1/2 of forty", "Ownership through agreement...", etc.	Comments regarding the stockpile ownership

Table Name	Field Name	Key	Definition	Valid Values	Description
	WithSurIn		yes/no	yes or no	"Yes" means the stockpile ownership is tied to the underlying surface ownership (generally, stockpiles containing overburden materials are tied to the surface owner of the parcel). "No" means the stockpile ownership is not the same as the surface ownership.
	WholeStkIn		yes/no	yes or no	"Yes" means the entire stockpile has the same ownership, regardless of varied underlying surface ownership across many parcels. "No" means the stockpile ownership may vary across many parcels.
	Geoglot	foreign key (links to 'Stockpile Legal Description')	number (double), 8		A 14-digit composite identifier that uniquely defines a portion of land to the government lot level. (Consists of fields: COUN, TOWN, RDIR, RANG, SECT, FORT, GLOT, given in this order, from 'Legal Description' table)
Stockpile Material Sample Acquisition					Table relates a single sample to a specific stockpile and an x, y coordinate.
	SampleNm	primary key (links to 'Sample')	text, 4		Unique identifier that corresponds to samples taken from the stockpiles.
				"1" - "82"	Single sample numbers
	StkplID	foreign key (links to 'Mined/Piled Stockpile Material')	number (long), 4	113, 114, 302, 305, ...	Unique identification number for each stockpile. (Used interchangeably with "Stkp_Uniq")
	XYIDNm	foreign key (links to 'X, Y Coordinates')	number (long), 4	10, 11, 13, ...308	Unique identification number for each x, y coordinate.

Table Name	Field Name	Key	Definition	Valid Values	Description
Stockpile Material Type					Table lists 11 stockpile material types, as defined for this project, that occur in the two study areas.
	MatTypID	primary key	number (long), 4	1-11	Unique identification number for each stockpile material type.
	MatTyp		text, 35	"Glacial Overburden"	This includes unconsolidated sediment deposited by glaciers that was removed to gain access to the iron ore. Material consists of sediments deposited during the Quaternary Period (10,000 to 2 million years ago). The sediments range from till (material deposited directly by glacial ice) to sand and gravel (material deposited from glacial meltwater). Till is an unsorted sediment with grain sizes ranging from clay to +5 foot boulders. Multiple glacial advances deposited several till units in the region. Between some of these till units are discrete lenses of sand and gravel. In several overburden stockpiles, many of these various units are mixed together. The stockpiles tend to be boulder-rich with a sandy, silt matrix. The color ranges from buff to reddish-brown. Rock particles are sub-angular to sub-rounded. A few stockpiles contain primarily outwash sand and gravel. The sand and gravel is moderately sorted, oxidized to a light brown color, contains little silt, and is cobble-rich. The rock particles are sub-rounded.

Table Name	Field Name	Key	Definition	Valid Values	Description
				"Cretaceous Overburden"	This includes unconsolidated sediment in the form of saprolitic clay and rock particles that forms from chemically weathered iron formation. Weathering events occurred during the Cretaceous period (65 to 146 million years ago). This material is dominantly clay with some rock particles. Within a given stockpile, cretaceous overburden may contain glacial till and other "overburden" type sediments.
				"Slate"	A local term used to described a fine-grained rock composed mostly of siliceous minerals. Slate is found above and within the iron formation and is approximately 1.9 billion years old. Although the slate is mostly fine grained, some clastic bedding is evident. Fracturing, or splitting, occurs along bedding planes. Within the pile, slate appears to have a dark gray appearance. Rock sizes range from 1/8 of an inch to +3 feet.

Table Name	Field Name	Key	Definition	Valid Values	Description
				"Paint Rock"	A highly decomposed, slate-like rock with a tacky, powdery texture on exposed surfaces. The decomposition of these rocks is attributed to weathering of altered slate and natural ore along fault or joint planes. The descriptor "paint" refers to the red to rust colored, colloidal particles that partially constitute the rock. Within the stockpiles, paint rock can vary from fine sand to +3 foot rocks. Similar to natural ore, paint rock fractures parallel to bedding planes.
				"Natural Ore Fine Tailings"	This includes a by-product of the natural iron ore mining processes. Fine tailings have been crushed and usually deposited into a "tailings" basin. This material is very well sorted with a rock size ranging from clay to 3/8 of an inch. Rock fragments are sub-angular.

Table Name	Field Name	Key	Definition	Valid Values	Description
				"Natural Ore Mixed-Sized Rock"	This includes soft, iron ore that has been altered and re-mineralized along faults and fractures. This material was originally deposited as taconite, which was then oxidized to create trough, fissure, or flat-lying natural iron ore bodies. The mineralogy consists of mostly hematite, goethite and limonite with minor amounts of magnetite and manganese oxides. There are a range of textures from compact to rubbly or friable. Bedding and other primary features are often evident. Within a stockpile, this material is unsorted. Rock sizes range from clay to +6 foot boulders, with an estimated average rock size being 3/8 of an inch to 5 inches. The amount of clay in natural ore piles is difficult to quantify; however, the clay seems to be a natural cement that stabilizes the stockpile. Natural ore rocks fracture, or part, parallel to bedding planes. Taconite boulders are frequently observed along the slopes of natural ore stockpiles and may have been placed there for slope and erosion control.

Table Name	Field Name	Key	Definition	Valid Values	Description
				"Natural Ore Coarse Tailings"	This includes a by-product of the natural iron ore mining processes. This by-product contains mostly siliceous rocks with some hematite banding. The stockpiles are moderately-well sorted, ranging in size from 3/8 to 4 inches in diameter, and has an angular particle shape. In the processing of coarse tailings, the material was washed; therefore, there is little to no silt within the pile.
				"Taconite rock (boulders)"	This includes magnetic and some non-magnetic iron-bearing boulders. Characterized by alternating bands of iron oxides (magnetite and/or hematite) with bands of silicates and carbonates. Bedding and other primary structures are evident. Most taconite stockpiles consists of boulder-sized rocks ranging from 2 feet to +9 feet in diameter with an estimated average of three feet. The boulders tend to have a blocky shape. Some glacial boulders may be incorporated into the pile.

Table Name	Field Name	Key	Definition	Valid Values	Description
				"Cretaceous Ore"	Semi-lithified conglomerate deposited during the Cretaceous period. The conglomerate contains sub-angular to rounded hematite cobbles and sands within an iron-rich, glauconitic, carbonate matrix. Cretaceous ore piles have moderately poor sorting and range in grain size from clay to +3 foot boulders. The boulders are highly cemented blocks of smaller rock particles.
				"Taconite Mixed Sized Rock"	Magnetic and non-magnetic iron ore, some of which may have been processed. The rock characterization is described in Taconite Rock Boulders above. This stockpile type is difficult to discern from "Natural ore mixed-sized rock" in the field and may contain other material within the stockpile; classification is based upon company records pertaining to individual stockpiles. These piles are poorly sorted with a rock size from 2mm to +6 feet. Taconite boulders frequently occur along the slope and edges of these piles.
Stockpile Mine of Origin					Table relates a specific stockpile to one or many mines of origin. Determinations are based on records kept by stockpile owners and/or mining companies.
	STMOID	primary key	number (long), 4		Unique identification number for each stockpile mine of origin record.

Table Name	Field Name	Key	Definition	Valid Values	Description
	StkplID	foreign key (links to 'Mined/Piled Stockpile Material')	number (long), 4		Unique identification number for each stockpile. (Used interchangeably with "Stkp_Uniq")
	MineID	foreign key (links to 'Natural Ore Mine'	number (long), 4	1 - 62	Unique identification number for each mine/property name.
Stockpile Photo Location					Table relates a photo, and the comments about that photo, to a specific stockpile and an x, y coordinate.
	SPLID	primary key	number (long), 4	1 - 197	Unique identification number for each stockpile photo location record.
	PhotoNm	foreign key (links to 'Photo')	number (long), 4	Ex: 19, 20, 21, ...347	Unique identifier that corresponds to photographs taken of the stockpiles. These photographs (in .jpg format) are included as part of the data from this project.
	StkplID	foreign key (links to 'Mined/Piled Stockpile Material')	number (long), 4		Unique identification number for each stockpile. (Used interchangeably with "Stkp_Uniq")
	PhotoTx		text, 100	Ex: "Close up of material, pen for scale"	Comments about individual photographs. Comments may include if the picture is a close up or taken at a distance, the scale used, and other comments.
	XYIDNm	foreign key (links to 'X, Y Coordinates')	number (long), 4	Ex: 10, 11, 13, ...308	Unique identification number for each x, y coordinate.
Test Name and Sample Number					Table contains a list of all samples, the name of the test performed on the sample and the sample type, single or composite.

Table Name	Field Name	Key	Definition	Valid Values	Description
	TestName	(may be linked to 'Test Type')	text, 50		The name of tests performed on samples. (See 'Test Type' table for further definition)
	SampleNm	foreign key (links to 'Sample')	text, 4		Unique identifier that corresponds to samples taken from the stockpiles.
	SampType		text, 10	"single" or "composite"	See descriptions above for "SampleNm" field in 'Sample' table
Test Results- Abrasion					This test measures the breakdown of material by weight percent. This test was performed on glacial overburden, natural ore coarse tailings, natural ore fine tailings, natural ore and taconite mixed-sized rock, and cretaceous ore samples.
	TestTypeID	primary key (composite) foreign key (links to 'Test Type')	text, 20	"C131/C535"	These are the official call letters for the American Society Testing and Materials (ASTM) test for Los Angeles Abrasion.
	TR3ID	primary key (composite)	number (long), 4		Unique identification number for each 'test results...' record in this table.
	SampleNM	foreign key (links to 'Sample')	text, 4	"ZZ1", "ZZ2", "ZZ3", "ZZ4", 'ZZ5", and "ZZ6"	Unique identifier that corresponds to samples taken from the stockpiles. In this case, composites of composite samples.
	AbrasVal		number (double), 8	Ex: 45.30	The test results for abrasions measured in weight percent.
Test Results- Chem Assays					This test measures major chemical oxides within a sample. The results are the percentage of the sample. Chemical assays were performed **only** on single samples that contain **iron ore.**

Table Name	Field Name	Key	Definition	Valid Values	Description
	TestTypeID	primary key (composite) foreign key (links to 'Test Type')	text, 20	"IRON"	Call letters for this test.
	TR10ID	primary key (composite)	number (long), 4	Ex: 1, 2, 3, 4, ...51	Unique identification number for each 'test results...' record in this table.
	SampleNM	foreign key (links to 'Sample')	text, 4	Ex: "14", "15", "16", ..."82"	Unique identifier that corresponds to samples taken from the stockpiles. In this case, single samples taken from iron ore stockpiles.
	Fe		number (double), 8	Ex: 41.91	Percent total iron in a sample by weight.
	Hematite		number (double), 8	Ex: 59.38	Percent of hematite in the sample. This calculation was derived by: $(Fe - Fe++) \times 1.4297$
	Fe++		number (double), 8	Ex: 0.90	Percent ferrous iron in a sample by weight.
	FeO		number (double), 8	Ex: 1.16	Percent iron oxide in a sample by weight.
	SiO2		number (double), 8	Ex: 22.16	Percent of silica in a sample by weight.
	Al2O3		number (double), 8	Ex: 2.685	Percent of aluminum oxide in a sample by weight.
	CaO		number (double), 8	Ex: 1.010	Percent of calcium oxide in a sample by weight.
	MgO		number (double), 8	Ex: 0.345	Percent of magnesium oxide in a sample by weight.
	Na2O		number (double), 8	Ex: 0.013	Percent of sodium oxide in a sample by weight.
	K2O		number (double), 8	Ex: 0.181	Percent of potassium oxide in a sample by weight.

Table Name	Field Name	Key	Definition	Valid Values	Description
	MnO		number (double), 8	Ex: 0.218	Percent of manganese in a sample by weight.
	FreeSiO2		number (double), 8	Ex: 17.26	Percent of free silica in a sample by weight.
	CO2		number (double), 8	Ex: 0.44	Percent of carbon dioxide in a sample by weight.
Test Results-Clay Lumps					A test to measure the amount of clay lumps and friable particles in a sample by weight percent. Tests were performed on glacial overburden, natural ore coarse tailings, Cretaceous ore, natural ore and taconite mixed-sized rock samples.
	TestTypeID	primary key (composite) foreign key (links to 'Test Type')	text, 20	"C142"	These are the official call letters for the American Society Testing and Materials (ASTM) test for clay lumps.
	TR1ID	primary key (composite)	number (long), 4		Unique identification number for each 'test results...' record in this table.
	SampleNM	foreign key (links to 'Sample')	text, 4	Ex: "A1", "B9"	Unique identifier that corresponds to samples taken from the stockpiles. In this case, composite samples of single samples.
	ClyLmpVal		number (double), 8	Ex: 0.62	Amount of clay lumps in a sample by the percent weight.
Test Results-Fine Agg					This test measures the angularity of the fine particles within a sample by weight percent. This test was only performed on natural ore fine tailing samples because of their small grain size.

Table Name	Field Name	Key	Definition	Valid Values	Description
	TestTypeID	primary key (composite) foreign key (links to 'Test Type')	text, 20	"T304"	These are the official call letters for the American Society Testing and Materials (ASTM) test for fine aggregate particle shape.
	TR5ID	primary key (composite)	number (long), 4		Unique identification number for each 'test results...' record in this table.
	SampleNm	foreign key (links to 'Sample')	text, 4	Ex: "ZZ4", "ZZ5", "ZZ6"	Unique identifier that corresponds to samples taken from the stockpiles. In this case, composites of composite samples.
	FineAggVal		number (double), 8		Amount of fine aggregate angularity by percent weight.
Test Results-FlatElong					This test measures the weight percent of flat and elongated particles within a sample. This test was performed on glacial overburden samples.
	TestTypeID	primary key (composite) foreign key (links to 'Test Type')	text, 20	"D4791"	These are the official call letters for the American Society Testing and Materials (ASTM) test for flatness and elongation.
	TR2ID	primary key (composite)	number (long), 4	1, 2, 3, ...21	Unique identification number for each 'test results...' record in this table.
	SampleNM	foreign key (links to 'Sample')	text, 4	Ex: "A1", "B9"	Unique identifier that corresponds to samples taken from the stockpiles. In this case, composite samples of single samples.
	FlatElgVal		number (double), 8	Ex: 1.90	Amount of flat and elongated particles in a sample by weight percent.

Table Name	Field Name	Key	Definition	Valid Values	Description
Test Results-LtWt Particles					This tests measures the amount of deleterious material that is lightweight. This was performed only on glacial overburden samples.
	TestTypeID	primary key (composite) foreign key (links to 'Test Type')	text, 20	"C123"	Official call letters for the American Society Testing and Materials (ASTM)
	TR4ID	primary key (composite)	number (long), 4	1, 2, 3, ...21	Unique identification number for each 'test results...' record in this table.
	SampleNM	foreign key (links to 'Sample')	text, 4	Ex: "D20", "D21", ..."D29"	Unique identifier that corresponds to samples taken from the stockpiles. In this case, composite samples of single samples.
	LtWtVal		number (double), 8	Ex: 1.90	Amount of lightweight particles in a sample by weight percent.
Test Results-SGA-Coarse					This test measures the specific gravity (weight/volume) and water absorption for aggregate particles larger than the number 4 sieve. This was performed on all samples except natural ore fine tailings. Fine tailings were not tested because they do not contain any coarse aggregate.
	TestTypeID	primary key (composite) foreign key (links to 'Test Type')	text, 20	"C127"	These are the official call letters for the American Society Testing and Materials (ASTM) test for specific gravity and absorption in coarse materials.

Table Name	Field Name	Key	Definition	Valid Values	Description
	TR6ID	primary key (composite)	number (long), 4	1, 2, 3, ...32	Unique identification number for each 'test results...' record in this table.
	SampleNM	foreign key (links to 'Sample')	text, 4	Ex: "A1", "B9"	Unique identifier that corresponds to samples taken from the stockpiles. In this case, composite samples of single samples.
	CBulkOvDry		number (double), 8,	Ex: 2.574	Specific gravity when sample is oven dry and the weight is divided by the bulk volume.
	CBulkSSDry		number (double), 8,	Ex: 2.732	Specific gravity when sample has a saturated surface where the weight of the dry aggregate plus the weight of the water in pores are divided by the bulk volume.
	CApOvDry		number (double), 8	Ex: 3.057	Specific gravity when the sample is dry and the sample weight is divided by the volume of the solid aggregate.
	CAbsorpPc		number (double), 8	Ex: 6.130	Weight percent of the water absorbed in the pore space of the sample.
Test Results-SGA-Fine					This test measures the specific gravity (weight/volume) and water absorption for aggregate particles smaller than the number 4 sieve. This was performed on all samples.
	TestTypeID	primary key (composite) foreign key (links to 'Test Type')	text, 20	"C128"	These are the official call letters for the American Society Testing and Materials (ASTM) test for specific gravity and absorption in fine materials.

Table Name	Field Name	Key	Definition	Valid Values	Description
	TR7ID	primary key (composite)	number (long), 4	1, 2, 3, ...32	Unique identification number for each 'test results...' record in this table.
	SampleNM	foreign key (links to 'Sample')	text, 4	Ex: "A1", "B9"	Unique identifier that corresponds to samples taken from the stockpiles. In this case, composite samples of single samples.
	FBulkOvDry		number (double), 8,	Ex: 2.574	Specific gravity when sample is oven dry and the weight is divided by the bulk volume.
	FBulkSSDry		number (double), 8,	Ex: 2.732	Specific gravity when sample has a saturated surface where the weight of the dry aggregate plus the weight of the water in pores are divided by the bulk volume.
	FApOvDry		number (double), 8	Ex: 3.057	Specific gravity when the sample is dry and the sample weight is divided by the volume of the solid aggregate.
	FAbsorpPc		number (double), 8	Ex: 6.130	Weight percent of the water absorbed in the pore space of the sample.
Test Results-Sieve					This test measures the various sized particles of a sample by percent passing each sieve by weight. This test was conducted on all samples except for 45 and 46 (too fine to dry sieve).
	TestTypeID	primary key (composite) foreign key (links to 'Test Type')	text, 20	"MNDNR"	Call letters for this test. (In this case, it specifies the laboratory where the analysis was conducted)
	TR8ID	primary key (composite)	number (long), 4	1, 2, 3, ...80	Unique identification number for each 'test results...' record in this table.

Table Name	Field Name	Key	Definition	Valid Values	Description
	SampleNM	foreign key (links to 'Sample')	text, 4	Ex: "1", "2", "3", "4", ...	Unique identifier that corresponds to samples taken from the stockpiles. In this case, single samples taken from stockpiles. All samples were sieve except samples 44 and 45.
	4in		number (double), 8	Ex: 100	Weight percent passing on the 4 inch sieve.
	3in		number (double), 8	Ex: 100	Weight percent passing on the 3 inch sieve.
	2,5in		number (double), 8	Ex:: 97	Weight percent passing on the 2.5 inch sieve.
	2in		number (double), 8	Ex:: 92	Weight percent passing on the 2 inch sieve.
	1,5in		number (double), 8	Ex: 88	Weight percent passing on the 1.5 inch sieve.
	1,25in		number (double), 8	Ex: 85	Weight percent passing on the 1.25 inch sieve.
	1in		number (double), 8	Ex: 75	Weight percent passing on the 1 inch sieve.
	3/4in		number (double), 8	Ex: 71	Weight percent passing on the 3/4 inch sieve.
	5/8in		number (double), 8	Ex: 69	Weight percent passing on the 5/8 inch sieve.
	num4		number (double), 8	Ex: 51	Weight percent passing on the Number 4 Sieve.
	num8		number (double), 8	Ex: 45	Weight percent passing on the Number 8 Sieve.
	num10		number (double), 8	Ex: 40	Weight percent passing on the Number 10 Sieve.
	num16		number (double), 8	Ex: 39	Weight percent passing on the Number 16 Sieve.
	num30		number (double), 8	Ex: 20	Weight percent passing on the Number 30 Sieve.
	num40		number (double), 8	Ex: 17	Weight percent passing on the Number 40 Sieve.
	num50		number (double), 8	Ex: 15	Weight percent passing on the Number 50 Sieve.

Table Name	Field Name	Key	Definition	Valid Values	Description
	num100		number (double), 8	Ex: 10	Weight percent passing on the Number 100 Sieve.
	num200		number (double), 8	Ex: 4	Weight percent passing on the Number 200 Sieve.
Test Results-Soundness					This test measures the ability of a material to withstand freeze/thaw cycles and is measured in weight percent. This test was performed on all sampled material types except for natural ore fine tailings.
	TestTypeID	primary key (composite) foreign key (links to 'Test Type')	text, 20	"C88"	These are the official call letters for the American Society Testing and Materials (ASTM) test for determining the results of magnesium sulfate or soundness tests.
	TR9ID	primary key (composite)	number (long), 4	1 - 7	Unique identification number for each 'test results...' record in this table.
	SampleNm	foreign key (links to 'Sample')	text, 4	Ex: "ZZ1", "ZZ7", "ZZ10"	Unique identifier that corresponds to samples taken from the stockpiles. In this case, composites of composite samples.
	11/2to1in		number (double), 8	Ex: 12.7	Percent by weight breakdown of material that is 11/2 to 1 inch in diameter.
	1to3/4in		number (double), 8	Ex: 20.6	Percent by weight breakdown of material that is 1 to 3/4 inch in diameter.
	3/4to1/2in		number (double), 8	Ex: 28.9	Percent by weight breakdown of material that is 3/4 to ½ inch in diameter.
	1/2to3/8in		number (double), 8	Ex: 41.0	Percent by weight breakdown of material that is ½ to 3/8 inch in diameter.

Table Name	Field Name	Key	Definition	Valid Values	Description
	3/8toNum4		number (double), 8	Ex: 41.5	Percent by weight breakdown of material that is 3/8 inch to number 4 mesh diameter.
	CompLoss		number (double), 8	Ex: 33.8	Composite percent by weight breakdown of material.
Test Type					Table lists all test types performed on samples.
	TestName		text, 50		Name of test performed on samples.
				"Lightweight Particles"	This tests measures the amount of deleterious material that are lightweight. This was performed only on glacial overburden samples.
				"Specific Gravity and Absorption-Coarse"	This test measures the specific gravity (weight/volume) and water absorption for aggregate particles larger than the number 4 sieve. This was performed on all samples except natural ore fine tailings.
				"Specific Gravity and Absorption-Fine"	This test measures the specific gravity (weight/volume) and water absorption for aggregate particles smaller than the number 4 sieve. This was performed on all samples.
				"Los Angeles Abrasion"	This test measures the breakdown of material by weight percent. This test was performed on glacial overburden, natural ore coarse tailings, natural ore fine tailings, natural ore and taconite mixed-sized rock, and cretaceous ore samples.

Table Name	Field Name	Key	Definition	Valid Values	Description
				"Clay Lumps and Friable Particles"	A test to measure the amount of clay lumps and friable particles in a sample by weight percent. Tests were performed on glacial overburden, natural ore coarse tailings, Cretaceous ore, natural ore and taconite mixed-sized rock samples.
				"Magnesium Sulfate Soundness"	This test measures the ability of a material to withstand freeze/thaw cycles and is measured in weight percent. This test was performed on all sampled material types except for natural ore fine tailings.
				"Flatness and Elongation"	This test measures the weight percent of flat and elongated particles within a sample. This test was performed on glacial overburden samples.
				"Chemical Assays"	This test measures major chemical oxides within a sample. The results are the percentage of the sample. Chemical assays were performed on only samples that contain iron ore.
				"Sieve Analysis (Gradations)"	This test measures the various sized particles of a sample by percent passing each sieve by weight. This test was conducted on all samples except for 45 and 46 (too fine to dry sieve).

Table Name	Field Name	Key	Definition	Valid Values	Description
				"Spall"	Spall is any deleterious material within a sample (i.e. shale, iron oxide, soft particles). This test measures the total spall within a sample by weight percent. This test was performed on glacial overburden samples.
				"Fine Aggregate Angularity"	This test measures the angularity of the fine particles within a sample by weight percent. This test was performed on natural ore fine tailing samples.
	TestTypeID	primary key	text, 20		These are the corresponding ASTM and other call letters for each test.
				"C123"	Lightweight Particles
				"C127"	Specific Gravity and Absorption-Coarse
				"C128"	Specific Gravity and Absorption-Fine
				"C131/C535"	Los Angeles Abrasion
				"C142"	Clay Lumps and Friable Particles
				"C88"	Magnesium Sulfate Soundness
				"D4791"	Flatness and Elongation
				"IRON"	Chemical Assays
				"MNDNR"	Sieve Analysis (Gradations)- performed by MNDNR
				"MNDOT"	Spall
				"T304"	Fine Aggregate Angularity
	TestAbbr		text, 20		This are the abbreviations used in the data base for each test.
				"LtWt Particles"	Lightweight Particles

Table Name	Field Name	Key	Definition	Valid Values	Description
				"SGA-Coarse"	Specific Gravity and Absorption-Coarse
				"SGA-Fine"	Specific Gravity and Absorption-Fine
				"Abrasion"	Los Angeles Abrasion
				"Clay Lumps"	Clay Lumps and Friable Particles
				"Soundness"	Magnesium Sulfate Soundness
				"FlatElong"	Flatness and Elongation
				"Chem Assays"	Chemical Assays
				"Sieve"	Sieve Analysis (Gradations)- performed by MNDNR
				"Spall"	Spall
				"Fine Agg"	Fine Aggregate Angularity
Test Type Determination					This table notes which tests are performed on which material types. For further explanation, refer to 'Test Type' table.
	TTDID	primary key	number (long), 4		Unique identification number for each test type determination record.
	TestTypeID	foreign key (links to 'Test Type')	text, 20	"C123", "C88", "C4791", "IRON", ...	This are the corresponding ASTM and other call letters for each test.
	MatTypID	foreign key (links to 'Stockpile Material Type')	number (long), 4	1-11	Unique identification number for each stockpile material type. (See 'Stockpile Material Type' table for definitions)
X, Y Coordinate					Table contains all possible point locations where observations, samples and photos were taken.
	XYID	primary key	number (long), 4	10, 11, 13, ...308	Unique identification number for each x, y coordinate.

Table Name	Field Name	Key	Definition	Valid Values	Description
	StudyArea		text, 10	"Calumet" or "Virginia"	Project study area where coordinate was collected.
	Descriptio		text, 40	"01-AUG-00 14:10"	Date and time that point was collected using GPS receiver. Coordinates **not** collected with a GPS receiver have a null value in this field.
	X_Coord		number (double), 8		UTM X coordinate in zone 15, meters
	Y_Coord		number (double), 8		UTM Y coordinate in zone 15, meters
	Method		text, 20		How the coordinate was obtained
				"GPS"	Garmin GPS receiver
				"Screen digitized"	Digitized on screen using ArcView