

Aggregate Resource Mapping Program



Chad Crotty Geologist | Aggregate Mapper

DNR's Aggregate Resource Mapping Program

- Identify and classify aggregate resource potential (Minn. Stat. §84.94)
- Produce easy to read maps and usable GIS data
 - ➤County-scale
 - High, moderate, low, or limited potential
- Provided technical support



DNR's Aggregate Resource Mapping Program

- Assist local governments and the State in:
 - Making sound land use decisions
 - Incorporating information in land use planning
 - Ensure that future generations have access to construction materials



DNR's Aggregate Resource Mapping Program

Aggregate is a non-renewable resource



Sand and gravel

Transported, sorted, and deposited by water/wind

Crushed stone

A product of mechanically breaking down bedrock





vs Glacial till

Unsorted material deposited by glaciers



Minnesotans Rely on Aggregate

- Each American uses about 10 tons of aggregates every year.
- +50% of all aggregates consumed in MN are on publicly-funded projects.





Minnesota Infrastructure Grades



A: EXCEPTIONAL, B: GOOD, C: MEDIOCRE, D: POOR, F: FAILING

Each category was evaluated on the basis of capacity, condition, funding, future need, operation and maintenance, public safety, resilience, and innovation

Source: American Society of Civil Engineers, https://www.infrastructurereportcard.org/state-item/minnesota/

\$1 Trillion Bipartisan Infrastructure Law

- \$110 billion for roads, bridges, and major projects
- Includes \$40 billion for bridge repair, replacement, and rehabilitation
 - Largest investment in our nation's bridges since the construction of the interstate highway system
- ~20% or 173,000 miles of highway and major roads and ~45,000 bridges are in poor condition
- All raw materials must be sourced in the US

\$1 Trillion Bipartisan Infrastructure Law

Potential Federal Funding for Minnesota:

- \$4.5 billion for highways
- \$302 million for bridge replacement and repairs
- \$818 million for public transportation

Could lead to unprecedented amount of construction in MN

Housing



www.npr.org



The supply of previously owned single-family homes fell to a 2.4 months in October — the lowest since 1982, when the National Association of Realtors began collecting the data.

Not Only an Urban Issue



- Needed at all levels township, county, and state
 - Infrastructure, trails, public buildings, private construction, emergency response, etc.
- High transportation cost of aggregate



Uneven Distribution



Map Created January, 2010. Minnesota Department of Natural Resources, Division of Lands and Minerals, Director Marty Vadis

- Areas of natural scarcity vs. abundant sand and gravel
- Not a renewable resource

Need for local resources

Aggregate Quality



These materials are deleterious to pavements:

- Shale causes pop-outs in pavements
- Friable sandstone breaks easily
- Hydrous iron oxides
- Argillite or other water absorbing materials
- Flat and elongate particles

Looking Forward

- Potential for unprecedented need for construction aggregate
- Increased transportation costs
- Increased CO² emissions
- Uneven distribution of texture/quality across MN
- Local government's need to know where aggregate is to use and conserve resources



ARMP Products

Easy-to-read, data-rich products

- Aggregate Potential Printed Map
- Aggregate Mapper (Interactive Map)
- Gravel Pit Database
- Field Observation Database
- Aggregate Potential Database
- Quality Database





RHL-4, PART A RHL-4, PART A

- Literature Review
- Gravel Pit Inventory
- Quality Database
- Data Compilation
- Landform Mapping
- Fieldwork

• Finalize Map and Databases



sampling sites A through F.

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Reclamation (Post 1990's)

- Passive (naturally) vs. Active (sloped and vegetated)
- Multiple uses: Recreation, wetlands, prairie, agriculture, etc.

Legacy pits

- Older pits opened prior to 1990's during period of no/limited requirements for regulation
- Related to Interstate Hwy Construction

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Landform – Sediment association



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Challenges Facing Construction Aggregate Resources

Central MN Case Study:

- Final ARMP Aggregate Potential Map
- Overlay land use conflicts
 - Easements, wetlands, lake and residential home setbacks
- 53% reduction in High to Moderate potential



ARMP Status and Goals



MN County Status

- 20 completed
 - Plus 7 mapped separately
- 18 requested
- 3 in-progress
 - Sibley, Swift, and Redwood
 - Completed summer of 2022

ARMP Status and Goals



ARMP Goals

- Fully funded program
- Finish mapping state in 10 years
- 6 counties / year

By knowing the location of aggregate as well as having the conversation about the importance of aggregates, local and state governments can do a better job preserving and conserving natural resources.



Thank You!

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Questions?



DEPARTMENT OF NATURAL RESOURCES

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MINNESOTA POLLUTION CONTROL AGENCY

Sand and Gravel, Associated Activities 2022 MACPZA Spring Conference

Craig Weingart | Industrial Water Quality Compliance & Enforcement



Environmental Concerns

MPCA permits Do and Don't Cover

MPCA Permit Termination

Environmental Justice



Environmental Concern

Discharge of sediment (TSS) offsite, to waters of the state. Soils, mined, quarried materials





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Discharge of sediment (TSS) offsite, to surface waters. Soils, mined, quarried materials

05/04/20

Discharge of pollutants to environment Fuel, Oil, Chemicals.





Infiltration of stormwater or wastewater to groundwater.





Infiltration of stormwater or wastewater to groundwater.





MPCA Water Quality Permits

If a site is conducting mining, asphalt production, concrete production, and or recycling asphalt or concrete. A water quality permit is likely required.

Permits Authorize

- Industrial Stormwater Discharges
- Construction Stormwater Discharges
- Some Wastewater Discharges to Surface or Groundwater

Requirements Not in MPCA Permits

- Site Location
- Setbacks
- Site Design

These may be Addressed by

- Conditional Use Permit or Similar
- Zoning Ordinance
- Shoreland Rules

Authorized Discharges

Discharges to Surface Water

Stormwater Discharges

- Sand and Gravel, Stone
- Concrete, Readymix, Asphalt
- Wastewater Discharges to Surface Water
 - Dewatering Sand and Gravel, Stone

Wastewater Discharges to Groundwater

- Wash water, sand and gravel or crushed stone
- Dredging
- Equipment washing, no detergents solvents or degreasers
- Dust Control
- Concrete Washout

Nonmetallic Mining Requirements Overview

Permit Compliance

- Develop, implement and Maintain Best Management Practices
- Conduct Monthly Inspections
- Document in a Pollution Prevention Plan
- Sample if discharge
 - Stormwater 2/year
 - Dewatering 1/quarter and 1/year
- Submit DMRs: Quarterly and or Annually



MNG49 BMPs

What BMPs can you use?

- Grading
- Seeding/mulching/sodding
- Rip rap
- Silt fence
- Sedimentation ponds
- Infiltration ponds
- Vegetative swales
- Vegetated buffers
- Collection and reuse
- Inlet controls
- Outlet controls
- Dikes/berms to divert clean water
- Proprietary filter devices
- Check dams in ditches/swales
- Etc.



MNG49 BMP

Berm Design

- Slope 2:1 or greater (flatter)
- Stabilized
 - Vegetation or Rip Rap
- Emergency Overflow



MPCA MNG49 Permit Termination

Potential for Stormwater Runoff from area where Activity which Required Coverage Occurred

Cessation of Activity that Required Coverage, and; Site meets Final Stabilization Requirements

No Potential for Stormwater Runoff from area where Activity which Required Coverage Occurred, "Internally Drained" Site Cessation of Activity that Required Coverage



MPCA MNG49 Permit Termination

Final Stabilization:

a. The drainage ways that leave the site must be stabilized to prevent erosion with riprap or other protective material.

b. All soils must be stabilized by a uniform perennial vegetative cover with a density of 70 percent over the entire pervious surface area, or other equivalent means necessary to prevent soil failure under erosive conditions.

c. Temporary BMPs for erosion prevention, such as synthetic liners and silt fences, must be removed. BMPs designed to decompose on site (such as some compost logs) may be left in place.

d. All sediment must be removed from conveyances and from temporary sedimentation basins that are to be used as permanent water quality management basins in order to sufficiently return the basin to design capacity. Sediment must be stabilized to prevent it from being washed back into the basin, conveyances or drainage-ways discharging off-site or to surface waters.

e. Other BMPs as necessary must be implemented so as to prevent erosion from the site excavation areas and stockpiles that have been used by the Permittee. [Minn. R. 7001]

5/16/2022

www.pca.state.mn.us/quick-links/nonmetallic-mining-and-associated-activities

Environmental Justice

MPCA's environmental justice policy

The Minnesota Pollution Control Agency (MPCA) will, within its authority, strive for the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies.

Meaningful involvement means that

- People have an opportunity to participate in decisions about activities that may affect their environment and/or health;
- The public's contribution can influence the regulatory agency's decision;
- Their concerns will be considered in the decision making process; and
- The decision makers seek out and facilitate the involvement of those potentially affected

The above concept is embraced as the understanding of environmental justice by the MPCA

Environmental Justice

Minnesota areas of environmental justice concern

- The number of people of color is greater than 50%; or
- More than 40% of the households have a household income of less than 185% of the federal poverty level

• Tribal Areas



Areas of environmental justice concern

Thank you!

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5/16/2022

AGGREGATE MAPPING, GRAVEL PITS, & COMPLIANCE: AGGREGATE INDUSTRY PERSPECTIVE

JOHN CUNNINGHAM, ARM OF MINNESOTA



AGGREGATE INDUSTRY UPDATE

Restricted Supply

- Forces Acting on Supply
- Increasing Needs
- Responses
 - Legislative responses
 - Policy responses
 - Emerging Technologies



RESTRICTED SUPPLY

- Finite resources (quantity of material)
 - As noted earlier by Mr. Crotty (DNR)
- Continually shrinking pool of materials
 - Accessibility
 - Mining and processing limitations
 - Transportation limitations
- Workforce challenges in every phase
 - Mining
 - Processing
 - Transportation





FINITE RESOURCES (SUPPLY)

Dealing with raw materials that cannot simply be replenished

• Finite material deposits

• Accessibility to deposits further reduces the amount of material available

Most of the materials we produce must comply with very specific performance/engineering specifications

- Not all crushed stone, sand, or gravel is desirable or acceptable
- Performance is particularly important for resilient infrastructure
- Resilience is a primary effort in response to effects of climate change

There are limitations on what can be recycled

- Some construction materials are 100% recyclable, but it may not be practical or acceptable to do so
- Depends on the use and performance criteria



ACCESSIBILITY (SUPPLY)

- Some deposits are already inaccessible due to
 - Current or highest and best use of land on or adjacent to deposit
 - Development on or around
 - Public use
 - Planning and zoning
- Increasing limitations on accessibility of materials
 - Continuing development
 - Preservation of natural areas
 - Social justice
 - If efforts ignore aggregate resources





LIMITATIONS ON MINING AND PROCESSING

- Limited labor pool
- Increasing regulatory requirements
 - Air quality
 - Water quality
 - Covered by Mr. Weingart
- Climate change
 - Lowering emissions in order to minimize climate change
 - More efficient fossil fuel equipment
 - More alternative-fuel equipment
 - Changing operations to be as efficient as possible
 - Reducing the number of motors/engines needed
 - Use of Environmental Product Declarations (EPDs) to decrease emissions
 - Cement industry has committed to being carbon neutral by 2050
 - Concrete is the most used material on Earth, except for water
 - Focus on resilience





LIMITATIONS ON TRANSPORTATION

- Limited labor pool (drivers)
 - An even greater concern than for operations
- Increasing air quality regulations
 - Emissions
 - LOCATION impacts transportation
- Climate change
 - Lowering emissions
 - More efficient vehicles
 - More alternative-fuel vehicles
 - More efficient logistics
 - LOCATION is a key component





WORKFORCE CHALLENGES

- Minnesota's population is stagnant
 - Reflecting a general trend for the Midwest as a whole
- Growth of our industry's labor pool is projected to be average
 - 5% 6% in the next 10 years
 - According to US Bureau of Labor Statistics
- Our industry's current labor shortage is likely to continue
 - Attract a greater percentage of the work force
 - Decrease the number of jobs required for **current production levels**





STAGNANT POPULATION

- Nominal percentage increase in population
- Not keeping pace with states elsewhere in the US
 - DOES reflect the regional trend
- Minnesota nearly lost a Congressional seat
 - If NY had counted just 85 more people, MN would have lost one seat
 - According to the Star Tribune



MN Changes in Population

MINNESOTA'S POPULATION GROWTH

- Percentage of moves in Minnesota has tilted more towards "Out" migration as opposed to "In"
 - United Van Lines data
- MN's nominal growth does NOT appear to be due to in-migration



ALLIED VAN LINES DATA SHEET - 2021

1



Mi	nnesota	\langle	Total Inbound: 45.7% Total Outbound: 54.3%							
Prin	Primary Reason for Moving									
	INBOUND		OUTBOUND							
	14.74%	retirement	19.03%							
	3.68%	health	5.60%							
•	34.21%	family	25.00%							
	10.53%	lifestyle	14.93%							
	39.47%	job	42.91%							
	3.68%	cost	2.24%							
Age	Ranges									
Inco	ome									



BUREAU OF LABOR STATISTICS

Job opening rate vs. hiring rate

The job opening rate measures the percent of job positions that are currently vacant while the hiring rate measures the percent of workers hired to fill these positions. A gap between hires and job openings indicates an imbalance between the number of available workers and the number of open jobs



AGGREGATE & READY MIX ASSOCIATION OF MINNESOTA

*Graph from Federal Reserve Bank of Minneapolis website

LABOR AVAILABILITY (CONSTRUCTION)





RESERVE BANK OF MINNEAPOLIS

FEDERAL

INCREASING NEEDS (DEMAND)

- Historic levels of construction demand
- Infrastructure Investment & Jobs Act (IIJA)
 - 47% increase over current levels
 - Largest infrastructure investment in 50 years
- Minnesota impact
 - \$4.9 billion in highway funding over 5 years
 - 22% increase over current level
 - 32% increase in FY2022
 - Plus supplemental funds



OUTLOOK FOR CONSTRUCTION WORK





Requests for Proposal: <u>Public</u> Projects

Significantly lower
Somewhat lower
Flat/no change
Somewhat higher
Significantly higher

FEDERAL RESERVE BANK OF MINNEAPOLIS

INFRASTRUCTURE INVESTMENT & JOBS ACT

- Reauthorization of \$304 billion
 - Highway Bill Reauthorization
- \$550 billion additional hard infrastructure
- ROCKS Act (Rebuilding Our Communities by Keeping aggregates Sustainable)





IIJA IS AN INFRASTRUCTURE BILL

	In \$ billions								
AGENCY	2021 ACTUAL	202	2023	2024	2025	2026	TOTAL	AVG	
HIGHWAYS/FHWA	49.0	67.7	69.0	70.3	71.5	72.9	351.3	70.3	
TRANSIT/FTA	12.8	17.6	17.9	18.2	18.5	18.9	91.2	18.2	
RAIL/FRA	2.5	13.2	13.2	13.2	13.2	13.2	66.0	13.2	
SAFETY/NHTSA	1.0	1.3	1.3	1.3	1.4	1.4	6.7	1.3	
SAFETY/FMCSA	0.7	1.0	1.0	1.0	1.0	1.0	5.1	1.0	

Average increase of 43% over current highway funding levels



IIJA IS AN INFRASTRUCTURE BILL



MINNESOTA'S INCREASE



Minnesota Apportionments Under IIJA and Continuing Appropriations Act, 2021

32% to 42% Increase

Source: Data from Federal Highway Administration, Senate EPW Committee. Highway includes core highway funds, supplemental bridge formula funds, and EV charging station formula funds. Transit includes formula grant funds.



THE DILEMMA

- Contracting supply
 - Accessibility
- Growing needs
 - Infrastructure





RESPONSES

- Legislative Responses
 - ROCKS Act
 - Emphasize the need for careful planning and zoning
 - MN's ARTF Recommendations
 - See above
 - Funding for Aggregate Mapping
- Policy Responses
 - P & Z policies that account for aggregate resources
 - They ARE resources
 - Social justice policies that account for proximity of resources




LEGISLATIVE RESPONSES

- ROCKS Act
 - Rebuilding Our Communities and Keeping aggregates Sustainable
 - Working group under the Sec. of Trans. to ensure that all communities have access to aggregate resources
 - Part of the IIJA
 - Passed out of Senate EPW by 20-0 vote
- ARTF Recommendations
 - Report finalized in Jan of 2018
 - Similar focus as ROCKS Act
- DNR's Aggregate Mapping Program
 - Continue to guide local P & Z on development that allows use of aggregate resources

Resource Mapping & County Participation

Counties are invited to join the program with passage of a Board Resolution. Contact an <u>ARMP</u>. <u>Coordinator</u>
© to start developing your plan and receive a <u>Sample resolution</u>. Nineteen counties have already been mapped with financial support from the <u>Minerals Coordinating Committee</u> gi and General Fund, and 17 counties have passed resolutions to join ARMP and are currently pending funding.





POLICY RESPONSES

- Encourage Planning and Zoning policies that:
 - Recognize aggregate resource locations
 - Aggregate mapping is a key component
 - Protect resources for use before development occurs
 - Or other land use that might prevent use of the resources
- Social Justice
 - Looking at the locations of asphalt, concrete, and aggregate facilities
 - Encourage approaches that do not disadvantage communities
 - Infrastructure
 - Development
 - Proximity to resources provides economical acquisition of the building-blocks
 - Greater haul distances mean greater environmental impacts





THANK YOU

Questions?

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