



## Iowa Geological Survey

### Research Project Title

TR-571

GIS - Based Decision and Outreach Tools  
for Aggregate Source Management

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### Sponsors

Iowa Highway Research Board

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# Using an Internet Mapping Service (IMS) to provide GIS information to decision makers for Aggregate Source Management

## Technological Transfer Summary

### Background

Land use conflicts involving aggregate mining have increased over the past decades as suburban and rural housing developments have grown around the outskirts of many cities and towns. While this issue first arose around the nations larger metropolitan areas, they are becoming more numerous in Iowa as well. Such conflicts are likely to continue, as both demand for aggregate and suburban - “sub-rural” populations grow.

In response, many states, Canadian Provinces, and local governments have began efforts to incorporate “planning for aggregate” in there long-term land-use plans and zoning decisions. These efforts are commonly state-wide guides for planning. Others focus more on plans or strategies for regional areas. Others are more localized and contain recommended and established zoning code language defining areas and practices for aggregate mining. State-level efforts are typically planning guides for local government entities which exercise zoning authority.

Needed information for the first steps in planning for future aggregate access in these studies and guides focus on:

- 1.) Locations and descriptions of the aggregate resource.
- 2.) Factors with implications for extraction.

### Problem Statement

Rural and suburban residents have become increasingly resistant to the establishment or expansion of quarries and sand pits in their vicinity. This has increased haul distances for road projects, which in combination with rapidly rising fuel prices has increased costs for aggregate at the job site. Land use conflicts have also raised concerns over adequate supplies of certified high-quality aggregate required for certain state and federal projects. As zoning decisions affecting aggregate operations are typically made by county zoning programs and boards of supervisors, readily useable and useful mapping tools are needed to show current and potential sources in relation to adjacent land use, natural and cultural resources, and development trends in their locales. Such mapping tools represent a first step towards establishing local and state-wide plans for assuring aggregate availability.

## Objectives and Research Plan

GIS coverages will be created and verified for:

- 1) All operations currently certified by DOT for federal and state projects.
- 2) Aggregate operations currently registered with Iowa Department of Agriculture and Land Stewardship (IDALS).
- 3) Coverage of former DOT-certified and IDALS-registered operations would also be created.
- 4) An existing coverage of the historic Abandoned Mined Lands Inventory would be coupled to these for a complete picture of current and past aggregate resource locations, an important first step towards defining the resource base.

### *Coupling Mines and Geology*

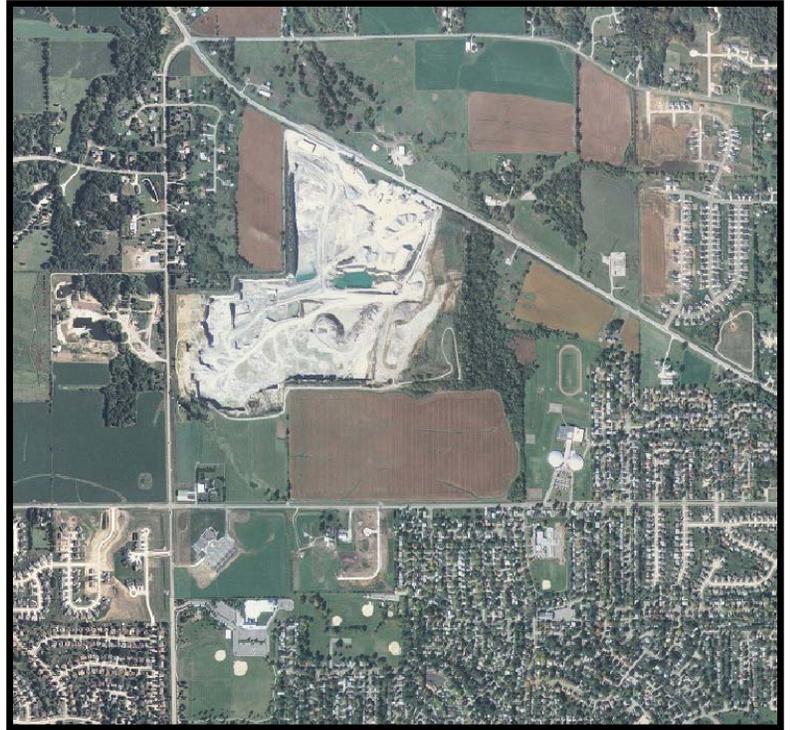
The above products will describe aggregate resources as they currently and historically have been exploited. A more complete view of the resource will be obtained by combining these coverages with bedrock and surficial geologic map coverages of the state, allowing for better extrapolation of potential resource locations and defining relationships between aggregate quality and geologic map units to the degree possible. A depth to rock coverage will be used to identify areas where rock aggregate sources are relatively shallow and have the potential to be economically mined.

### *Adding Coverages Relevant to Planning*

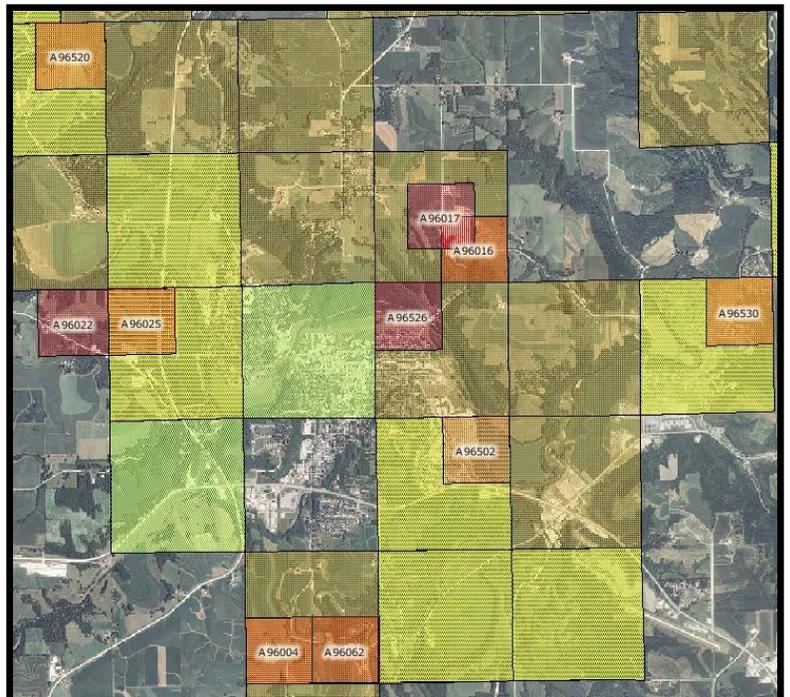
We have met with representatives from ISAC, ILPA, and DOT Materials to review the coverages that are currently available in the Natural Resources GIS Library (<http://www.igsb.uiowa.edu/nrgislib/>). Those that were viewed by these entities as the most useful for aggregate protection planning, those that represent impediments to or positives for resource extraction, were combined with those describing the resource itself and added as layers into an Internet Map Service (IMS) application.

### *Develop IMS Application*

Once relevant coverage layers and functionalities for the IMS were selected, display properties were assigned and overall display parameters were defined. For most of the existing layers that were available for use, display properties had been set. Properties for the new layers were discussed and agreed upon as far as how they would be displayed, and what linkages will be needed to mesh with other relevant information. Testing of the web-based IMS followed until a final product was agreed upon and all parties needs were met. As new information becomes available it has been and will continue to be added to the IMS as some of the data expressed as desirable by various participants is still under development.



Development occurring around Crawford and Morgan Creek quarries in Linn County outside of the western city limits of Cedar Rapids, IA



The area surrounding Decorah, IA shows many aggregate operations (A numbered polygons) with other factors that will potentially limit extraction (green polygons are eco-sensitive areas, tan polygons are archeological significant areas, yellow are both eco-sensitive and archeological sensitive areas).