USGS

EMERGING SCIENCE

Nebraska Water Science Center

Can sand from dredged reservoirs be used a proppant in a fracking well?

NEWSC is conducting a pilot study to determine whether sand dredged from the Lewis and Clark Lake delta has the desired properties to be used as a proppant in fracking wells. Proppants are small particles injected into a well to hold open the fractures created during the fracturing process.

Why Frac Sand?

ISSUE 1: Sediment Management

Six large reservoirs along the mainstem of the Missouri River are managed by the U.S. Army Corps of Engineers (USACE). USACE is considering several sediment management options for these reservoirs. One management option is hydraulic dredging, although this option is expensive.

ISSUE 2: Proppant Sources

Fracking operations require proppants to increase and prolong hydrocarbon recovery in fracking wells. Sources of proppants are limited to Bidahochi sands in Arizona and the Loup River sands in Nebraska. Potential sand also is being studied in Wisconsin.

Providing dredged sand to fracking companies could allow dredging to become a more feasible sediment management approach for USACE while also providig fracking companies with much closer source of proppant. **Data from this USGS study will provide important information for all stakeholders.**

NEWSC Role

Task 1: Coordination and Reconnaissance

- Contact stakeholders.
- Coordinate with Federal, State, and local agencies.
- Surface Geophysical Reconnaissance at various sandbar complexes.

Task 2: Sample Collection and Core processing

- Lake delta sampling via Geoprobe (or vibracorer).
- Cores split, logged, photographed and subsampled.
- Subsamples sent to speciality lab for sample analysis.

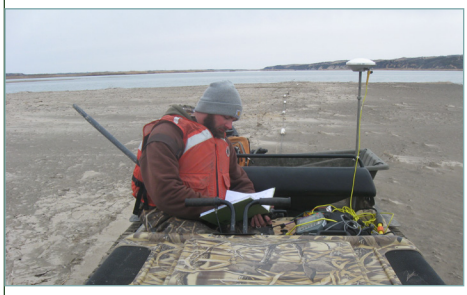
Task 3: Evaluate Results

- Summarize lab results by sand body sampled.
- Compare results with preferred values for proppant.
- Evaluate potential suitability of sand as proppant.
- Compare lake delta deposits with upstream sources.

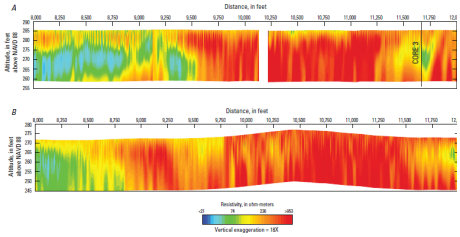
Surface Geophysical Reconnaissance

Characterizing subsurface texture at 4 sandbar complexes in the lake delta

Resistivity profiles are collected along lines using the OhmMapper™.



OhmMapper™-surveyed lines are processed, modeled, and interpreted.



Results will guide selection of best-quality targets for sampling.

OhmMapper™ is an array of capacitively coupled resistivity meters. NEWSC typically pulls the array behind a tracked ATV.

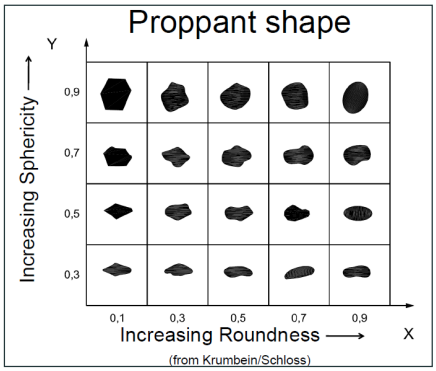
Sample Collection

Lake delta sampling with Geoprobe

Sediment cores from 25-30 borings (2-inch diameter) with Geoprobe. Depth target is 10 feet, pre-impoundment surface, or refusal.

Cores are split, logged, photographed, and subsampled. Subsamples are targeted to apparent best-quality proppant. Fifty subsamples sent to lab at Montana Tech.

Montana Tech Proppant Research Group evaluates particle-size distribution, bulk density, sphericity, roundness, and crush testing.



Upstream Sources

Sampling sites:

- Impoundment behind Spencer Dam (6 samples)
- Channel bars of lower Niobrara River (10 samples)
- Streambeds of tributaries to lower Niobrara River (10 samples)

Samplers to be used:

- Hand cores (impoundment)
- Short cores (BMH-53 piston sampler)
- Bed-surface grabs (BMH-60/80), submerged