



Making Topsoil from Sediment at Grand Haven Harbor

Introduction

Like many Great Lakes commercial harbors, the Lake Michigan port of Grand Haven, Michigan at the mouth of the Grand River fights an ongoing battle with the issue of what to do with sediment dredged from its navigation channels. Disposal options - both on land and in open water - are dwindling, so the incentive to find beneficial uses for dredged material is great. In Grand Haven's case, it was great enough to forge a unique coalition of community leaders, local industry, dock operators, state regulators and the U.S. Army Corps of Engineers to come up with just such an alternative: "Earth Renewed," a high-quality topsoil product made from a mixture of dredged sediment and local yard waste.

Background

Marine trade at the mouth of the Grand River can be traced back to the 1600s when Ottawa Indians began trading in furs with the area's first European settlers. In the 1700s John Jacob Astor's American Fur Company established a prominent trading post in the harbor which lasted well into the 1800s and which first used the name Grand Haven. The port peaked in activity during the Great Lakes lumber boom in the late 1800s when schooners and lumber hookers were calling at some 18 different lumber mills in the harbor. As that era phased out, Grand Haven evolved into a more diverse industrial port, well situated to serve a growing West Michigan market. The harbor is defined by three municipalities, the cities of Grand Haven and Ferrysburg and the Village of Spring Lake. The community is known collectively as the Tri-Cities.

The port today is almost exclusively a bulk cargo port, with six active docks typically handling over 1 million tons a year transported by Great Lakes bulk carriers. In 2003, the port received 86 inbound cargos and sent 13 outbound. Primary commodities include coal, stone and aggregate, sand, slag and cement. One of Grand Haven's core utilities relies heavily on the port's viability. The Grand Haven Board of Power and Light receives about 170,000 tons of coal a year via Great Lakes self-unloaders to fuel its generating station. The utility could not operate its coal-fired units as cost effectively without direct water transportation access, if it could operate them at all. Board of Power and Light officials estimate that if the utility were to receive this tonnage by rail or truck it would cost up to an additional \$3 million. If the coal was shipped by rail, it would require 15 110-car trains to the Harbor Island facility per season, and if it were shipped on trucks, it would mean 3,400 truck deliveries; both scenarios would likely be unacceptable to the community.

Verplank Trucking and Dock Company is the largest private dock operator at the port, handling from 300,000 to 400,000 tons a year of coal, limestone, sand, slag and salt, among other things. Other port operators directly dependent on dredged channels include the Meekhof dock which handles aggregate products, Construction Aggregates Corp. which loads out sand, and Cemex which receives bulk cement shipments for regional distribution.

Dredging profile

According to the U.S. Army Corps of Engineers, the harbor's navigation channel should be dredged every three years to maintain an authorized project depth of 21 feet. Each dredging cycle in Grand Haven typically produces from 40,000 to 50,000 cubic yards of relatively clean dredged material. From the 1970s to the 1990s the sediment was deposited in a confined disposal facility (CDF) to create the usable green space now known as Harbor Island.

But that facility was capped in 1992 and the subsequent search for another CDF has been unsuccessful. When Grand Haven was last dredged in 1998, the sediment was placed on the Verplank dock in Ferrysburg on an interim basis. By 2004 the harbor was overdue for maintenance dredging and bulk carriers calling at the port had to load light, particularly in the low water regime. But the Verplank facility did not have the capacity to accommodate another dredging cycle, thus contributing to a growing urgency for alternative solutions. Also, efforts by the Corps of Engineers to develop a Dredged Material Management Plan (DMMP) had been stalled for several years.

The project

As the crisis grew, community leaders realized that the future of commercial shipping in Grand Haven largely depended on a successful strategy to deal with dredged material on an ongoing basis. The result of this collective concern was formation of a Harbor Task Force involving harbor users and several local governmental officials. The group, headed by the Grand Haven Chamber of Commerce, worked closely with the Michigan Department of Environmental Quality and the U.S. Army Corps of Engineers to identify the most viable beneficial use solution, which turned out to be the manufacture of a high quality topsoil product by combining harbor sediment with local municipal yard waste. The first product was introduced in August, 2004 under the brand "Earth Renewed."

"This is a product that compares very well with a premium potting soil you would buy at a garden shop, and is probably even a little better" said Richard Price, a researcher at the Corps of Engineers' Engineering Research and Development Center in Vicksburg, Mississippi who specializes in developing beneficial uses of dredged material. "It has excellent nutrient loading capability and holds moisture very well." Project Manager Carl Platz of the Corps' of Engineers' Grand Haven Area Office worked with Price and municipal officials to determine the best combination of dredged material, which is composed largely silts and clays, and composted yard waste. In initial testing, a 55-gallon drum of the Grand River sediment was shipped down to Price's lab in Vicksburg, along with a sampling of the local yard waste, for a series of

greenhouse experiments. The testing revealed the optimum blend to be 90 percent dredge material and 10 percent leaf litter.

The entrepreneur behind “Earth Renewed” is Verplank Trucking & Dock Company of Ferrysburg, Mich. which is processing and selling the product. Conversion of dredged sediment to beneficial use is not the company’s first recycling venture; Verplank has experience marketing crushed cement rubble, and recycled asphalt and foundry sand.

Conclusions

According to Verplank Trucking and Dock Co. President Joseph Burns, the market for the sediment-based topsoil appears to have good potential. “Demand for topsoil goes up and down, just like any commodity, but we think there is a good market for this volume of product within the region.” Burns also noted that “Earth Renewed” topsoil may potentially be a candidate for bulk shipment by water to other markets.

One already satisfied customer is the Grand Haven School District which has used the topsoil mixture for tree plantings and even some athletic fields. That the schools see no problem with direct exposure of the product to students says much about its non-toxicity. Before any beneficial use could be explored, Michigan Department of Environmental Quality had to classify the dredged material as inert, and thus safe for public use.

If the “Earth Renewed” venture takes off, it will represent a success story with both environmental and economic benefits, and impact extending beyond the Tri-Cities. The story is also an example of intergovernmental, and public/private partnerships. Joy Gaasch, president of the Grand Haven-Spring Lake-Ferrysburg Chamber of Commerce, is one of the community leaders who came together under the aegis of the Harbor Task Force to work with the Corps of Engineers and the state toward a sustainable solution. “If we can continue to use this recycling site, it is a better use of land and is more cost effective,” said Gaasch. “We are trying to be proactive in an environmentally sensitive way.” Said Lt. Col. Donald Lauzon, Commander of the Corps of Engineers’ Detroit District Office, “This certainly is a win-win solution for both the Corps and the local community and what I hope is the beginning of a long and successful partnership.”

Note: this case study was prepared during the spring of 2005.

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