

Harbison-Walker Superfund Site Restoration Cape May County, NJ

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By

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On September 17th, 1999, the land known locally as the "Magnesite Property," comprising approximately 125 acres of undeveloped beachfront, dune, coastal wetlands and disturbed, former industrial area, came into the public domain through the efforts of New Jersey's Green Acres Program. This property represents a significant addition to the existing Higbee Beach Wildlife Management Area and to Cape May Point State Park.

Site Description

From 1941 to 1983, Dresser Industries operated the Harbison Walker - Cape May Works, also known as the Northwest Magnesite Plant. Operations at the plant consisted of reacting softened, clarified sea water from Delaware Bay with limestone to produce a magnesium hydroxide solution. This solution was filtered and then fired in rotary kilns to produce magnesite refractory brick. The factory closed in 1983 and was demolished. Environmental contamination was cleaned up by Dresser Industries pursuant to the Environmental Cleanup Responsibility Act (ECRA). The only remains of the plant are a 10' chain link fence surrounding the plant site, a water tower, and scars on the landscape including a "landfill" of process waste primarily consisting of waste magnesite and limestone. The alkalinity of the process raw materials and waste is high enough to prevent the establishment of native vegetation. The site has remained relatively unvegetated since the plant closure in 1983. The only vegetation volunteering on the magnesite material was a native alkali saltgrass growing only in moist depressions.

A plan to restore native vegetation to the scarred industrial portion of the property was developed by the USDA-NRCS Cape May Plant Materials Center and the Regional Plant Materials Specialist in cooperation with the NJ Department of Environmental Protection. This site presented challenges from both a revegetation and an ecological restoration standpoint. Being in the path of the major Atlantic flyway, this area is used by neotropical migrants and raptors as well as supports a few rare plants and animals. Revegetating the area will require creating a soil which will support native vegetation. The waste magnesite is low in organic matter and high in pH (7.9-9.9), which supports little natural vegetative growth. Consequently, the restoration plan involved amending the alkaline magnesite material with incorporated dredge disposal material. This process will add organic matter to the magnesite and lower the pH of the "soil" over time, through

oxidation. However, initially the dredge material will have an alkaline pH and contain a high level of soluble salts.

Native Grass Seed Mixture

A Brillion seeder was used to establish the native cool/warm season grass and forb mixture on 9.3 acres. This was done January 11-12, 2001 as a winter dormant seeding. This seed mixture was designed to provide both short term and long term cover and to tolerate the varying soil pH's and salinities as the soil conditions change over time:

- **Alkali saltgrass (*Puccinellia distans*) - 20 #/ac**
- **Switchgrass (*Panicum virgatum*) - 10 #/ac.**
- **Annual ryegrass (*Lolium multiflorum*) - 10 #/ac.**
- **Canada wildrye (*Elymus canadensis*) - 5 #/ac.**
- **Redtop (*Agrostis gigantea*) - 1 #/ac.**
- **Little bluestem (*Schizachyrium scoparium*) - 5 #/ac.**
- **Roundheaded bushclover (*Lespedeza capitata*) - 2 #/ac.**
- **Partridge pea (*Chamaecrista fasciculata*) - 2 #/ac.**

A total of 55 pounds/acre of seed was applied by applying the seed in perpendicular directions with a Brillion drop seeder. The alkaligrass, annual ryegrass, redtop and Canada wildrye are cool season grasses designed to germinate quickly and tolerate the high salinity levels present in the dredge material. The native warm season grasses, switchgrass and little bluestem, are intended to provide long term stabilization and cover. The roundheaded bushclover and partridge pea are native legumes added to the mix for diversity. After seeding, the site was covered with an Excelsior erosion control blanket to prevent seed desiccation and wind movement.

Initial results

First year plant establishment was encouraging. As expected, the alkali saltgrass, annual ryegrass and redtop dominated the site in the first growing season with a small percentage of Canada wildrye seedlings present. In the second growing season, alkali saltgrass and redtop remained dominant, but more seedlings of Canada wildrye and switchgrass were developing. Even a few switchgrass plants were flowering and producing seed under these difficult soil conditions. Unfortunately, no seedlings of little bluestem, partridge pea, or roundheaded bushclover have been observed to date. This is particularly surprising for partridge pea which is an annual legume. This lack of seedling

development could be due to heavy cool season grass competition and/or to the high soil salinity.

The newly established vegetation has provided the microclimate for volunteer native plants such as seaside goldenrod (*Solidago sempervirens*) and groundsel bush (*Baccharis halimifolia*) to establish. Unfortunately, the dredged material contained phragmites (*Phragmites communis*) rootstock and is also volunteering on the site. The spread of this plant will be closely monitored.

Future Recommendations

Future recommendations will involve adding deertongue (*Dichanthelium clandestinum*) and coastal panicgrass (*Panicum amarulum*) to the mix and lowering the rates of alkali saltgrass and annual ryegrass to reduce its competition and achieve more balance and diversity. Follow-up soil tests will provide indications on how quickly soil pH's and salinities are changing. This will help plan future seeding recommendations.