

Technical Note

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# Vegetating

## New Hampshire

### Sand and Gravel Pits



# TABLE OF CONTENTS

FOREWORD .....	3
INTRODUCTION .....	4
SITE PREPARATION .....	5
SEEDING PROCEDURES .....	5
(1) SPECIES AND VARIETY SELECTION .....	5
(2) LIME AND FERTILIZER DETERMINATION .....	7
(3) MULCH DETERMINATION (for hydro and hand seeding) .....	7
(4) SEEDING METHODS .....	8
(5) SEEDING DATES .....	8
(6) RESPONSE OF SEEDING .....	8
MAINTENANCE .....	9
ASSISTANCE FROM THE NATURAL RESOURCES CONSERVATION SERVICE .....	10

## FOREWORD

Plant materials are the basic tools used in environmentally and economically efficient erosion control. Plants, in addition to shaping our environment, protect our soil, water, and air resources from degradation. The value of plants cannot be exaggerated.

Industrial activity, resource mining, inappropriate farming techniques, waste disposal, and increased runoff from hard surfaces all combine with a growing population to threaten long-term resource stability. Intelligent use of plants and plant-related systems will contribute to our future well-being.

The USDA/NRCS administers a Plant Materials Program in order to: (1) identify and make available superior plants for protecting soil and water resources; (2) determine improved techniques for using plants and plant systems; (3) provide for commercial increase of superior plants, and (4) promote the use of plant materials to meet the objectives and priorities of the National Conservation Program.

Plant Materials Centers and Plant Materials Specialists operate within each region of the country to carry out the plant materials program. Plant Materials Specialists provide direct assistance to NRCS personnel and conservation districts in each state seeking vegetative solutions to site specific problems.

This report is a result of the NRCS Plant Materials Program in New Hampshire. It provides current vegetative recommendations to help solve the persistent and difficult problem of vegetating sand and gravel pits.

DAWN W GENES  
State Conservationist

## INTRODUCTION

Soil erosion, aesthetics, and adverse impacts on water quality are concerns associated with the operation, maintenance, and closure of sand and gravel pits. A good vegetative cover of grasses and legumes can alleviate these concerns. Vegetative cover will retard surface runoff and prevent erosion, reducing the sedimentation of nearby streams, waterways and waterbodies. Vegetative cover will enhance the aesthetics of sand and gravel pits while providing nesting and escape cover for wildlife.

These vegetative recommendations are based on an evaluation of numerous test plantings made at sand and gravel pits throughout New England and New York. The NRCS coordinated the planting and conducted follow-up evaluations during the period 1975-1990. Plantings and evaluations will continue in the years ahead to gain additional insight and knowledge. NRCS will provide updated recommendations when and if further study warrants them.

Sand and gravel pits are difficult sites to permanently vegetate. The difficulty is due to droughty conditions, low soil organic matter, low soil fertility, and lack of topsoil. These characteristics make it difficult to establish and maintain a permanent grass or legume cover.

A 4-inch cap of topsoil will usually be sufficient for establishing selected vegetation that is otherwise compatible with the site condition. Thus, the stockpiling of and reuse of topsoil on critical areas of a site improve vegetative establishment.

## SITE PREPARATION

- Cut and fill slopes should not exceed 2:1 (2 horizontal feet for 1 vertical foot) to provide stability. Flatter slopes (3:1) are preferred to facilitate seeding efforts.
- Avoid long slopes to help prevent erosion and to allow access for seeding, mulching, and maintenance. Control slope length by installing one terrace (10 feet wide and sloped into the cut slope) for every 40 vertical feet.
- Construct diversions at tops of slopes to divert runoff water away from the slope banks to a stable outlet.
- Construct rock lined chutes or equivalent to conduct concentrated flow of water to stable outlets.
- Remove large stones, boulders, and other debris that will hinder the seeding process and the establishment of vegetation.
- Spread a minimum depth of 4 inches of topsoil over the site, if available.
- Obtain soil samples by collecting 6 to 8 small samples (1 or 2 handfuls) of soil material from the upper 4 inches of the area to be seeded. Mix the small samples to obtain one composite sample.
- Use part of the sample for a soil test to determine lime and fertilizer needs. Run the balance of the sample(s) through a sieve analysis to determine the percent by weight passing a No. 22 sieve.\* Those passing are called "fines."

## SEEDING PROCEDURES

### (1) SPECIES AND VARIETY SELECTION

Select one of the grass/legume mixes based on the percent weight passing a No. 200 sieve as outlined above. Mix 2 is recommended if suppression of woody growth is desired and there are more than 15 percent fines. The standard conservation mixes available from local seed suppliers are not recommended on droughty sites. These mixes usually provide a green cover very quickly, but the plant species begin to die in 2-4 years on sterile and droughty sites.

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Sources of assistance for determining sieve analysis may be obtained at your local NRCS field office.

Where percent by weight passing a No. 200 sieve is less than 15, select from mix 1.

**Mix 1 (warm season grasses)**

<u>Species</u>	<u>Varieties (select one)</u>	<u>Mix Options for Various Situations<sup>b/</sup></u>		
		<u>Lbs Per Acre (PLS)</u>		
		(1)	(2)	(3)
Switchgrass	Trailblazer, Pathfinder	6	2	6
Coastal panicgrass	Atlantic		5	
Big bluestem	Niagara, Kaw	4	2	4
Little bluestem	Aldous, Camper, Blaze	2		
Sand lovegrass	Bend, NE-27	4	6	5
		15	15	15

**Options in Mix 1**

- (1) This combination most closely represents the naturally occurring vegetation where warm season grasses are native in the northeast.
- (2) This combination has the fastest establishment and cover.
- (3) This combination is the simplest and may be easier to obtain. Options 2 or 1 are preferred by the authors.

Where percent by weight passing a No. 200 sieve is between 15 and 20, use mix 1 or 2.

**Mix 2 (legumes and cool season grass)**

<u>Species</u>	<u>Varieties (select one)<sup>a/</sup></u>	<u>Lbs Per Acre<sup>c/</sup></u>
Flatpea <sup>c/</sup>	Lathco	10.0
Perennial pea <sup>c/</sup>	Lancer	2.0
Crown vetch <sup>c/</sup>	Pengift, Chemung	10.0
Tall fescue	KY=31, Rebel, Ken-Hi	10.0

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<sup>a/</sup> Varieties are listed in preferential order.

<sup>b/</sup> Warm season grass seed is sold and planted on the basis of pure live seeds (PLS). An adjustment is made to the bulk pounds of seed to compensate for inert material and dead seed.

<sup>c/</sup> These legumes must be inoculated at time of seeding. If seeding by hand, use a sticking agent, such as cola or milk to stick inoculant to seed. If seeding with hydroseeder, use 4 times the recommended rate of inoculant.

Where percent by weight passing a No. 200 sieve is above 20, use mix 1, 2, or 3.

**Mix 3 (cool season grasses and legumes)**

<u>Species</u>	<u>Varieties (select one)</u> <sup>a/</sup>	<u>Lbs Per Acre</u> <sup>b/</sup>
Tall fescue	Ky-31	20.0
Redtop	Streeker, Common	2.0
Birdsfoot trefoil <sup>c/</sup>	Viking, Empire	8.0

(2) LIME AND FERTILIZER DETERMINATION

(a) Mix 1 – In lieu of a soil test, lime at the rate of 1 ton/acre (50 lbs/1,000 sq ft). Fertilize with 500 lbs/acre (11 lbs/1,000 sq ft) of 10-20-20 or equivalent. Incorporate lime, fertilizer, and seed using rakes if seeding is done by hand. It is strongly recommended to use a bulldozer to “track” the site after seeding. tracking will incorporate the lime, fertilizer, and seed to promote seed germination.

(b) Mixes 2 and 3 – In lieu of a soil test, lime at the rate of 2 tons/acre (90 lbs/1,000 sq ft). Fertilize with 500 lbs/acre (11 lbs/1,000 sq ft) of 10-20-20 or equivalent.

The seed needs to be incorporated to ensure success and to shorten establishment time. This is especially true of mixes 1 and 2, and is most critical for the large seeded legumes in mix 2. On the flatter slopes, use a bulldozer to “track in” the seed.

(3) MULCH DETERMINATION (for hydro and hand seeding)

(a) Mulching for Mix 1 - Weed free mulch. Clean straw is recommended. mulch at the maximum rate of 500-700 lbs/acre. Higher mulching rates and mulch with weed seed content will inhibit seeding success significantly. If the erosion hazard is low and the seed is incorporated, mulching is not necessary for seeding success. Do not apply mulch prior to tracking with a bulldozer.

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<sup>a/</sup> Varieties are listed in preferential order.

<sup>b/</sup> Legume and cool season grass seed is sold and planted on a bulk basis, the weight is not compensated for dead seed and inert material.

<sup>c/</sup> These legumes must be inoculated at time of seeding. If seeding by hand, use a sticking agent, such as cola or milk to stick inoculant to seed. If seeding with hydroseeder, use 4 times the recommended rate of inoculant.

(b) Mulching for Mixes 2 and 3 - Mulch with weed free hay or straw and mulch at the rate of 2-3 tons/acre for mix 2 and 1-2 tons/acre for mix 3. The higher mulching rate is recommended where seed incorporation is difficult. This is especially critical for mix 2.

#### (4) SEEDING METHODS

ALTERNATIVE 1 - large areas and/or steep slopes.

Apply lime, seed, and fertilizer with a hydroseeder and, depending on the consistency of the soil material, steepness of slope, and seed mixture used:

- (a) press the seed into the soil by tracking with a bulldozer, or
- (b) cover the seed by walking back and forth over steep loose sandy slopes,  
or
- (c) apply mulch and a tackifier to hold the mulch in place.

ALTERNATIVE 2 - Flat to gently sloping areas (2:1 slopes maximum)

Apply lime, seed, and fertilizer using farm type spreaders, and track the site with a bulldozer or apply mulch.

#### (5) SEEDING DATES

Primary seeding dates begin as soon as the snow melts in the spring and ends May 15. **The importance of early seeding cannot be overemphasized.** This is especially true for mix 1. Depending on weather conditions, substantial failure can be expected if seeding is done later.

Late summer and early fall seedings are not recommended for mixes 1 and 2. If late season seedings of mixes 1 and 2 are necessary, they should be done after October 20 to prevent fall germination and subsequent winterkill.

Mix 3 can also be seeded from August 15 to September 1 with conventional seeding.

#### (6) RESPONSE OF SEEDING

The plant species in mixes 1 and 2 germinate and grow slowly. Complete cover may not occur for 2-4 years. However, a well-established stand will endure for years.

Follow-up seeding may be needed to establish vegetation on the more difficult parts of some sites. The need to do follow-up seeding can be determined the year after the initial planting.

## **MAINTENANCE**

Substantial stand vigor can be achieved if the site is topdressed with fertilizer one year after planting. If topdressing mix 1, fertilize between June 15 and July 15. The timing of this topdressing is important. Mixes 2 and 3 should be topdressed in the early spring. Topdress mixes 1 and 3 should be topdressed in the early spring. Topdress mixes 1 and 3 with a balanced fertilizer, applying 50 lbs of nitrogen/acre. For example, apply 250 lbs of 20-20-20/acre. Topdress mix 2 with 500 lbs of 0-20-20/acre in April, May, or June.

If mowing is desired to suppress woody growth, mow mix 1 about mid-July leaving a stubble height of 6-8 inches. It is not necessary to mow mix 2. A good cover of flatpea will prevent invasion of woody species. Mix 3 can be mowed at any time.

## **ASSISTANCE FROM THE NATURAL RESOURCES CONSERVATION SERVICE**

NRCS personnel are available to help evaluate specific sites and to assist fitting the above recommendations to the site(s). Plantings of some of the species identified in mixes 1 and 2 are located in Belknap, Carroll, Merrimack, and Rockingham Counties. If interested in seeing these plantings, contact the appropriate NRCS field office.

### **NRCS FIELD OFFICE ADDRESSES**

Natural Resources Conservation Service and  
Carroll County Conservation District  
The Grindle Ctr, 73 Main Street (PO Box 533)  
Conway, NH 03818-0533  
Phone: 477-2771

Natural Resources Conservation Service and  
Cheshire County Conservation District  
Route #12 South, Box 315  
Walpole, NH 03608-9744  
Phone: 756-2988

Natural Resources Conservation Service and  
Coos County Conservation District  
RR 2, Box 235  
Lancaster, NH 03584-9612  
Phone: 788-4651

Natural Resources Conservation Service and  
Grafton County Conservation District  
RFD #2, PO Box 148B  
Woodsville, NH 03785-0229  
Phone: 747-2001

Natural Resources Conservation Service and  
Hillsborough County Conservation District  
Chappell Professional Center  
#468, Route, 13, South  
Milford, NH 03055-3442  
Phone: 673-2409

Natural Resources Conservation Service and  
Merrimack County Conservation District  
The Concord Center  
10 Ferry Street, Box 312  
Concord, NH 03301-5081  
Phone: 223-6023

Natural Resources Conservation Service  
Telly's Plaza  
243 Calef Highway  
Epping, NH 03042  
Phone: 679-1587

Natural Resources Conservation Service  
Federal Building  
2 Madbury Road  
Durham, NH 03824-1499  
Phone: 868-7581

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