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Workmen on hillside unload materials brought to the site by helicopter. Use of the helicopter preserved the slope from additional wear.

As a result of the massive landslide, sensing probes were placed in the slide area to monitor movement of the hillslide to forewarn site managers of further slide potentials. A thorough study of the situation placed several constraints on the ensuing revegetation project.

The use of heavy equipment in this area was prohibited because it could further deteriorate slope stability. The erosion control medium could not allow moisture accumulation and subsoil percolation increasing slide potential. Access road construction was prohibited because of increased substrata disturbance as well as visual disturbance. Placement of topsoil was economically prohibitive and could increase slide potential.

Common Name	Application Rate pounds pure live seed per acre
Crested Wheatgrass	7
Intermediate Wheatgrass	3
Western Wheatgrass "Arriba"	6
Smooth Bromegrass	4
Blue Grama	6
Buffalo Grass	4
Annual Rye	2.5
Cicer Milkvetch	2
Mountain Mahogany	1.5
Sagebrush	.5
Rabbit Brush	1.5
Total PLS Pounds/Acre	38.0

Three alternative methods of revegetation were developed. Two of the methods revolved around hydroseeding the slopes and then applying a cover of wood fiber hydromulch. A helicopter would be utilized to provide access by hoisting the hydromulcher and hovering over the slide area.

After consideration of these two methods, their total cost, and potential success, a third alternative was recommended by Randall & Blake.

All seed was broadcast by hand during the spring, except the last three forbes (herbaceous plants other than grass) which were incorporated in the fall seeding period. Fertilizer with 50 pounds of available nitrogen per acre in the form of slow release was distributed by hand, as well as 1.5 tons of hay mulch per acre.

"Conwed Economy Netting" was installed as per manufacturer's recommendations but a longer and sturdier staple was substituted due to the rocky, unstable soil conditions. Finally, 1000 seedling Rocky Mountain Junipers and Gambels Oak were planted.

A second seeding in the fall utilized the same seed and fertilizer rates.

The cost of this method versus hydromulching was substantially less with the same potential success of meeting all prescribed goals.

Due to the constraints mentioned and the fact the slide area constituted a rise in elevation of 850 ft. with a run of 1350 ft., Randall & Blake incorporated the use of a helicopter to transport material to strategic locations to minimize material movement and thus excessive labor costs.

All materials were transported to the parking area at the base of the slide area. Two cargo nets with hook assemblies, eight men loading nets alternately and four men unloading at the pre-planned

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Jot Carpenter (Left), Pres.-Elect of A.S.L.A., and Dick Brickman (Right), Pres. of ALCA, present the ALCA Environmental Improvement Grand Award to Rick Randall, of Randall & Blake, for his firm's reclamation project at the Johns-Manville World Headquarters Building in Colorado. This was one of thirteen Grand Awards presented at the Eighth Annual Environmental Awards Luncheon, held on Feb. 1st, at the ALCA Annual Meeting in Orlando, Florida.

points provided a smooth and continuous placement operation. With this system of operation 13 tons of hay, 11 rolls of netting, 370 lbs. of seed, 6.5 tons of fertilizer, and 80 boxes of staples were transported using only 6 hours helicopter time. Installation of seed, fertilizer, mulch and netting required 480 hours of labor time.

A fall seeding and fertilization program the first year completed the project with a stand of grass establishing itself fairly well on a site composed mostly of rocky subsoil.

The following spring, 1977 indicated a continuation toward a permanent stand of grass. The summer moisture was well below average, inhibiting optimum growth, but a survey of the slope this past fall showed a remarkable tenacious stand of grass. With a good winter and normal spring the slope will be very near to appearing much like the surrounding area.

In summary, the landslide revegetation project met all the goals set prior to construction. The slope no longer appears as a stark reminder of a nearly disasterous slide. The building lays against the foothills in grandeur overlooking the inspiring sandstone formations of the front range hogback.

A hike up the slope will illustrate the presence of a deer population through pellets and split hoof prints. Erosion is minimal and percolation will not become a problem due to the slope and vegetative association.

"The site conditions, soil, slope and aspect challenged our company (Randall & Blake) as no other site has and we feel the success in installation will be followed by an enduring natural vegetation enhancing the architectural design.' WTT

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Malus 'Snowdrift'

Malus 'Mary Potter'







Malus sargentii

Malus floribunda

#### CRAB APPLES CAN BE BOTH BEAUTIFUL AND TOUGH

By Douglas J. Chapman, Horticulturist, Dow Gardens, Midland, Michigan

Crab apples are an extremely popular small tree, filling a unique place in the landscape, with outstanding flower color in the spring and good fruiting during the autumn. There are some 200 cultivars available in the trade, but due to susceptibility to apple scab and fireblight, the list of actively-grown cultivars should be drastically adjusted. The following 15 varieties of crab apples show a high degree of resistance to apple scab and fireblight while being aesthetically outstanding. These should be divided into white and pink flowering forms.

The white flowering forms to be discussed are Malus 'Beverly,' 'White Angel,' 'Mary Potter,' 'Red Jewel,' 'Snowdrift,' 'White Cascade,' M. hupehensis, M. Floribunda, and M. sargenti.

'Beverly' Crab Apple is an upright, oval tree, reaching 25 feet at maturity. This annual flowering plant produces dark red buds which break into clear single white flowers. The small red fruit are quite colorful during the fall months.

'White Angel' Crab Apple has outstanding white flowers. The summer foliage is dark green which contrasts the small dark glossy red fruit during the fall. At maturity its habit is somewhat round, reaching 20 feet in height.

'Mary Potter' Crab Apple's unique horizontal branching habit separates it from any other crab apple. Its ultimate height is 12-15 ft. This profuse producer of clear white flowers and dark red fruit (1/2 in.) makes it an outstanding specimen tree.

'Red Jewel' Crab Apple is a recent introduction of American Garden Cole which holds its small ( $\frac{1}{2}$ in.) hard bright red fruit into February and March, providing good winter color. This crab apple's mature habit of growth is an upright, oval tree, reaching 15-18 ft., with slightly horizontal branching. The clear white flowers produced annually are quite attractive.

'Snowdrift' Crab Apple is exciting in its annual profuse display of clear white flowers. When in flower, this plant is outstanding as a single specimen or in mass plantings. For a crab apple, this cultivar is a large tree, reaching 25 ft. in height. This vigorous plant requires little annual pruning to maintain its dense oval shape. The small orangered fruit (¾ in.) is effective for only a short period of time.

'White Cascade' Crab Apple, another recent introduction, is one of three good pendulous forms. At maturity this plant reaches only 12-15 ft. in height, but is outstanding as a weeping tree. The white flowers complement the unique growth habit. The small (¼ in.) lime-yellow fruit of 'White Cascade' make it one of the few good yellow fruiting forms. Tea Crab Apple (Malus hupehensis) has a somewhat vase shape, reaching 25 ft. in height. This plant has been grown in the trade for many years but, with its unique habit, white flowers, and red fruit, is still useful in the landscape.

Japanese Crab Apple (Malus floribunda) is an outstanding specimen crab apple. This round dense tree reaches 25 ft. at maturity. This plant continues to show outstanding disease resistance. Annually M. floribunda produces pink buds which at full bloom has clear, white flowers. The yellowred fruit developing in the fall is another unique characteristic of this outstanding crab apple specimen.

#### A few crab apples show a high degree of resistance while being aesthetically outstanding

Sargent Crab Apple (Malus sargenti) is the original and, for many years, only dwarf crab apple, reaching only 8 ft. in height. Biannually it produces good clear, white flowers and small, dark red fruit. The fruit of this plant is among the first to mature and seems to be a primary food for birds, reducing its effectiveness for color.

The outstanding pink and red crab apple varieties include *Malus* 'Adams,' 'Liset,' 'Profusion,' 'Coralburst,' and 'Candied Apple.'

'Adams' Crab Apple at maturity has a somewhat round habit of growth, reaching 25 ft. in height. The dark pink buds open to a clear, pink flower. The carmine-red fruit developing in the fall make this one of the truly showy trees for mass planting.

'Liset' Crab Apple has a somewhat upright or vase shape habit of growth, reaching 20 ft. at maturity. Annually this variety produces good dark red flowers. The new growth, also being somewhat red or maroon, prolongs the period of color through early summer. The dark crimson fruit ( $\frac{1}{2}$ in.) is somewhat contrasted against the dull green foliage, making this a good specimen tree.

'Profusion' Crab Apple is the purplish or red flowering complement to Japanese Crab Apple. This plant, which reaches 25 ft. at maturity, is outstanding as a specimen plant with good, dark oxblood-red fruit developing in the fall.

Continues on page 30

# Image: Addition of the problem of t

models, E-Z-GO's GT-7 and the Cushman Turf Truckster. Head to head, here's what we found.

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#### Crab Apples from page 27

'Coralburst' Crab Apple is a recent introduction with a somewhat dwarf, twiggy habit of growth. This plant annually produces an abundant quantity of clear pink flowers which make this an outstanding shrub or tree on a standard.

'Candied Apple' Crab Apple is a somewhat weeping or pendulous variety, reaching 18-20 ft. in height. It annually produces large purplish-pink flowers. During the fall months, the large dull red fruit (1/2 in.) are somewhat obscured by the normal foliage color.

Tschonoski Crab Apple (Malus tschonoski) is more appropriately a specimen or street tree. It is a narrow, upright growing tree which reaches 25-30 ft. in height. It rarely flowers or fruits but has silver-green foliage in the summer with an outstanding maroon fall color. The plant is clearly in a class by itself with little flowers or fruiting but, for those interested in minimum maintenance and fall color, it integrates well as a specimen tree.

Today, the above limited list of crab apples are among the most outstanding cultivars of this colorful small tree. They all show good resistance to apple scab and fireblight, but we must be continually evaluating these and new varieties as resistance breaks down due to overplanting or simply new virulent forms of apple scab and fireblight. There is always room in the trade and landscape for new varieties. **WTT** 



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