Recreational lakes, ponds and streams are meant to be fun places. Not choked with unwanted water weeds or ugly algae. Now, Pennwalt offers two great aquatic herbicides that clean up these problems—fast and effectively.

Meet Aquathol K and Hydrothol 191 aquatic herbicides. Aquathol K is available as a liquid or granular. It controls weeds efficiently and quickly. In fact, you can swim in lakes treated with Aquathol K 24 hours after application. And treated water can be used immediately for golf course irrigation without harm to bentgrass turf. Hydrothol 191 does even more. It controls both weeds and algae. And after treatment, there’s no waiting period for swimming. Put Aquathol K or Hydrothol 191 to work for you.

For a cleaner, prettier lake.

For more information, contact AGCHEM DIVISION, PENNWALT CORPORATION, 1630 E. SHAW AVE., FRESNO, CALIFORNIA 93710 (209) 226-8400.

All pesticides can be harmful. Read the label carefully and use only as directed.
Mulches and binding agents are used in two ways: 1) for temporary erosion and dust control during construction; and, 2) for simultaneously controlling erosion while seedlings become established. The best way to control erosion is with a plant cover.

For temporary erosion and dust control in construction projects with mulches, it is best to seed a temporary species such as annual ryegrass that will give a temporary vegetative cover. Such a temporary vegetative cover along with mulch is effective and persists longer than mulch-binder combinations.

The only practical way to control water and wind erosion is to establish a vegetative cover as quickly as possible. Success in achieving this depends on four steps.

1) Proper grading of slopes, cuts, and medians. The slopes should be as shallow as possible. Steep cuts should be stairstep graded. The surfaces, except for sandy soils, should be left in a rough, loosened condition for all slopes.

2) The appropriate lime and fertilizer mixture to stimulate desirable, persistent, long lasting species must be applied. It is usually necessary to apply high rates of phosphorus. Soil tests are very helpful in diagnosing the lime and fertilizer needs.

3) Appropriate varieties and seed mixtures are of paramount importance. The components in seed mixtures depend on the slope environment, the climatic region, the soil and rock characteristics, the subsequent mowing management or lack of mowing management, and the season of seeding.

For example, for steep cuts and fills, we design lime and fertilizer practices and seed mixtures to give a vegetative cover quickly from temporary species by using small amounts of annual ryegrass or cereals. Through a series of stages of changing vegetative covers, annual temporary grasses shift to persistent perennial grasses and, finally, persistent, hardy, perennial legumes such as crown-vetch, flat pea, sweet pea, or sericea lespedeza dominate over the grasses. The legumes add variable beauty and are very persistent requiring no fertilization nor mowing management. We have legume stands on very infertile subsoil materials that have persisted on cuts and fills for over 20 years without additional attention.

Mulching is a final important factor that helps obtain vegetative cover quickly. Good mulches moderate the soil temperature and encourage water infiltration — these improve moisture content, germination, and seedling growth. Without mulches, the forceful contacts of raindrops with

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Excellent germination and seedling growth (above) on a 1:1½ fill slope with a rough, loose surface mulched with 1,500 lbs./acre of woodfiber. A roughened 1:1½ fill slope (right) after applying 3,000 lbs./acre of straw and overseeded with a slurry of seed, fertilizer, and woodfiber at 700 lbs./acre.
soil breaks down the soil particles causing the pore spaces to become plugged with fine sandy and silty materials, thereby causing water runoff and erosion. Thus, with mulches, most of the water will filtrate into the soil to improve moisture for the seedlings.

We find that straw, hay, wood bark, wood chips, and wood fiber are the best kinds of mulches. Wood bark and wood chips are expensive to use because 35-50 cu. yds. are needed per acre, and these materials are usually not available in adequate amounts. Straw is generally a better mulch than wood fiber, but straw can also be a poor mulch if it bears a lot of cereal grains or weed seeds. Hay is comparable to straw mulch, but hay crops are usually contaminated with weeds and undesirable seeds.

I have noticed many seeding failures in highway corridors and in our experiments where we used hay or straw because the aggressive plants of cereal grains or weed seeds in the straw crowded the slow growing persistent perennial grasses and legumes. Later, when the annual cereal plants or weeds die, the soil erodes because desirable perennial grasses and legumes were shaded out.

Wood fiber applied at 1500 pounds per acre (6-12 percent dry matter) has given very satisfactory results during the favorable seeding seasons. Some paper fibers are 30 percent water and must be at higher rates to compensate for the water. Wood fiber and paper fiber are of similar value if applied at the same dry matter rates.

Because wood fiber has no contaminants, it is important to use a companion fast growing species such as annual ryegrass at 5-10 lbs. of seed per acre. During periods of stress, wood fiber at 1500 lbs./acre alone is inferior to straw applied at 3000-4000 pounds per acre. Straw cannot be used on steep 1:1 slopes — with heavy rains it usually flows down the slope, also it is difficult to hold in place. For steep slopes, wood fiber is the best material as it sticks to the soil and holds seed and fertilizer in place.

There is no one mulch best for all situations. The mulching should be tailored to the site. For example, for a lawn, it is very desirable to use wood fiber to avoid weed seed and cereal grain contamination. The best mulch treatment from the standpoint of prolonged control of erosion and ease of application is a combination of 3000 lbs. of straw overseeded with a slurry of fertilizer, seed, and wood fiber by the hydro method. We found that seeding the slurry mixture of mulch seed and fertilizer after applying the straw is as good as a three-step operation: 1) applying the seed and fertilizer; 2) applying the straw; and, 3) applying the wood fiber. Binding 3000 lbs. of straw with 700 lbs. of wood fiber has been a superb mulching combination. This is superior to any of the many binders or tacking agents. The wood fiber binds the straw together and at the same time to the soil; therefore, during late fall and winter seasons, when it is too cold for germination, the mulch lasts a long time and does not blow off. In experiments, a straw mulch with wood fiber as a binder has lasted during the entire winter season on steep 1:1½ slope sites. Asphalt, according to a few of our experiments, is the only chemical material that binds straw together satisfactorily; however, soil contact is poor, so removal by the wind is common.

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"I mowed 15 days after sowing Dixie Green® and was on my way to the prettiest putting surface I have ever seen." Bob Martin, Superintendent, Clarksdale Country Club, Clarksdale, Mississippi.

"Dixie Green® has given me a uniform, dense putting surface that has putted consistently true. The color has been outstanding . . . even though the temperature in January dropped to 11 degrees F. Bent greens went off color . . . but Dixie Green® came through like a champ." Ed O'Donnell, Superintendent, Brook Valley Golf & Country Club, Greenville, North Carolina.

Dixie Green® overseeding mixture is a premier mix of Highlight Chewings-type red fescue which was judged World Champion at the 45th Annual Royal Agricultural Show in Toronto, and Derby turf-type perennial ryegrass. This fine mix has proven a winner for winter-seeding of greens, tees and aprons all over the South. Dixie Green® — a great mixture for you and your members.
EXCLUSIVE BOWIE HYDRO-MULCHER FEATURES.

- Only proven unit for both sprigging and seeding with cellulose fiber mulches.
- Equipped with enclosed shredder bar for shredding full bales of cellulose fibers.
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- Equipped with triple agitators for faster mixing and eliminating sediment build-up.
- Uses pump only for spraying, so pump lasts longer.
- Slurry passes through pump only once, thus reducing seed damage and clogging.

The revolutionary machine for the turf industry that seeds or sprigs, fertilizes, waters, sprays and mulches in one easy operation.

The BOWIE HYDRO-MULCHER performance is unequaled. Its capability has created a totally new method of lawn, turf and ground cover application, plus faster, more effective erosion control.

If you need a dependable mulcher, then you need THE BOWIE HYDRO-MULCHER.

Call or write for complete details.
The Land Reclamation Market
YOU CAN HELP CONTROL FUSARIAUM BLIGHT WITHOUT COSTLY CHEMICALS . . .

Mother Nature has ways of controlling diseases of grasses that defy scientific explanation. Such is the case in the use of twenty-to-forty percent Citation perennial ryegrass in a mixture with Kentucky bluegrass. Tests made in areas of high Fusarium blight incidence have verified that such mixtures have better withstood the damaging effect of Fusarium blight without the use of costly chemicals. Citation has an attractive dark green color which blends well with Kentucky bluegrass, and in many tests throughout the U.S., mows superior to other perennial ryegrasses.

The above photo was taken of a test plot located in California. The Fusarium blight has devastated the bluegrass stand on the right. On the left, the balanced plant population using twenty percent Citation perennial ryegrass and eighty Kentucky bluegrass is unaffected by the Fusarium. Citation's ability to withstand high temperatures and high humidity helps to maintain a quality turf and balanced plant population during stress conditions. An added plus is Citation's dark green color and improved mowing qualities.

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"PROGRESS FROM THE GROUND UP"
Land reclamation/erosion control could be the BIG Green Industry market of the future. Environmental legislation, especially recent surface mining requirements, are expected to increase dollar volume by nearly 30 percent this year. That is more in one year than experienced in the last five years according to survey respondents in the field. The growth is expected primarily in the area of coal and non-highway public works projects.

WEEDS TREES & TURF polled 1,200 erosion control specialists in the International Erosion Control Association and the Associated Landscape Contractors of America. Ten percent participated in the survey. Respondents included landscape contractors and architects, foresters, engineers, highway maintenance officials, utility personnel, and others.

Respondents indicated their primary types of revegetation work at the moment are highway rights-of-way, parks, residential construction sites, industrial construction sites, and utility work sites. Mining site revegetation is performed by only 27 percent of those responding. Reforestation represents only nine percent of the type of revegetation work performed.

The average percentage of gross revenue derived from erosion control was 31 percent with a median response of 20 percent. Ten percent indicated that erosion control makes up 100 percent of gross revenue.

The average volume of erosion control work done in 1977 was $295,529 with a median of $75,000. We asked also for volume in 1973 and predicted volume for 1978 to get a picture of market growth. The average volume for erosion control in 1973 was $277,380 with a median of $50,000. The predicted average volume for 1978 was $381,934 with a median of $150,000.

It is evident that a much greater jump in erosion control business is expected this year than has been experienced in the past five years. Projecting the average to 1,200, the base for this survey, the market increased from $333 million in 1973 to $355 million in 1977, an increase of $22 million in five years. In 1978, the market is expected to reach $458 million, a jump of $104 million in one year! Furthermore, when asked about the next five years, respondents predicted an average increase in volume of 117 percent, which would place the market at $760 million in 1982. We repeat, these market figures are projected from the average volume of erosion control work done by 1,200 firms. Growth in the number of firms, which is very likely in a healthy market, may increase these figures significantly.

Surface mine revegetation alone will grow at a fantastic pace with the help of funds received from taxes on mined coal and distributed to states for reclamation projects. An estimated $70 million will be spent this way in 1978. Forty percent expect to benefit from mining legislation.

Two thirds of the respondents said they serve as a revegetation consultant to some degree. They consult primarily for public agencies, general contractors, landscape con-
Sand's no longer a problem in this sprinkler system.

"I had one and sometimes two guys working nearly full-time every day, cleaning sand out of my sprinklers. My ATH control valves wouldn't work at all 'cause of the sand.

"We had settling tanks, but they didn't work worth a damn. So we got Laval Separators. Installed 'em ourselves. They really work good. What more can I say?"

Nothing else gets the sand and grit out like Laval Separators. Up to 98% of all particles as small as 74 microns (200 mesh). No moving parts to wear out. No screens or filter elements to clean or replace. And very little loss of line pressure. Call on us. We won't let sand grind you down.

My Laval Separators save me over $3,500 every year in labor costs."

Julian Serno, Golf Superintendent
Albuquerque CC, Albuquerque, New Mexico

Laval Separator Corporation
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Fresno, CA 93703, (209) 255-1601

Circle 134 on free information card

Percentage of revegetation Work That is Hydraulic Seeding

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Over $3,500 every year in labor costs.
It takes a great deal of time and money to build a golf green. Irrigation, drainage and contour are some of the considerations of a great putting surface. The final touch is the type of grass selected for that putting surface. Penncross Creeping Bentgrass is recognized around the world as a superior grass for golf course use. Penncross is more genetically uniform, disease resistant and it establishes quicker than conventional bents. From Palm Desert, California to Anchorage, Alaska, Penncross has proven its climatic adaptability. For that final touch to a great golf green, look to Penncross!
The technology of reclaiming surface-mined land has changed greatly in the last 15 years, primarily because laws have mandated what the technology will be and the laws have changed. In 1977, Congress passed the Surface Mining Control and Reclamation Act and the Office of Surface Mining, Reclamation, and Enforcement was created within the U.S. Department of the Interior. Although final regulations are not complete, anticipation of what they will be has created a surge of interest in reclamation of surface-mined land.

One company that has done an admirable job of adjusting to both state and Federal laws is Peabody Coal Co. of St. Louis, Mo. WEEDS TREES & TURF visited Peabody's Broken Aro mine in east central Ohio for a look at the changes of the past 15 years and the reaction to upcoming Federal requirements.

Reclamation supervisor Earl Murphy, a forester by training who joined Peabody from the Ohio Park Service in 1973, described the latest revegetation work performed at Broken Aro, one of two surface mines owned by Peabody in Ohio.

The difference between revegetation work performed during three separate periods was striking. Reclamation performed prior to 1965 consisted of many small tree-covered hills, many bodies of water and visible high walls. The dense vegetation and craggy terrain offered protection for wildlife inside.

The next method of reclamation, from 1965 to 1972, consisted of striking the tops of spoil piles and planting trees, 900 per acre, and some grass. The most common tree for reclamation has been the black locust.

The third type of reclamation, performed after 1972, consists of gentle rolling hills of grasses and legumes with networks of drainage ditches leading to silt basins. The company that Peabody leases the land from has asked that it be reconstructed to serve as grazing land.

The three-year permit which Peabody has from the state allows mining of approximately 300 acres per year. The mining procedure goes as follows:

- silt basins are constructed
- top foot of soil is removed and stockpiled