

CITY OF OXNARD

OXNARD-JOSLYN LAWN BOWLS CLUB

GREEN

MAINTENANCE MANUAL



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2012

PREFACE

This booklet is designed to both formalize and standardize maintenance of the Oxnard-Joslyn Lawn Bowls Green. The green has a highly specialized level of maintenance. The standards expressed in this booklet are designed to give guidelines to the greens keeper on most aspects of maintenance.

Not all aspects of the green maintenance are in this manual. It will be the responsibility of the greenskeeper to use his imagination and resourcefulness to correctly complete all aspects of the green maintenance. The most important skill of the greenskeeper will be to notice and repair changes in the vigor of the green.

The sport of lawn bowling is a seldom-used opportunity for social interaction of the City's semi retired or retired age group. This green should become increasingly popular, as the green becomes better known. A first class green will assist in the growing popularity of the sport and provide for healthy activities for a large segment of the population.

TABLE OF CONTENTS

Introduction	1
Irrigation	2
Tensiometer	2
Mowing	3
Specialized Maintenance	3
Aeration	3
Dethatching/Verticutting	4
Groomer	4
Greensplaner	4
Greensiron 3000	5
Fertilizers	5
Pesticides	5
Oxnard-Joslyn LBC Green Equipment Inventory	6
Equipment Maintenance Schedule	7
Materials Required	8
Pesticides/Fertilizers/Sand/Equipment Parts	9
References	10

City of Oxnard Oxnard-Joslyn Lawn Bowls Green

Introduction: The Oxnard-Joslyn lawn bowls green is a 120-foot square turf area surrounded by a foot wide sand buffer. The sport of lawn bowling requires a flat, clean turf area devoid of weeds and other irregularities that would affect the true roll of the oblong bowls.

The basic aims of the greenskeeper are always to maintain the smoothness and levelness of the green. Poor mowing, weeds, and diseased turf all mar the aesthetics and usefulness of the green. Wetness or dryness also has a bearing on the play and vigor of the green. Finally, the relative compaction of the subsoil could greatly increase irregularities and make this area unavailable for competitive play.

The Oxnard Joslyn lawn bowls Green is constructed with a subsoil of pure, washed, sieve #60 sand. This soil restricts compaction resulting in a level surface. The sand allows deep-water penetration and subsequently a deeper root zone for the grass. Leach lines are installed to transport excess irrigation/or rainwater to drains in the park. The porosity of the sand results in more air, nutrients, and water reaching the roots with less disease potential.

The major deleterious aspect of the sand is the potential for drying out of the grass. Because sand has large pores and the irrigated water moves more quickly through the horizons of the soil, there is a greater risk of drying. Nutrients and fertilizers also leach more quickly past the root zone. In order to limit the damage, it is necessary to irrigate weekly and deeply and fertilize often at a regular rate. This solution will limit the discrepancies of peaks and valleys in both water and nutrients availability.

The sport of lawn bowling requires a smooth and level surface with grass length no more than 3/16 above the soil level. There are very few species of grass that will live at this height. Bent grass is a cool season grass that will thrive at this cutting height. Bent grass, however, does well in northern and eastern parts of the United States. Hybrid Bermuda has become the dominant lawn bowls grass in our area. Hybrid Bermuda has very positive attributes, such as:

- A. Low mowing tolerance
- B. High temperature tolerance
- C. High wear tolerance
- D. High disease tolerance
- E. High drought tolerance
- F. High salt tolerance
- G. Quick recovery rate
- H. High compacted soil tolerance

The above list shows the importance of Hybrid Bermuda as the greens grass. The tifgreen variety of Bermuda grass is best suited and survives well when mowed to the height of 1/8" to 1/4".

All Hybrid Bermuda grass has a definite disadvantage in cooler weather. The growth of the grass goes dormant in temperature below 50 degrees. The sand of the sub base loses temperature faster than normal loamy soils, resulting in faster dormancy of the lawn bowls green. The City of Oxnard has a very mild climate where very few months average lows below 50 degrees.

This booklet is divided into sections dealing with most aspects of green maintenance. The maintenance sections are listed as; irrigation, mowing, specialized maintenance, and fertilization-pesticide application.

IRRIGATION

Water is the single most important element affecting the health and playability of the turf. It is the major component of the plant's cells and directly relates to wear resistance, disease resistance and nutrient absorption.

In a stand of turf on pure sand, the area requires not only more water, but also water more often. The area between soil particles is much greater in sand than normal soil. These gaps between soil particles take greater time to fill and less time to empty. The water moves quickly through the horizon and is less available for root absorption. It is of extreme importance that every square foot of the surface area receives approximately the same amount of water.

The Oxnard Joslyn lawn bowls green has an automatic irrigation system that is designed to water every square foot as evenly as possible. The irrigation heads around the perimeter are spaced to throw water evenly from head to head. The head located in the center of the green generates 100% overlap to the center outside heads. The corner sprinklers throw into one half the area with the same gallons per minute output as the side heads; therefore, the output is as much water per square foot of coverage. The middle side heads cover one half the area of the center head, also with the same gallons per minute output. In order to even out the water on each general area it is necessary to operate the irrigation head in the center four times the corner sprinklers, and twice the side sprinklers.

The turf uses and needs less water during cool and moist weather than during the hot, dry summer. Tifgreen Bermuda grass is also dormant during the winter months and, therefore, its need for water is at a greatly diminished rate. The irrigation times are reduced during the spring and fall, and further reduced during the winter.

The irrigation scheduling has been formulated using the precipitation rate, sprinkler head spacing and controller timing to irrigate $\frac{1}{2}$ " of water per week in the winter, $\frac{3}{4}$ " of water per week in the spring and fall, and 1" per week in the summer.

Water is the main carrier of fertilizers and other nutrients in the grass. Nutrients are dissolved into the water and transported to the root zone of the grass. The nutrients are then absorbed into roots and transferred by osmosis to the leaves and growth centers. It is necessary for the health of the grass to irrigate after fertilization. This not only facilitates the uptake of the fertilizer, but also prevents burning and other damage to the leaf blades by washing the chemical off of direct contact.

TENSIOMETER

Too much water will not allow oxygen to penetrate to the root level. Without oxygen the roots become stunted, shallow and subject to disease. The roots are closer to the surface and are not able to reach or absorb nutrients. It is imperative the green not be over watered.

Fluctuation in humidity, rainfall, heat, porosity of the soil, and non-uniform throw of the irrigation heads all vary the water need of the grass. The experience of the greenskeeper will help to determine when the turf needs more or less water, but where there is some doubt it is necessary to use a device called a tensiometer. The tensiometer measures the amount of surface tension exerted by the water in the soil.

The tensiometer, when used properly, will indicate to the greenskeeper; areas that get more or less water, when to water, how much to water, less or more porous subsoil, and depth of water penetration. Without a tensiometer it is impossible to correctly determine a time schedule on the irrigation control. The tensiometer reading, at a depth of 3-4 inches, of zero indicates standing water. A tensiometer reading of 50 centibars is fairly

dry. The greenskeeper should withhold irrigating until the tensiometer reading is 20 centibars for hybrid Bermuda grass.

MOWING

Correct mowing of the lawn bowls green maintains the smooth and consistent rolling of the bowls. To correctly mow a lawn bowls green it is necessary to have the proper equipment. The Oxnard Joslyn Lawn Bowls Green is cut with a Scott Bonner 16 blade reel mower with a Honda 5.5 hp gas engine.

A reel mower cuts the grass with a scissor action and is better for fine textured grass where a low mowing height and more even cut is desired. The rotary mower is better adapted to higher cuts and coarser textured grasses. A potential problem of most reel mowers in low cut turf is waves developed by bouncing of the mower. This situation is avoided in the Oxnard's green because the Scott Bonner mower is heavier than the normal reel mower and because it has 16 blades on the reel. The greater number of blades increases the cutting speed and reduces the area between cuts.

Bowling at the Oxnard green is always done in a north-south direction or an east-west direction. Mowing should be done at a 45-degree angle to the roll of the bowl. The mowing directions, at the green, therefore, should be northwest southeast or northeast southwest. These directions should be rotated each time mowing is done.

This technique will give the green a cut 45-degrees to the ditches. When approaching the ditch, declutch the mower, slow and depress the mower handle to raise the blades. This practice will save extra wear on the strip next to the side. Overlap each pass of the mower by 50%. This will maintain even cut and insure no area is missed. After mowing diagonally the entire green, mow an area approximately 3 foot wide parallel with the ditches around the entire perimeter of the green. This mowing will pick up the grass clipping left during the turn of the mower and smooth out and irregularities caused by the turn.

Maintenance of the mower is almost as important as the mowing operation itself. A dull mower rips and tears the grass and produces a mottled appearance. The cutting height of the mower can be set to 3/16". Grass cut at this height with a dull mower can be patchy and more susceptible to disease. The Scott Bonner blade is sharpened at a 90-degree angle, enabling the blade to be removed and reversed. When both sides of the reel are dull, the blade is removed and back lapped.

The bed knife is the second blade of the scissor action. The reel should be adjusted to the bed knife so that the reel barely touches across the total width. Before any mowing is accomplished, always check the tightness of the cutting assembly. The bed knife should be replaced when the reel does not come in contact throughout the total width.

General maintenance should be performed every time the mower is used. Always check the oil and gas levels, grease fitting and reel driving chain before putting the mower on the green. Removing the chain cover and putting pressure on the chain check the reel-driving chain. The chain should be slightly loose.

Consistent upkeep of the grass stabilizes the chemical reactions necessary for healthy growth. The greenskeeper should not change dramatically the schedule of mowing. It is not beneficial to allow the grass to grow and then severely cut it back to 3/16" height. Keep a firm schedule to keep a healthy stand of turf.

SPECIALIZED MAINTENANCE

AERATION

Aerating allows greater water and nutrient penetration to the root zone of the turf. Even on a bed of pure sand the turf should be aerated twice a year. The root zone of the turf decays and knits to prevent proper water penetration. Debris from pollution and soil from the bowler's shoes all build on the top layer of the green. This

material hardens and prevents water and air penetration to the roots. As this material builds the grass becomes stunted and easily damaged. The resultant bare spots mar the playability of the turf.

At the Oxnard green we aerate with the use of a Groundsman, model 460 Aerator with 4 inch tines. Immediately after plugging, drag the green with a welded mat, thus breaking the plugs and partially filling the holes, remove the resulting debris and cover with enough sand to completely fill the holes left by the aeration procedure. It is vitally important to fill the holes after the aeration. The openings in the turf facilitate the drying out of the roots. If these holes are left open, roots may dry out or disease may get in.

The sand used to fill after aeration should be sieve #60, pure washed and dry. The surface of the green should be as dry as possible. Plug cleanup should be finished before the green is top dressed with sand. It will take 6-7 tons of sand to adequately fill all holes in the turf. Spread the sand evenly over the entire lawn surface and remove any extra. A small thickness of sand will remain after the procedure. This material should be watered into the top layer of turf. Fertilize and water as soon as possible after the aeration is complete.

Soon after aeration, the turf will appear speckled. This appearance is due to new grass appearance in the plugholes. The grass will grow faster due to greater nutrient, air and water penetration. The grass, with proper fertilization, will become darker and healthier in appearance. The bowls will appear to roll more evenly and the game will become more enjoyable.

DETHATCHING/VERTICUTTING

Thatch is a buildup of dead and decaying herbaceous material at or slightly below the ground level. It is necessary to remove this material to allow proper water and nutrient permeability. If thatch is allowed to remain, the turf builds up unevenly and is more susceptible to fungus infections. The thatch slows the roll of the bowl and can alter the course of the roll.

A secondary function of verticutting is the strengthening of the turf stand. Bermuda grass spreads by both undergrounds and above ground roots called rhizomes and stolons. The verticutter cuts these roots to a depth of $\frac{1}{4}$ ". When these roots are cut, the roots produce a hormone that stimulates new growth of both leaves and roots. Soon after verticutting the turf thickens and becomes a lighter green.

A verticutter has a shaft of blades $\frac{3}{4}$ " apart that cut approximately $\frac{1}{4}$ " into the turf. These blades rotate and cut the matted turf roots and bring dead thatch to the surface where the lawn mower sweeps it into a catch bin.

As in the mowing operation, verticutting should be done in a rotating direction at a 45-degree angle to the ditch. The verticutting, aerating, top-dressing, and clean-up operation when discussed together is termed the renovation procedure.

GROOMER

Grooming provides the same benefits as verticutting, except the cut is much finer. It controls lateral surface growth by vertical mowing, increases turf firmness and smoothness for better bowling conditions, helps control and balance turf texture, helps reduce moss build up in upper turf layers.

GREENSPLANER

Leveling removes irregular growth areas on the green. The resultant green area is close to level throughout the entire surface. Bermuda grass grows and spreads by underground or overgrown roots. These roots intertwine among themselves and sometimes build up tufts. The mowing and dethatching operation

sometimes does not remove these tufts in a level manner. Soil buildup along the edge also tends to raise the green so that the roll of the bowl is pushed in toward the center.

Two pieces of green maintenance equipment could alleviate this problem. The scarifier is a piece of maintenance equipment that tears the surface and lifts the tufts for easy removal by the greens mower. A green planer is an apparatus that verticuts along a level plane, thus removing any irregular growing areas. The planer is an effective substitution for both a scarifier and a verticutter, and does a far superior job of leveling the green.

GREENSIRON 3000

Two machined and tapered high carbon steel steering rollers. One vulcanized rubber covered drive roller. This equipment is use for ironing a well-manicured playing surface.

FERTILIZERS

Use of Fertilizer not only affects the color and growth of the grass but it is also responsible for disease susceptibility, heat tolerance, wears tolerance, rooting and many more aspects of turf vigor.

Nitrogen is by far the most important nutrient for continued turf grass health. Nitrogen is a constituent of every cell in the plant and is largely responsible for the green color of the leaf. Nitrogen makes up 3-6% of the total weight of the grass. Nitrogen not only effects color but also increases heat and drought tolerance. Nitrogen in quantity also decreases seed head formulation and certain fungicide resistance.

Nitrogen is easily lost through leeching. It is necessary to re-supply nitrogen to the turf often. Bermuda grass needs at least one pound per 1000 square feet of actual nitrogen per growing month. It is recommended that nitrogen be applied more than once per month due to peaks and valleys in nutrient availability. When first applied, nitrogen is readily available at high concentrations. These concentrations gradually diminish to very low levels. With high concentrations the turf grass grows a lush and dark green top layer. As the nitrogen diminishes this layer becomes nitrogen starved and loses color. To combat this deficiency it is necessary to fertilize more often with less rates. The result is a uniform appearance.

We are fertilizing with two kinds of fertilizer. The Ammonium Sulfate or 21-0-0 is called an incomplete fertilizer, because it supplies only nitrogen. The second fertilizer is call Turf Supreme or 16-6-8. This fertilizer is a complete fertilizer because it contains nitrogen, phosphorus and potassium. Phosphorus and potassium are macronutrients that are needed in quantity in the turf. Phosphorus is a nutrient that affects the conversion of starch to sugar. The greater the amounts of phosphorus in the plant, the more seeds are provided and the faster the plant mature. Potassium regulates respiration and nutrient uptake. The greater amounts of potassium produces more wear tolerance in the grass.

Potassium and phosphorus are more readily available in the soil than nitrogen. It is not as necessary to add these two nutrients, as it is to add nitrogen. Therefore, the schedules of fertilizer applications reflect more nitrogen than potassium or phosphorus.

PESTICIDES

The term pesticide is used to describe agents that kill or hinder the growth of target individuals. In this scenario, it describes killing agents that destroy those items that would make the bowling green unusable or unaesthetic. Pesticides can be further specialized into the terms insecticides, an insect killer; fungicide, a fungus killer; or herbicide, a plant killer.

Insecticides generally are non-specific. This means that most insecticides kill a wide range of insects. The insecticide Merit 0.5G is a non-selective formulation that kills most small, leaf chewing insects and is a good insecticide for control of grubs as well.

Fungicides are also mostly non-specific. Fungicides do not affect certain types of fungus. If a fungus is

Detected, cultural practices can probably remove it. Cultural practices include decreasing water application and increasing water penetration through aeration. If these techniques do not reduce the infestation, spray with Daconil Weather Stik at the recommended rate. Generally funguses are only a problem in the fall and winter.

Herbicides are generally specific. This means they affect only the target species of plant. Poa annua is the most troublesome as is Pearlwort Birdeye of all potential weeds. Poa annua is a grass commonly called annual bluegrass. This grass bunches and produces thick tufts at the time when the Bermuda grass is becoming dormant. Pearlwort birdeye is a cold weather weed. If not controlled properly the weed will take over a green within a few seasons. This weed can be successfully controlled with Speed Zone Southern, Broadleaf Herbicide for turf. The pre-emergent herbicide Gallery 75 dry flowable will stop the seeds from germinating.

OXNARD-JOSLYN LAWN BOWLS CLUB GREEN EQUIPMENT INVENTORY

TRACTOR OJLBC-1995-06 18hp gas engine Model 917.252700. The tractor provides motion, 6 forward gears, 1 reverse gear and steering of the frame. It also provides power for the hydraulic pump. The frame includes the verticutter and planer. The primary function is to remove thatch evenly. The secondary function is the smoothing of all irregularities and lumps.

GREENSIRON 3000 OJLBC-2000-04 Gas engine Honda, 5.5 hp, adjustable clutch power transmission Model 5101B, with external adjustable screw. Two machined and tapered high carbon steel steering rollers. One vulcanized rubber covered drive roller. This equipment is use for ironing a well-manicured playing surface.

GROUNDSMAN AERATOR OJLBC-1998-05 Model 460, Kawasaki 7.9hp OHV gas engine, swath 24 inches, drives twin vee-belt and chain, penetration 5 inches maximum. This equipment provides an effective use for aerating the green.

SCOTT BONNAR 30 inch Queen Mower OJLBC-2004-02 Honda 5.5 hp gas engine, vee-belt and chain drive, 16 blade-cutting reel, adjustable height, replaceable bottom blade knife. This equipment is use for mowing the turf grass. The cutting blade height can be adjustable from 1/16 inch to ½ inch cut. During the turf growing season the cut is normally set at 1/8 inch.

SCOTT BONNAR 30 inch Queen Mower OJLBC-1988-11 Honda 5.5 hp gas engine, vee-belt and chain drive, 16 blade-cutting reel, adjustable height, replaceable bottom blade knife. This equipment is use for mowing the turf grass. The cutting blade height can be adjustable from 1/16 inch to ½ inch cut. During the turf growing season the cut is normally set at 1/8 inch.

GROOMER OJLBC-2002-08 on a Scott Bonnar mower frame. Primary function; controls lateral surface growth by vertical mowing, increases turf firmness and smoothness for better bowling conditions, help control and balance turf texture, helps reduce moss build up in upper turf layers.

SPRAYER OJLBC-2005-07, 25-gallon tank, 12 VDC 60 PSI 1.8 GPM HIGH FLO pump, 2 nozzle adjustable boom, pneumatic tires. This equipment is used for application of pesticides under controlled pressure for even distribution.

SAND SPREADER OJLBC-2003-01, Briggs & Stratton 5 hp gas engine, vee-belt and chain drive. This equipment is used for topdressing the green. Topdressing improves playing field condition by providing a smooth playing surface.

AIR COMPRESSOR OJLBC-1997-01, 13-gallon tank provides pressurized air when required.

TRIMMER and EDGER OJLBC-1997-02, this equipment is used for trimming around sprinkler heads and edges.

BLOWER/VACUUM OJLBC-1996-01, this equipment is used for cleaning around the perimeter of the playing field.

LAPPING MACHINE OJLBC-1999-01, this equipment is used for keeping the 16 blade reel sharp between major services.

HAND GARDEN TOOLS, the club owns an assortment of hand garden tools for proper maintenance of the lawn bowling green and its perimeter grounds.

EQUIPMENT MAINTENANCE SCHEDULE

Tractor OJLBC-1995-06, this equipment requires quarterly preventive/corrective maintenance to include, lubrication and oil change, engine tune-up, verticutter blades replaced when necessary, adjust height and level of planer. Evaluate transmission and make corrections/ adjustments as necessary.

Greensiron 3000 OJLBC-2001-04, this equipment requires semiannual preventive/corrective maintenance to include lubrication and oil change, engine tune-up, adjustment of steering system, adjustment of clutch and transmission drive system.

Groundsman OJLBC-1998-05, this equipment requires yearly preventive/corrective maintenance to include lubrication and oil change, gas engine tune-up, replace tines, and adjust controls.

Scott Bonnar 30" Queen Mower OJLBC-2004-02, this equipment requires semiannual preventive/corrective maintenance to include, lubrication and oil change, engine tune-up, 16 blade reel sharpening, replacement of bottom knife, evaluate and make necessary corrections to drive system, Adjust and align cutting unit to a predetermine level.

Scott Bonnar 30" Queen Mower OJLBC-1988-11, this equipment requires semiannual preventive/corrective maintenance to include, lubrication and oil change, engine tune-up, 16 blade reel sharpening, replacement of bottom knife, evaluate and make necessary corrections to drive system, Adjust and align cutting unit to a predetermine level.

Groomer OJLBC-20002-08, this equipment requires semiannual preventive/corrective maintenance to include, lubrication and oil change, engine tune-up, evaluate and correct drive system, adjust height of cutting blade to a predetermined level.

Sprayer OJLBC-2005-07, this equipment requires quarterly preventive/corrective maintenance to include; spray adjustment, replacement of dispensing heads, and triple cleaning tank, hoses and heads after each use.

Sand Spreader OJLBC-2003-01, this equipment requires yearly preventive/corrective maintenance to include, lubrication and oil change, conveyer belt inspection/adjustment and or replacement, drive system inspected, adjusted and fine tune for proper dispensing of material.

Air Compressor OJLBC-1997-01, this unit requires timely preventive/corrective maintenance on a non-scheduled basis.

Trimmer/Edger OJLBC-1997-02, this unit requires timely preventive/corrective maintenance on non-scheduled basis.

Blower/Vacuum OJLBC-1996-01, this unit requires timely preventive/corrective maintenance on a non-scheduled basis.

Lapping Machine OJLBC-1999-01, this unit requires timely preventive/corrective maintenance on a non-scheduled basis.

Hand garden tools, these items are cleaned after each use and replaced when necessary.

MATERIALS REQUIRED

Fertilizer: 16-6-8 with weed controls
Herbicide: selective herbicide
Pre-emergent: prevents seed germination
Fungicide: control fungi
Insecticide: control insects grubs, worms and other turf pests
Silver Sand: 60 grit approximate 6 to 10 tons per year

PESTICIDES/FERTILIZERS/SAND

PESTICIDES	\$400.00
FERTILIZER	\$400.00
SILVER SAND	<u>\$1000.00</u>
TOTAL COST	\$1800.00

ANNUAL SCHEDULE OF EVENTS

Mowing

April through November

Mow three (3) times per week as described on page 3 of greens maintenance manual. Set mower cutting blade height to 1/8 inch. Schedule work for Tuesdays, Thursdays, Fridays and/or Saturdays.

October through March

Mow once per week. Set mowers cutting blade height to ¼ inch for mowing the center of the green. Set mowers cutting blade height to 3/8 inch for mowing a strip 8 feet wide around the perimeter of the green.

Dethatching/Verticutting

April through November

Verticut, dethatch and level green twice a week as described on page 5 & 6 of greens maintenance manual. Schedule work for Tuesdays and Saturdays. Set cutting blades height to ¼ inch in depth.

Grooming

April through November

Groom grass twice a week as described on page 6 of greens maintenance manual. Schedule work for Tuesdays and Thursdays. Set the cutting blades depth to 1/16 inch.

Aeration

March

Follow procedures described on page 5 of greens maintenance manual. Plug with ½ inch diameter 6-inch long hollow tines. Remove debris from green after plugging. Back fill the empty holes with pure washed sand sieve #60 approximately 7 tons. Fertilize immediately and finish by watering. Set watering as described for April/October time period.

Irrigation

April through October

Follow directions described on page 2 of greens maintenance manual. Water one time each week.

Set irrigation heads as follows

Quarter arc head 20-minute

Half arc heads 25-minutes

Full arc head 30-minutes

November through March

Watering controlled by weather conditions; do not over water.

Quarter arc heads 8-minutes

Half arc heads 12-minutes

Full arc head 16-minutes

Fertilization

March through October

Follow direction as described on page 7 of greens maintenance manual. Fertilize every 60 days with Turf Supreme 16-6-8 with weed control.

November through February

Apply 30 pounds of Ammonium sulfate, 21-0-0 once every 30 days. Make sure to water the grass immediately after application utilizing head settings described for November/March time period.

Pest control

January

Apply 30 pounds of Merit .05G for insects control.

Apply 2oz per gallon of water of Daconil Weather Stik Flowable Fungicide.

Apply .75oz per gallon of water of Speed Zone Southern herbicide to control Pearlwort, a cold weather weed.

Two weeks after application of Speed Zone Southern, apply Gallery 75 Dry Flowable pre-emergent herbicide following label directions.

REFERENCES

California Department of Pesticides Regulation (DPR)

Pesticides Applicators Professional Association, (PAPA)

Weeds Container Nurseries in the United States, Virginia Tech

Maintenance of the Lawn Bowling Green, Dr. Edger R Haley

Laws, Regulations, and Basic Principles (DPR)

The Safe and Effective Use of Pesticides (DPR)