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## Choosing Turf and Erosion Control Grasses for the Lake Tahoe Basin

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### INTRODUCTION

Planting grass near homes can control soil erosion and help create fire defensible space. Since the tragic Angora Fire in 2007, many Tahoe residents are re-evaluating their landscaping options for areas close to residences. To reduce wildfire threat to homes, residents are encouraged to avoid widespread use of wood and bark mulches within 30 feet of structures and to rake up pine needles there by spring each year. However, removing mulch or pine needles can expose bare soil, which may promote soil erosion and send sediments into Lake Tahoe. Increased sediments reduce water clarity. To protect water clarity, erosion control Best Management Practices (BMPs) are required on all developed properties at Lake Tahoe. Grasses can protect bare areas from erosion, but which grasses work well in the Tahoe Basin?

The Second Edition of *Living With Fire, Lake Tahoe Version* (Smith, 2006) recommends that people can use low-growing, irrigated, herbaceous (non-woody) vegetation in the Noncombustible Area (within 5 feet of structures), and in the Lean, Clean and Green Area (5 feet to 30 feet from structures). Grasses can be ideal for use in these defensible space areas.

There are two basic categories of grasses that meet regional requirements for defensible space and BMPs. These are **turf grasses**, mowed for a traditional lawn look, and **erosion control grasses** for lower maintenance and a meadow or forest-floor appearance. Both types control erosion.

In order to show Lake Tahoe Basin residents the characteristics and appearance of these different grasses, University of Nevada Cooperative Extension researchers planted eight demonstration plots of different grass mixes at the North Lake Tahoe Demonstration Garden on the campus of Sierra Nevada College in Incline Village, Nev. Nearly all of the species in these mixes are listed on the Tahoe Regional Planning Agency (TRPA) Recommended Plant list, in the *Home Landscaping Guide for Lake Tahoe and Vicinity* (Cobourn et al., 2006).



Grass plots and interpretive sign in the North Lake Tahoe Demonstration Garden

## DEMONSTRATION PLOTS

Four of the plots show turf grass mixes suited for traditional lawn use at Lake Tahoe. Another four demonstrate low-maintenance erosion control grasses that require less watering and little mowing once they are established. After establishment, the erosion control grasses will stay green during most of the growing season with weekly irrigation.

**How to Get Started:** The grass varieties chosen for the demonstration plots grow best at Lake Tahoe when they are planted from seed on amended and tilled soil. Compost was tilled into these demonstration plots, and a light covering of peat moss--no more than ¼ inch--was used as a top dressing. Although we seeded in mid-May, seed can be planted in fall or spring, once the soil is warm.

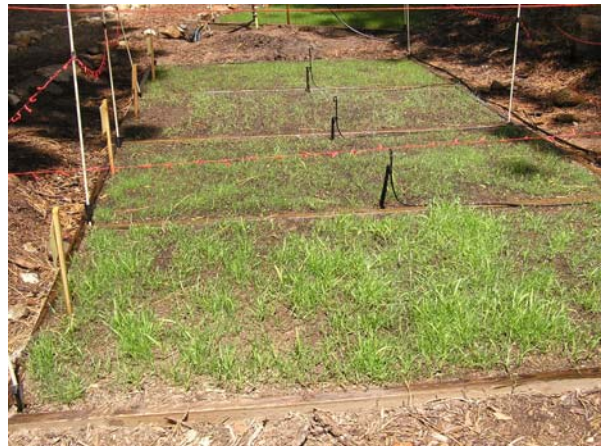
For seed germination and seedling development, the soil must be kept moist. We irrigated the seeded areas three times a day, 15 minutes per time, with a microspray, for the first six weeks until the grass was 4 inches to 6 inches tall. At that time, we mowed all the grasses to 3 inches tall. However, it is a better practice to mow at 2 inches to 3 inches, cutting the grasses back to 1 ½ inches to avoid ripping out new seedlings. This first mowing helps stimulate a denser root system. We also reduced the irrigation to once per day for all grasses.



*Proper seedbed preparation included raking seed in lightly, adding 1/8 inch of peat moss and rolling the area level.*



*Erosion control grass plots 15 days after seeding. Note the microsprayers used for irrigation three times per day.*



*Erosion control grass plots four weeks after seeding, still receiving irrigation three times per day.*



*More weeds grew in the erosion control plots than turf plots. Perhaps this was due to a lower seeding rate than in the turf plots, providing less competition for the weeds.*

## TURF GRASSES

The four turf grasses used required irrigation two to three times weekly after establishment, and weekly mowing.

We used a seeding rate of 7 pounds of seed per 1,000 square feet. See Table 1 for details.

**Turf Mix 1** contained 80 percent 'Baron' Kentucky bluegrass (*Poa pratensis* 'Baron') and 20 percent perennial ryegrass (*Lolium perenne*) by weight. Kentucky bluegrass is one of the most commonly used turf grasses, but requires frequent irrigation (Ogle, 1997).

Perennial ryegrass is a short-lived perennial grass that establishes quickly, but is shade intolerant. It is often used in a lawn seed mix to fill in while other grasses are germinating. It does well in areas too wet for other grasses (FEIS). It does need a minimum of 100 frost-free days for survival. It tolerates temperatures down to minus 18 degrees F.



Turf Mix 1: Kentucky bluegrass after three months

**Turf Mix 2** contained 50 percent 'Baron' Kentucky bluegrass, 30 percent 'Boreal' creeping red fescue (*Festuca rubra* ssp. *Arenaria*) and 20 percent perennial ryegrass by weight. Creeping red fescue

quickly forms a turf with its strong spreading rhizomes (NRCS, 1997). It has a fine leaf texture. It can be long-lived at high elevations (FEIS) and tolerates shade well.



Turf Mix 2: bluegrass/fescue after three months

**Turf Mix 3** had three varieties of dwarf turf-type tall fescues (*Festuca arundinacea*), 'Cochise', 'Titan' and 'Quest'. Turf-type tall fescues can be more heat- and drought-tolerant than Kentucky bluegrass (O'Brien and Hurley, 1986). These grasses have a semi-coarse leaf texture. Because of their late green-up in the spring and early dormancy in the fall, gardeners may have a tendency to overwater these grasses in an attempt to encourage a deep green color.



Turf Mix 3: dwarf fescues after three months

**Turf Mix 4** was 'Boreal' creeping red fescue (for description see Turf Mix 2).



Turf Mix 4: creeping red fescue after three months

## EROSION CONTROL (EC) GRASSES

These are low-maintenance grasses. They need to be cut down to reduce fire risk when they dry out and turn brown. Once established (late in their second summer), they require only once-per-week watering and little fertilizer to keep them green throughout the growing season. We seeded these plots at 1 pound of seed per 1,000 square feet. See Table 2 for details.

**EC Mix 5** included 'Durar' hard fescue (*Festuca trachyphylla* 'Durar'), 'Covar' sheep fescue (*Festuca ovina* 'Covar') and 'Boreal' creeping red fescue. Hard fescue and sheep fescue grow in clumps. The spreading growth pattern of red fescue helps fill in bare areas between clumps.



Erosion Control Mix 5: fescues after three months

**EC Mix 6** 'Sodar' streambank wheatgrass (*Elymus lanceolatus* ssp. *psammophilus* 'Sodar') was the only grass type in this mix. This erosion control grass is low-growing and spreads readily through underground stems called rhizomes.



Erosion Control Mix 6: 'Sodar' after three months

**EC Mix 7** was a modified meadow mix with 30 percent 'Covar' sheep fescue, 30 percent Sandberg bluegrass (*Poa secunda*), 15 percent 'Bromar' mountain brome (*Bromus marginatus* 'Bromar'), 15 percent 'Revenue' slender wheatgrass (*Elymus trachycaulus* 'Revenue') and 10 percent tufted hairgrass (*Deschampsia caespitosa*). This low-growing alternative may be mixed with hard and red fescues to increase coverage. Wildflowers may also be added to provide color and the general appearance of a meadow.



Erosion Control Mix 7: modified meadow mix after three months

**EC Mix 8** was modified from the TRPA harsh site mix, used for very dry sites. EC Mix 8 is low-maintenance and fast-growing. The invasive 'Paiute' orchardgrass in the previous TRPA harsh site mix was replaced with 'Bromar' mountain brome. The new mix contains 20 percent 'Luna' pubescent wheatgrass (*Thinopyrum intermedium* 'Luna'); 20 percent 'Revenue' slender wheatgrass; 30 percent Bromar' mountain brome; 15 percent Covar' sheep fescue; and 15 percent 'Sherman' big bluegrass (*Poa ampla* 'Sherman') by weight.

There are advantages and disadvantages to using 'Luna' pubescent wheatgrass. Some people may find its coarse texture less aesthetically pleasing for a residential landscape. However, it works well on harsh sites. Wildflowers may be added to this mix for color.



*Erosion Control Mix 8: modified TRPA harsh site mix after three months*

## DISCUSSION

These demonstration plots are located on an upland site under a Jeffrey pine (*Pinus jeffreyi*) overstory. The plots are shaded slightly more than half of each day. Even so, irrigation for the first summer is critical. Our irrigation system malfunctioned for about a week, two months after planting, and some species in the mixes nearly died.

We seeded our erosion control grasses much more sparsely than our turf grasses. We found that some species, such as 'Sodar' streambank wheatgrass, had very large seeds. Because we seeded at a rate of 1 pound per 1,000 square feet, this species had many fewer seeds per square foot than the other EC plots. You may want to plant erosion control species with large seeds at 2 pounds per 1,000 square feet.

Fertilization needs for grasses vary. However, in the Lake Tahoe Basin, using the least amount of fertilizer possible is recommended. We need to reduce the potential for excess fertilizer to leach through the soil or run off properties and contaminate Lake Tahoe. All the grasses listed are able to survive with very little fertilizer. A light application of fertilizer (1/2 pound to ¾ pounds of actual nitrogen per 1000 square feet) in late spring and late summer will suffice. See page 119 in the *Home Landscaping Guide* for more details.

## CONCLUSIONS

If you are looking for grasses that meet Tahoe Basin requirements for defensible space and erosion control, visit the North Lake Tahoe Demonstration Garden at Sierra Nevada College. The college is at the intersection of Tahoe Boulevard and Country Club Drive. The garden is located at the foot of Patterson Hall's lower parking lot. The plots are halfway down the slope.

You can reap the benefits of grasses – erosion control, dust control, temperature mitigation and aesthetics – whether you want the maintenance chores of a formal lawn or not. Areas of lawn make good sense close to the house for erosion control and as part of the Lean, Clean and Green and Noncombustible defensible space areas. If you fertilize appropriately, as described in Chapter 9 of the *Home Landscaping Guide for Lake Tahoe*, install an irrigation controller, and get your

sprinklers audited annually, appropriate lawn areas can be resource-efficient and attractive.

If you want a more natural look and less maintenance, check out the Erosion Control grasses at the Demonstration Garden. Once established, they require little maintenance other than weekly watering and one mowing late in the summer, when stalks dry out and turn brown. The dead stems should be removed for fire safety.

You can purchase seed for the species described in this publication through local nurseries and garden centers.

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**Table 1 – TURF GRASSES**

Grass Variety	Mix Number	Light	Traffic Tolerance	Root Depth (inches)	Annual precipitation (inches)	Drought Response	Establishment Rate	Comments	Erosion Control	Growth Form
'Boreal' Creeping red fescue <i>Festuca rubra</i> ssp. <i>arenaria</i> 'Boreal'	2, 4	Sun or shade <sup>3,7</sup>	Low <sup>3</sup>		18-30 <sup>3</sup>	Moderately tolerant <sup>1</sup>	Mod <sup>7</sup>	Low nitrogen requirement. <sup>1</sup> Susceptible to disease when overwatered. <sup>3</sup>	Excellent <sup>7</sup>	Sod <sup>1,7</sup>
'Cochise' dwarf fescue <i>Festuca arundinacea</i> 'Cochise'	3	Sun to shade <sup>3,6</sup>	Mod <sup>*</sup>	12-48 <sup>3,6</sup>	18-25 <sup>3,6</sup>	Intolerant <sup>3,6</sup>	Rapid <sup>3</sup>	A sod-forming, turf-type fescue.* Quick to germinate but slow to spread. <sup>7</sup>	Excellent (once established)	Bunch <sup>3,7</sup>
'Baron' Kentucky bluegrass, <i>Poa pratensis</i> 'Baron'	1, 2	Sun to light shade <sup>2,3</sup>	High <sup>4</sup>	3-8 <sup>4</sup>	20-56 <sup>3</sup>	Tolerant <sup>3</sup>	Med-slow <sup>*</sup>	Avoids drought with summer dormancy. <sup>3</sup>	Excellent <sup>7</sup>	Sod <sup>3,7</sup>
Perennial ryegrass <i>Lolium perenne</i>	1, 2	Sun to shade <sup>3</sup>	High <sup>3</sup>	10	15+ <sup>3,4</sup>	Intolerant <sup>1,3,7</sup>	Rapid <sup>1</sup>	High maintenance. Marginal winter hardiness. Short-lived. <sup>3,4</sup>	Strong seedling vigor <sup>7</sup>	Bunch <sup>1</sup>
'Quest' dwarf fescue <i>Festuca arundinacea</i> 'Quest'	3	Sun to shade <sup>3</sup>	Mod <sup>*</sup>	12-48 <sup>3,6</sup>	18-25 <sup>3,6</sup>	Intolerant <sup>3,6</sup>	Rapid <sup>3</sup>	A sod-forming, turf-type fescue.*	Excellent (once established) <sup>7</sup>	Bunch <sup>3,7</sup>
'Titan' dwarf fescue <i>Festuca arundinacea</i> 'Titan'	3	Sun to shade <sup>3</sup>	Mod <sup>*</sup>	12-48 <sup>3,6</sup>	18-25 <sup>3,6</sup>	Intolerant <sup>3,6</sup>	Rapid <sup>3</sup>	A sod-forming, turf-type fescue.*	Excellent (once established) <sup>7</sup>	Bunch <sup>3,7</sup>

1. Christopherson et al. 1992  
2. Cobourn et al., 2006

3. Ellefson et al., 2004  
4. FEIS, 2008

5. NRCS, 2008  
6. O'Brien et al., 1986

7. Ogle, 1997  
\* Comstock Seed, personal communication

**Table 2 - EROSION CONTROL GRASSES**

(Note: since these weren't studied for lawn use, traffic tolerance and greening up categories were removed.)

Grass Variety	Mix Number	Light	Height (inches)	Annual precipitation (in inches)	Drought Response	Establishment Rate	Comments	Erosion Control	Growth Form
'Boreal' Creeping red fescue <i>Festuca rubra</i> ssp. <i>arenaria</i> 'Boreal'	5	Sun to shade <sup>3</sup>		18-30 <sup>3</sup>	Moderately tolerant <sup>1</sup>	Mod <sup>7</sup>	Use as turf, erosion control or meadow. <sup>1</sup>	Excellent <sup>7</sup>	Sod <sup>1</sup>
'Bromar' mountain brome <i>Bromus marginatus</i> 'Bromar'	7, 8	Sun to shade <sup>2,7</sup>	12 -48 <sup>1,7</sup>	18+ <sup>7</sup>	Moderately tolerant <sup>1</sup>	Rapid <sup>7</sup>	Short-lived. <sup>7</sup>	Excellent <sup>7</sup>	Bunch <sup>1</sup>
'Covar' sheep fescue <i>Festuca ovina</i> 'Covar'	5, 8	Sun <sup>2</sup>	<11 <sup>7</sup>	10-14 <sup>5</sup>	Very tolerant <sup>7</sup>	Slow <sup>1,7</sup>	Aggressive competitor. <sup>1,7</sup>	Excellent <sup>1,7</sup>	Bunch <sup>7</sup>
'Durar' hard fescue <i>Festuca trachyphylla</i> 'Durar'	5	Sun <sup>2</sup>	30 <sup>7</sup>	12+	Very tolerant <sup>1</sup>	Rapid <sup>1,7</sup>	Heavy root producer. <sup>7</sup>	Excellent <sup>7</sup>	Bunch <sup>1</sup>
'Luna' pubescent wheatgrass <i>Thinopyrum intermedium</i> 'Luna'	8		36 -48 <sup>7</sup>	11+ <sup>7</sup>	Very tolerant <sup>1,7</sup>	Rapid <sup>7</sup>	Long-lived (50+ years), cold tolerant. Ideal for harsh sites. <sup>1</sup>	Excellent <sup>1</sup>	Sod <sup>1</sup>

1. Christopherson et al. 1992

2. Cobourn et al., 2006

3. Ellefson et al., 2004

4. FEIS, 2008

5. NRCS, 2008

6. O'Brien et al., 1986

7. Ogle, 1997

\* Comstock Seed, personal communication



**Table 2 - EROSION CONTROL GRASSES** (continued)

Grass Variety	Mix Number	Light	Height (inches)	Annual precipitation (in inches)	Drought Response	Establishment Rate	Comments	Erosion Control	Growth Form
'Revenue' slender wheatgrass <i>Elymus trachycaulus</i> 'Revenue'	7, 8	Sun or shade <sup>7</sup>	24-30 <sup>7</sup>	14+ <sup>7</sup>	Tolerant <sup>1,2</sup>	Rapid <sup>1,7</sup>	Short-lived. Best used as a filler with longer-lived species. <sup>7</sup>	Provides good initial plant cover <sup>7</sup>	Bunch <sup>1</sup>
Sandberg bluegrass <i>Poa secunda</i>	7	Sun or shade <sup>7</sup>	6-30 <sup>7</sup>	6-25 <sup>7</sup>	Intolerant	Med-slow <sup>*</sup>	Needs good moisture near surface for normal growth. <sup>7</sup>	Good <sup>7</sup>	Bunch <sup>7</sup>
'Sherman' big bluegrass <i>Poa ampla</i> Sherman'	8	Sun or shade <sup>7</sup>	15-20 <sup>7</sup>	15-20 <sup>7</sup>	Moderately tolerant <sup>1,7</sup>	Mod <sup>7</sup>	Long-lived <sup>7</sup>	Excellent <sup>7</sup>	Bunch <sup>7</sup>
'Sodar' streambank wheatgrass <i>Elymus lanceolatus</i> ssp. <i>psammophilus</i> 'Sodar'	6	Sun to light shade <sup>7</sup>	12-36 <sup>7</sup>	8-20 <sup>4,7</sup>	Tolerant <sup>7</sup>	Mod <sup>7</sup>	Long-lived <sup>7</sup>	Good after established <sup>7</sup>	Sod <sup>7</sup>
Tufted hairgrass <i>Deschampsia caespitosa</i>	7	Sun to light shade <sup>7</sup>	12 <sup>1</sup>	20+ <sup>4</sup>	Poor <sup>1</sup>	Rapid <sup>1</sup>	Attractive. Useful along a stream. <sup>1</sup> Long-lived. <sup>7</sup>	Good <sup>1,2</sup>	Bunch <sup>1</sup>

1. Christopherson et al. 1992  
2. Cobourn et al., 2006

3. Ellefson et al., 2004  
4. FEIS, 2008

5. NRCS, 2008  
6. O'Brien et al., 1986

7. Ogle, 1997  
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