SHOW CALCULATIONS ON SCORECARD FOR FULL CREDIT

Part 2B: Habitat Management Scenario (*40 points*)

In July 2012, the Kinyon Road fire southwest of Castleford, ID ignited during a cluster lightning event that sparked several other large fires in other states. It burned 234,914 acres in approximately one week, including critical sage grouse habitat. Most of the land burned was under BLM management and eligible for Wyoming big sagebrush restoration. Drill seeding is accomplished by pulling a rangeland drill behind a 4-wheel drive tractor, but is limited to relatively flat terrain that is free of large rocks. Aerial seeding is done with a fixed wing aircraft and can access any type of terrain, but requires 50% more seed than drill seeding.

Of the following options, which one is MORE cost effective?

Option 1: Drill Seeding	**Option 2: Aerial seeding**
15% purity 90% viability 20,000 acres Desire 3 PLS/1 ft² 4.5 million (4,500,000) seeds/1 lb $14.50/lb of seed 10 tractors 80 hours $230/hour	15% purity 90% viability 20,000 acres Desire 3 PLS/1 ft² 4.5 million (4,500,000) seeds/1 lb $14.50/lb of seed Requires 50% more seed than drill seeding 1 aircraft 10 hours $15,000/hour

(HINTS)

$$\frac{\%\ purity * \%\ viability}{100} = \%\ PLS\ \textit{(Pure Live Seed)}$$

$$number\ of\ acres * \frac{43{,}560\ ft^2}{1\ acre} * \frac{number\ of\ desired\ PLS}{1\ ft^2} = PLS\ needed$$

$$\frac{number\ of\ seeds\ in\ 1\ lb}{1\ lb} * \%\ PLS = \frac{number\ of\ PLS}{1\ lb}$$

$$PLS\ needed \div \frac{number\ of\ PLS}{1\ lb} = lbs\ of\ seed\ needed$$

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Which is more Cost Effective? OPTION 2: AERIAL SEEDING

Option 1: Drill Seeding

$$\frac{\mathbf{15}\%\ purity * \mathbf{90}\%\ viability}{100} = \mathbf{13.5}\%\ PLS$$

$$\mathbf{20,000}\ acres * \frac{43{,}560\ ft^2}{1\ acre} * \frac{\mathbf{3}\ PLS}{1\ ft^2} = \mathbf{2,613,600,000}\ PLS\ needed$$

$$\frac{\mathbf{4,500,000}}{1\ lb} *. \mathbf{135}\ PLS = \frac{\mathbf{607,500}\ PLS}{1\ lb}$$

$$\mathbf{2,613,600,000}\ PLS\ needed \div \frac{\mathbf{607,500}\ PLS}{1\ lb} = \mathbf{4,302.22}\ lbs\ of\ seed\ needed$$

$$\mathbf{4,302.22} * \frac{\$14.50}{lb} seed = \$\mathbf{62,382.19}\ seed\ costs$$

$$\mathbf{10}\ tractors * \mathbf{80}\ hours = \mathbf{800}\ \boldsymbol{hours}$$

$$\mathbf{800}\ hours * \frac{\$\mathbf{230}}{hour} = \$\mathbf{184,000}\ applicator\ costs$$

$$\$\mathbf{62,382.19}\ seed\ costs + \$\mathbf{184,000}\ applicator\ costs = \$\mathbf{246,382.19}\ \boldsymbol{TOTAL\ COSTS}$$

Option 2: Aerial Seeding

$$\frac{\mathbf{15}\%\ purity * \mathbf{90}\%\ viability}{100} = \mathbf{13.5}\%\ PLS$$

$$\mathbf{20,000}\ acres * \frac{43{,}560\ ft^2}{1\ acre} * \frac{\mathbf{3}\ PLS}{1\ ft^2} = \mathbf{2,613,600,000}\ PLS\ needed$$

$$\frac{\mathbf{4,500,000}}{1\ lb} *. \mathbf{135}\ PLS = \frac{\mathbf{607,500}\ PLS}{1\ lb}$$

$$\mathbf{2,613,600,000}\ PLS\ needed \div \frac{\mathbf{607,500}\ PLS}{1\ lb} = \mathbf{4,302.22}\ lbs\ of\ seed\ needed$$

$$\mathbf{4,302.22} * \frac{\$14.50}{lb} seed * \mathbf{1.5}\ seeding\ rate = \$\mathbf{93,573.29}\ seed\ costs$$

$$\mathbf{1}\ aircraft * \mathbf{10}\ hours = \mathbf{10}\ \boldsymbol{hours}$$

$$\mathbf{10}\ hours * \frac{\$\mathbf{15,000}}{hour} = \$\mathbf{150,000}\ applicator\ costs$$

$$\$\mathbf{93,573.29}\ seed\ costs + \$\mathbf{150,000}\ applicator\ costs = \$\mathbf{243,573.29}\ \boldsymbol{TOTAL\ COSTS}$$