Determination of Plant Cover in Field Sampling

Introduction to Basics and Best Practice

Assessment of Plant Community Reconstruction Success

- Measurement of Plant Abundance is usually a prominent approach (along with some evaluation of Species Diversity).

Measures of Plant Abundance

- Density (no. of plants per unit area)
- Forage or biomass production (kg / ha, lb /ac)
- Cover

Cover

The Misunderstood Plant Measure

What’s to Misunderstand?

Everyone knows its just how much green stuff is in the way of seeing the ground ----- Right?

Right --- Just like everyone knows what weight is -- its just how heavy stuff is.

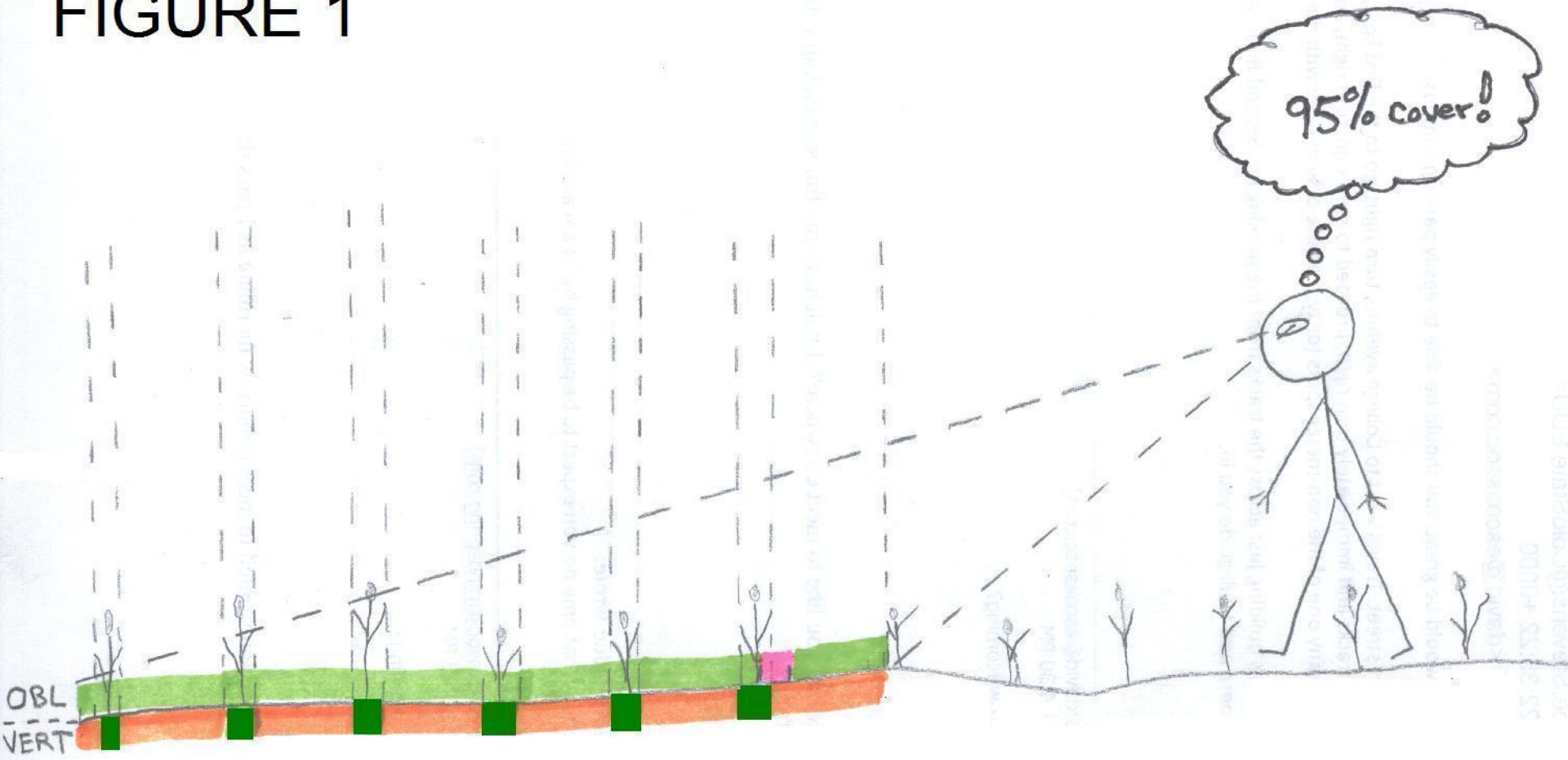
Importance of Standardized Measures to Modern Life

Plant Cover *(as a repeatable measure)*

A VERTICAL projection of naturally standing plants onto the ground.


BA10
PAR17

FIGURE 1



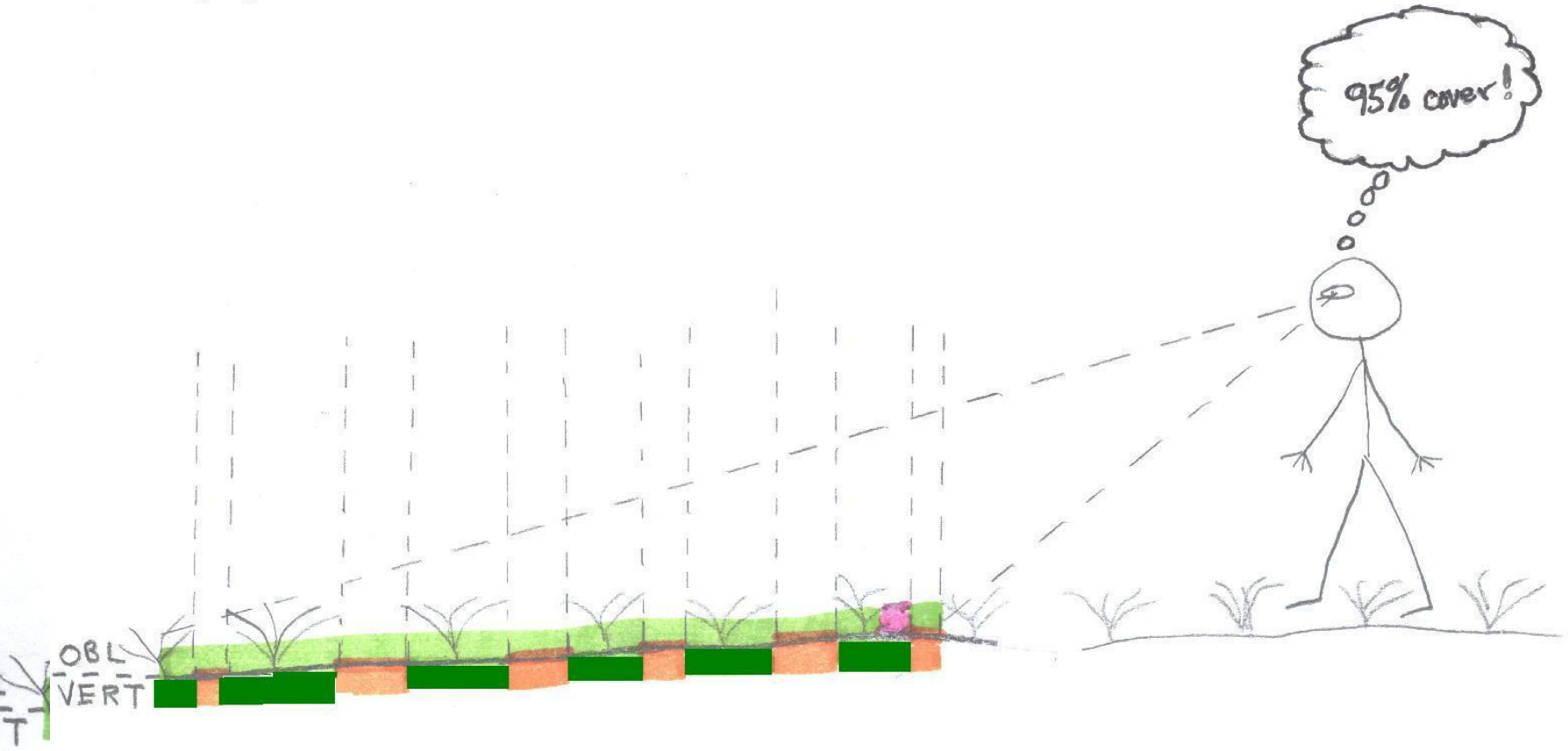
Actual [vertical view] Cover = 25%

Apparent Vegetation Cover [oblique view]

Bare Ground in Vertical View

Bare Ground in Oblique View

FIGURE 2



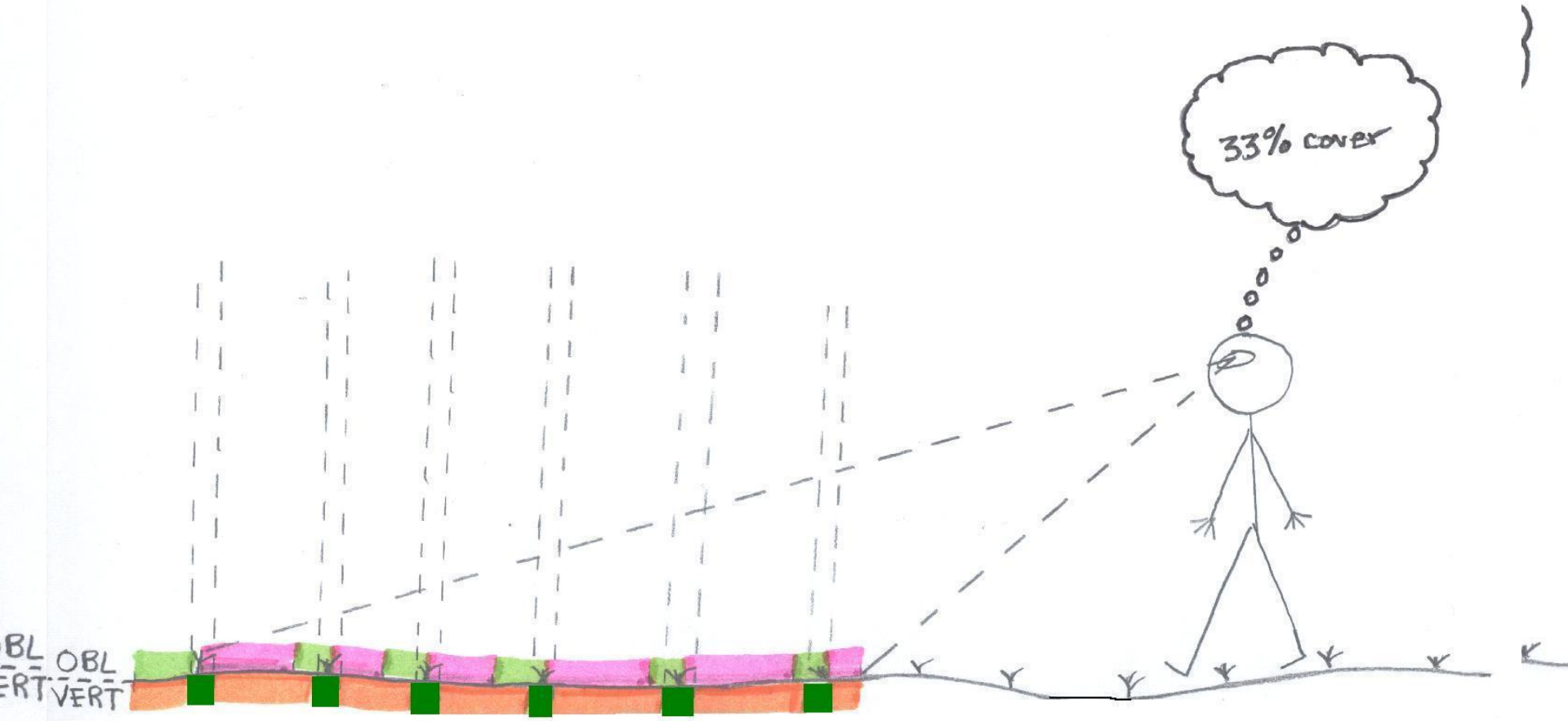
Actual [vertical view] Cover = 62%

Apparent Vegetation Cover [oblique view]

Bare Ground in Vertical View

Bare Ground in Oblique View

FIGURE 3



Actual [vertical] Cover = 19%

Apparent Vegetation Cover [oblique view]

Bare Ground in Oblique View

Bare Ground in Vertical View

How do we measure (vertical) plant cover?

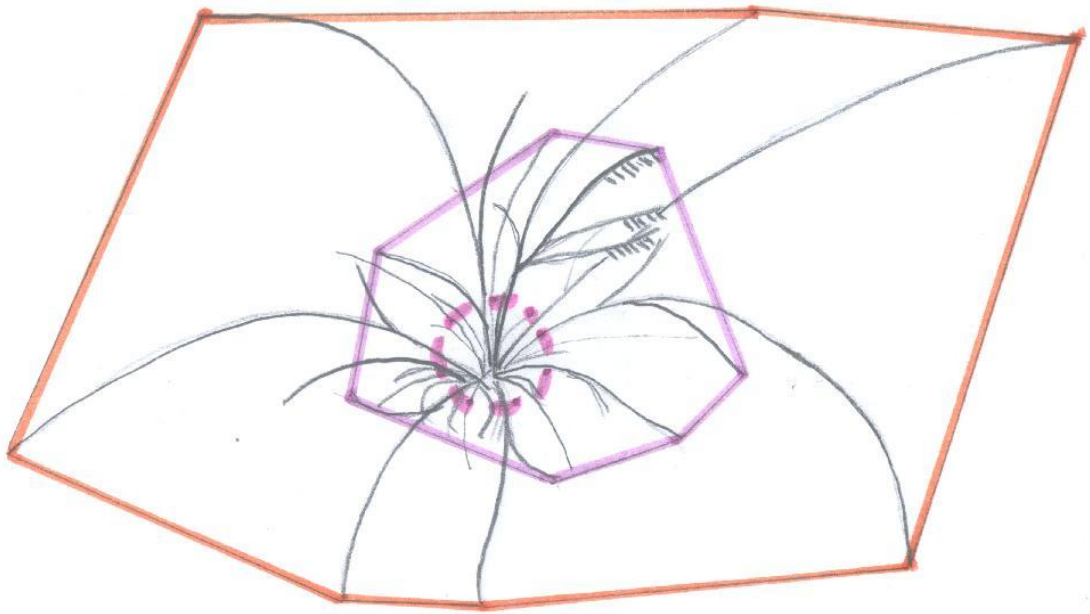
- Eye-ball (ocular) guess of percent cover, usually in plots
- Eye-ball guess / measure of interception of a projected line with plant parts (line intercept)
- Measurement via interception of projected points (point intercept)

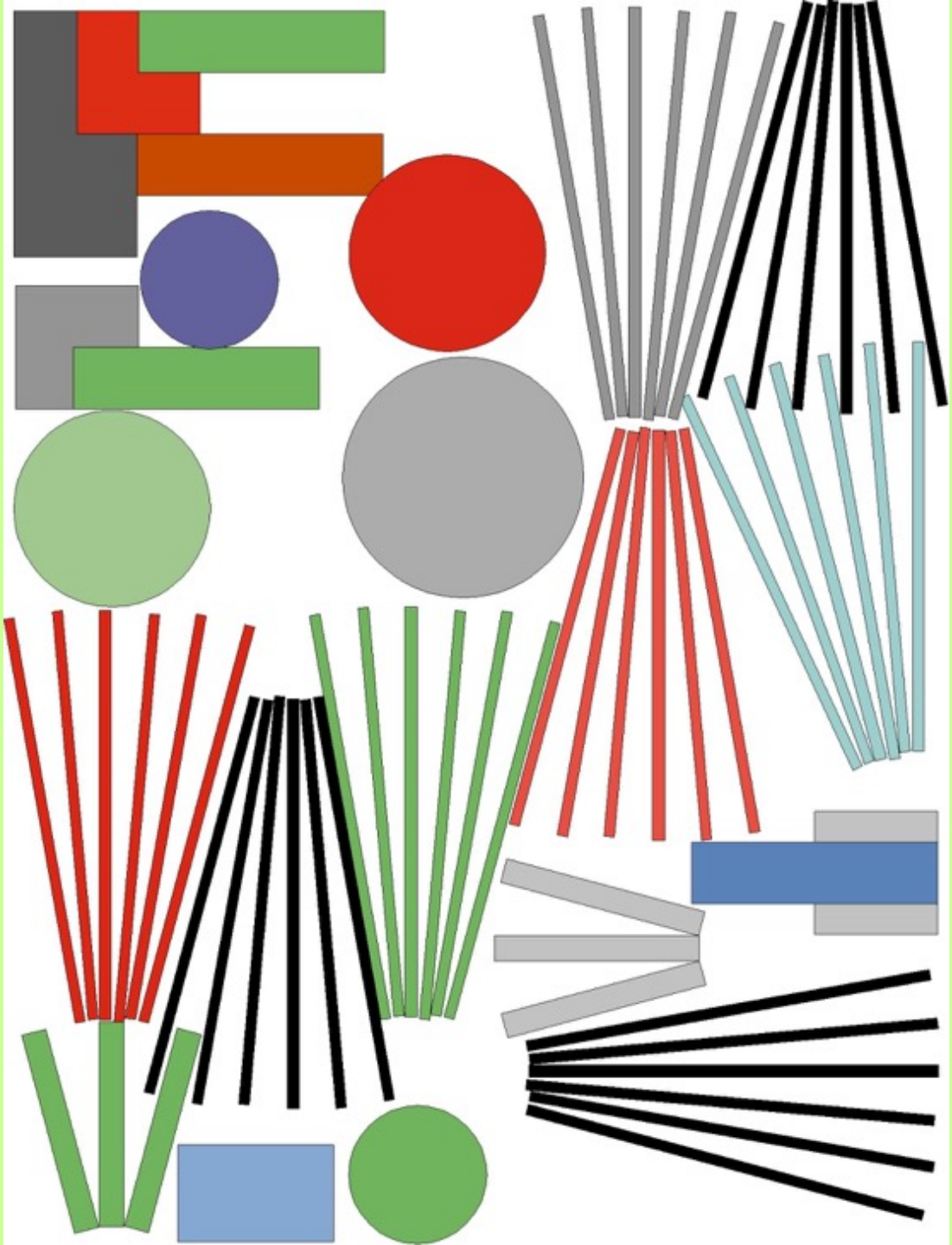
Eye-ball (ocular) Estimation of Cover

- Vertical perspective must be maintained
- Eye is asked to compress the 3D plant to 2D
- Eye/brain is asked to integrate a very irregular shape to a percentage determination
- Some observers use simplifying rules via mentally-constructed polygons

FIGURE 4

Possible Polygons Mentally Constructed to Approximate Canopy of a Grass:



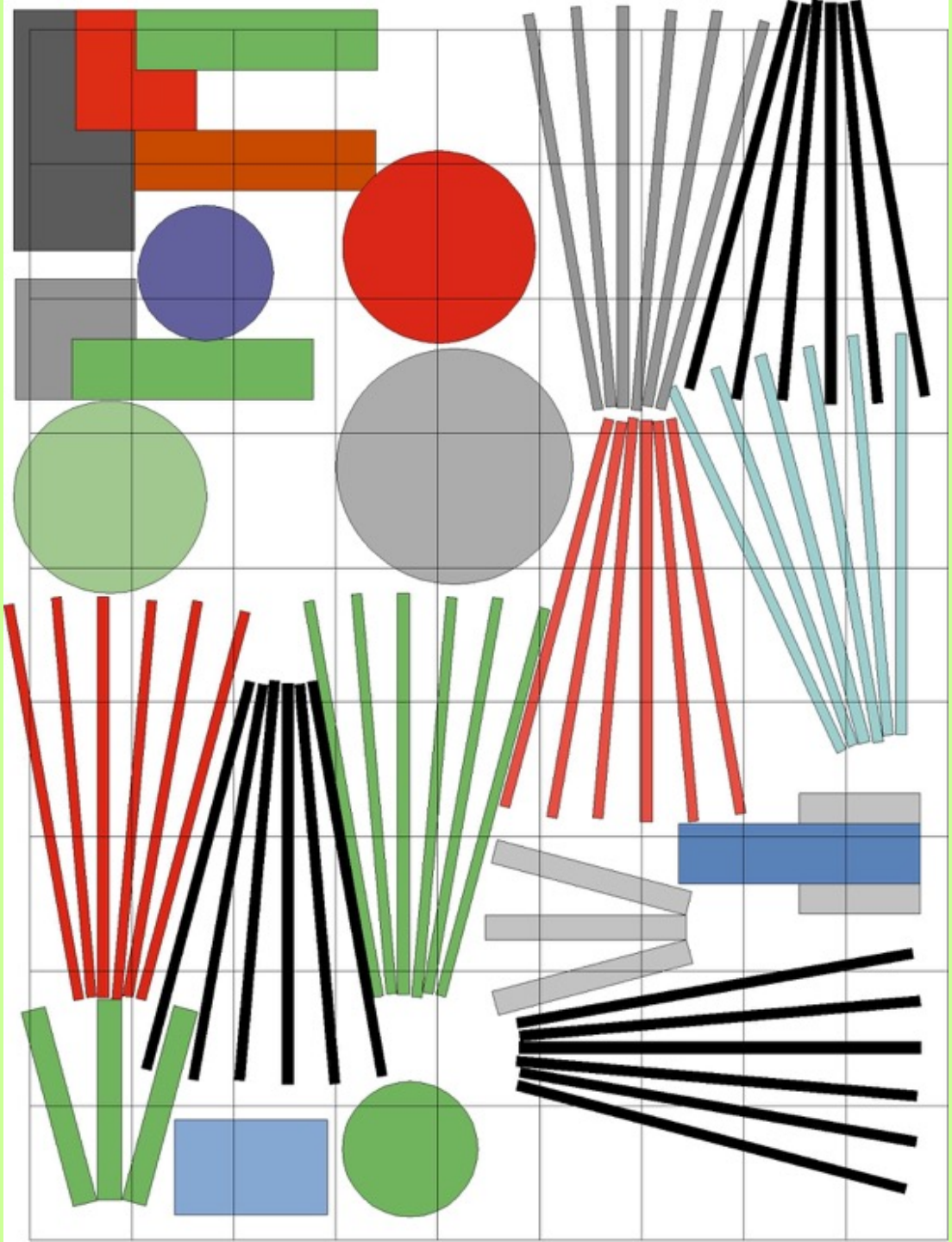


Eye-ball Guesses

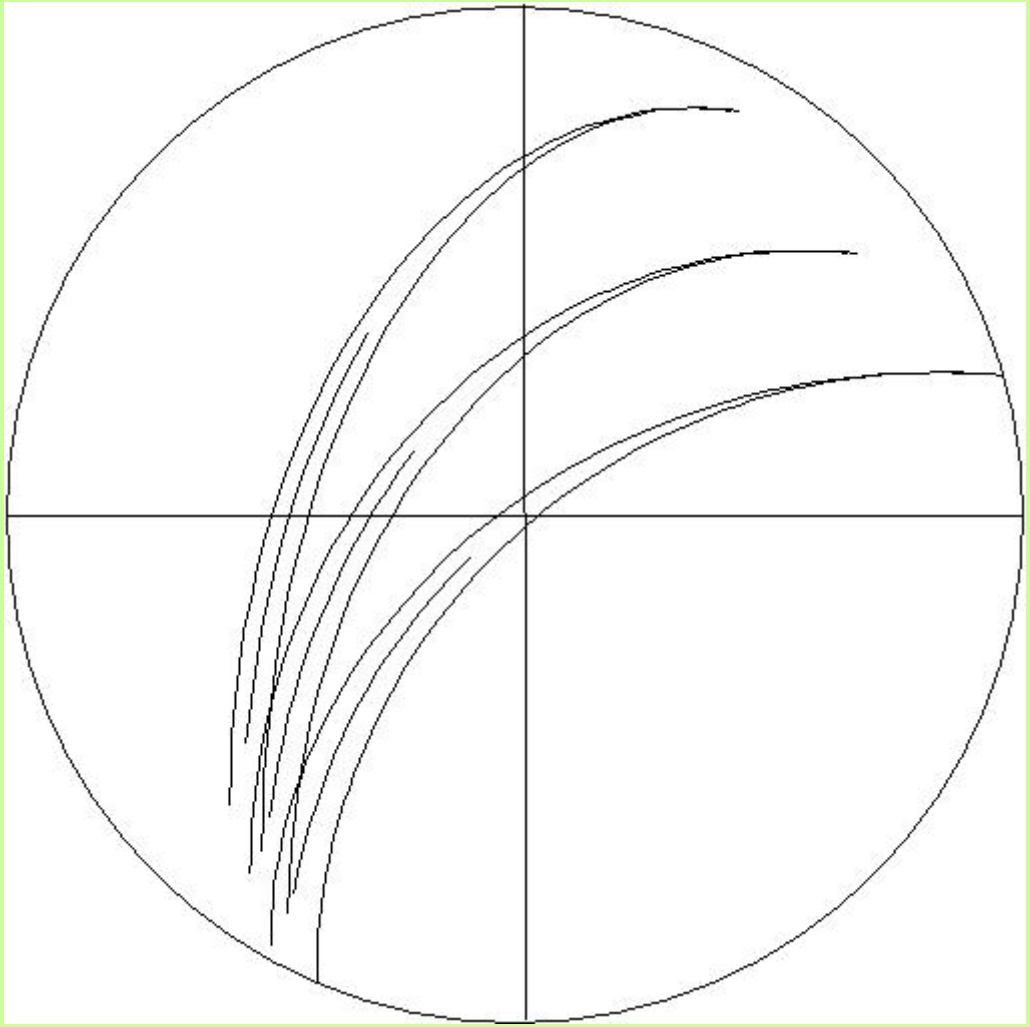
- Almost always done as Canopy cover
- Foliar Cover is just too hard
- But again what is the “canopy”
- And estimates to single percent or in Cover Classes?

Point Intercept Cover Measures

- Reduces plot size to as near zero as possible
- Only two possible cover values, 0% or 100%
- Points must be nearly dimensionless
- Points must be rigidly and objectively projected




SLIK
RELEASE
LOCK



So just why is it so important to have accurate and repeatable measures of plant cover?

- In academic studies -- this may or may not be of critical importance
- HOWEVER for :
- Long-term monitoring - Very important
- Revegetation Performance Standards - Very important

Revegetation Performance Standards

- This is an area of major misunderstanding about plant cover that has two parts
- Partly this relates to unrealistic or inexperienced views of plant cover in undisturbed sites.
- Part relates to confusion of Absolute Cover versus Relative Cover.

Caution in Use of Point Intercept

How Many Ways can it be Poorly Done and what are the Consequences

Mistakes that Can Nullify the point intercept advantage

- Points too large – need to be nearly dimensionless to avoid decisions about hit or miss
- Points that can be directed by observer -- allowing choice of hit or miss – hand-held sticks or pins or lasers are highly questionable on this point

Historical

- Painted Boot Tip – Step Point Method
- Parker Three-step Method
- Any contrivance in which points are not nearly dimensionless and where the points can be subjectively placed
- Any method in which the point is only vaguely identified (leaving the decision to the operator as to what was intercepted or not).

Pin Flag Dropping

- In current times, Point Intercept sampling is very commonly attempted (*especially by certain large gov't agencies*) using pin flags "dropped" along a tape.
- It is difficult to be politic in suggesting just how far this method strays from the technical requirements of point intercept sampling.

Advantages of the Optical Point Projector

Compared to other techniques

Advantages

- Extremely small point (0.07 mm diam.)
- Rigid vertical projection (up or down)
- Built-in instant leveling when used with pistol-grip panhead
- Treats all plant strata equitably from tree-tops to ground layer
- Superior objectivity and repeatability

Advantages *[cont'd]*

- Rapid Data Collection -- Two points per tripod placement (50 cm left, 50 cm right)
- Instant leveling
- Minimal bending and stooping
- 5X magnification built in to view to allow quick tally and species ID
- Data collected away from trampled table lay-down line

Other Important Nuances of Cover

Absolute vs. Relative Cover

- Direct measures discussed above result in Absolute Cover data - the proportion of the ground surface covered by live plants
- Relative Cover is a comparison to [i.e. proportion of] total vegetation cover.

Relative Vegetation Cover

- Conventionally, RC is the proportion of the vegetation cover comprised by a particular species
- And of course, values for species in a given sample total to 100%

Regulator's "Cover"

- Some regulators unconsciously use the term "cover" to mean a proportion of the pre-existing vegetation cover.

Regulator's "Cover" [cont'd]

- 70% cover as a performance standard may mean that the required absolute cover is 7/10 of the pre-existing absolute cover.
- In some cases, a performance standard may require 70% "native" cover which may mean 70% absolute cover by native species ---- or it may mean that 7/10 of whatever vegetation cover develops must be native.

Regulator's "Cover" [cont'd]

- The point here is that Performance Standards involving plant cover must be very specific and well thought - through.
- Always know whether absolute or relative cover is being assumed
- Always do a "reality check" to ascertain whether what is specified is possible.

Regulator's "Cover" [cont'd]

- Since levels of pre-existing vegetation are so frequently at issue, either solid baseline data or a suitable Reference Area must be specifically addressed.

Pre-Existing Vegetation Cover

- Cover on a particular site can vary from year to year by a factor of more than 3X.
- Hence baseline data are at risk of over- or under-estimating appropriate cover in subsequent years.
- Reference area vegetation cover “bobs” like a cork as the waves of ecological possibility change the possible levels of plant cover.

Questions?