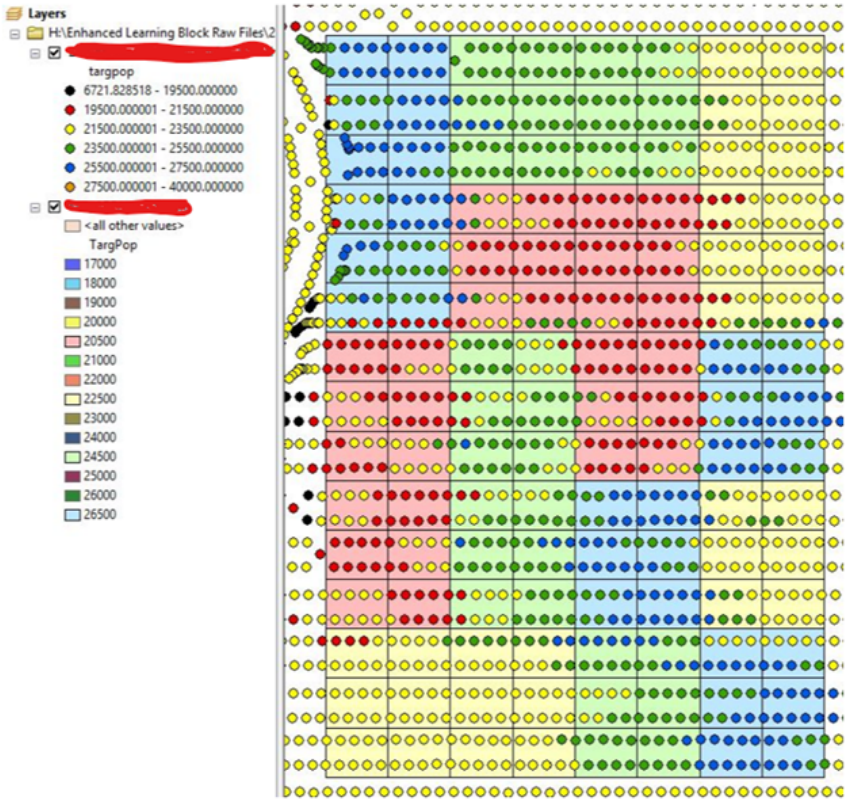
ELB Best Practices - what to avoid and why

If as-applied execution leaves us with a questionable amount of valid data and requires more extensive review, we set it aside to revisit after we are caught up on well executed ELBs. Such cases typically take more time to process, and can create hurdles in the automated workflow. They can also require more deliberation and manual work for quality control. Designating them as low priority allows us to process well executed ELBs in a timely manner and meet our goal of delivering (priority) reports in a 10 business day timeframe after loading yield. The scenarios in this document offer more detail on how this can happen, and what to avoid.

Failure to meet experiment design

We are most likely to designate an ELB as low priority if the experiment design is not technically met, as these scenarios are the most preventable (though we understand not always avoidable).

Execution in the wrong direction:



Executing an ELB in the opposite direction as designed often allows less runway for the planter/applicator to adjust. If the equipment still manages to quickly change rates in and out of replicates and there is a sufficient amount of valid as-applied data, we would disregard the direction and consider the ELB well executed.

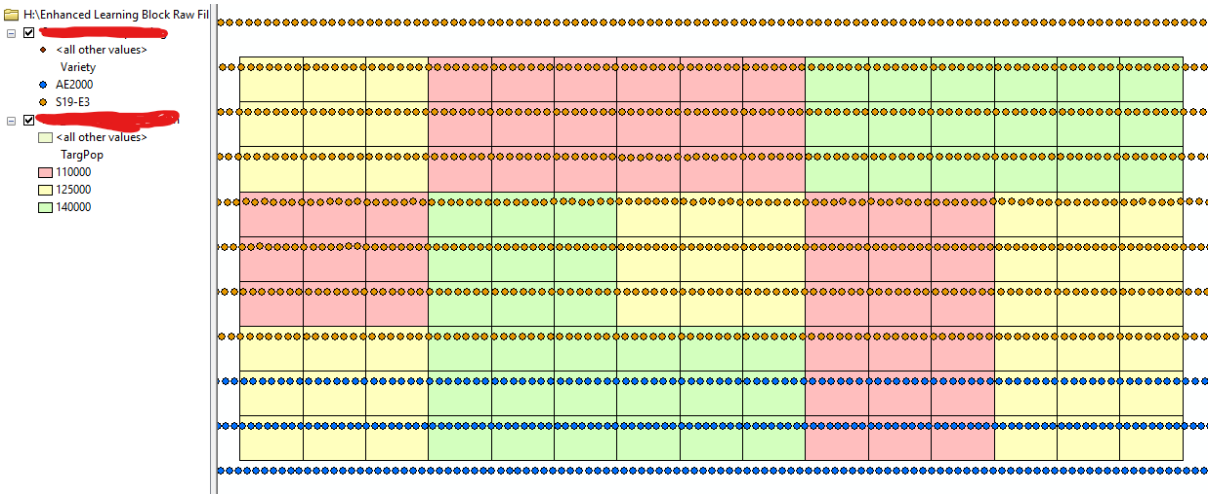
Application at an angle to ELB:

Applying at an angle to the ELB also makes it less likely for equipment to hold the target rate in the required runway. The more drastic the angle is to ELB orientation, the more likely it is to affect rates. It is less of an issue if rates are reached relatively well, but it can be a contributor in our determination. We understand direction can also be hard to predict at times.

Placement in headland:

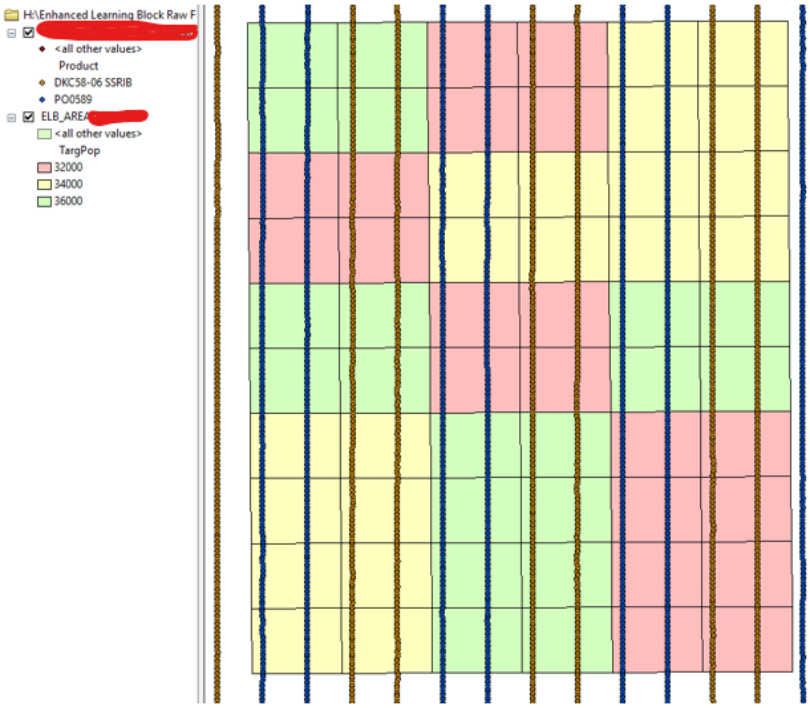
Placing ELBs in the headland can be hard to avoid, as it can be difficult trying to fit ELBs in one management zone. If it significantly impacts execution, it will still have to be placed in low priority unfortunately. This particular example effectively disqualifies four replicates, which is enough to place it on the cusp of being processed at all (a couple replicates not in the headland were also not executed, which doesn't help).

Multiple varieties (or seed treatments)



If the vast majority of data contains one variety, it will stay in high priority. The only exception would be non-plant population ELBs - this is because it is typically more difficult to map which variety is assigned to which applicator passes and thus has to be done manually. If there are multiple varieties in a nutrient, fungicide, lime, or custom ELB, that trial will immediately be designated as low priority.

If an ELB is split planted (without being appropriately designed with a doubled footprint), it will not be processed. This is because we are only left with half the desired footprint when analyzing each separate variety/treatment:

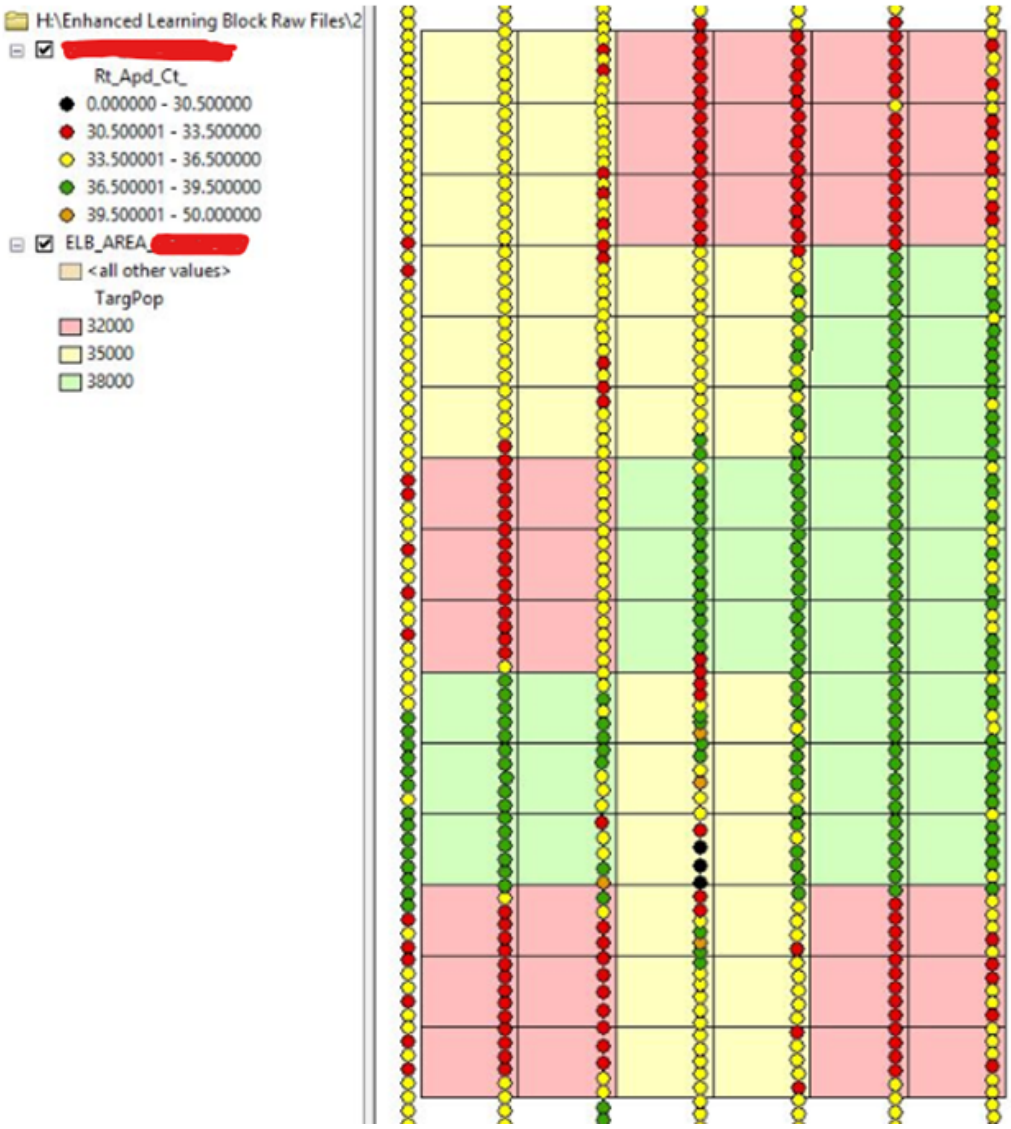


Incorrect applicator width entered vs what was used:

Discrepancies in implement width can be an issue when a larger implement width is used than what was entered in ELB creation, as it leaves us with fewer applicator passes per replicate. It can also, in some cases, result in empty replicates.

Equipment and performance related issues

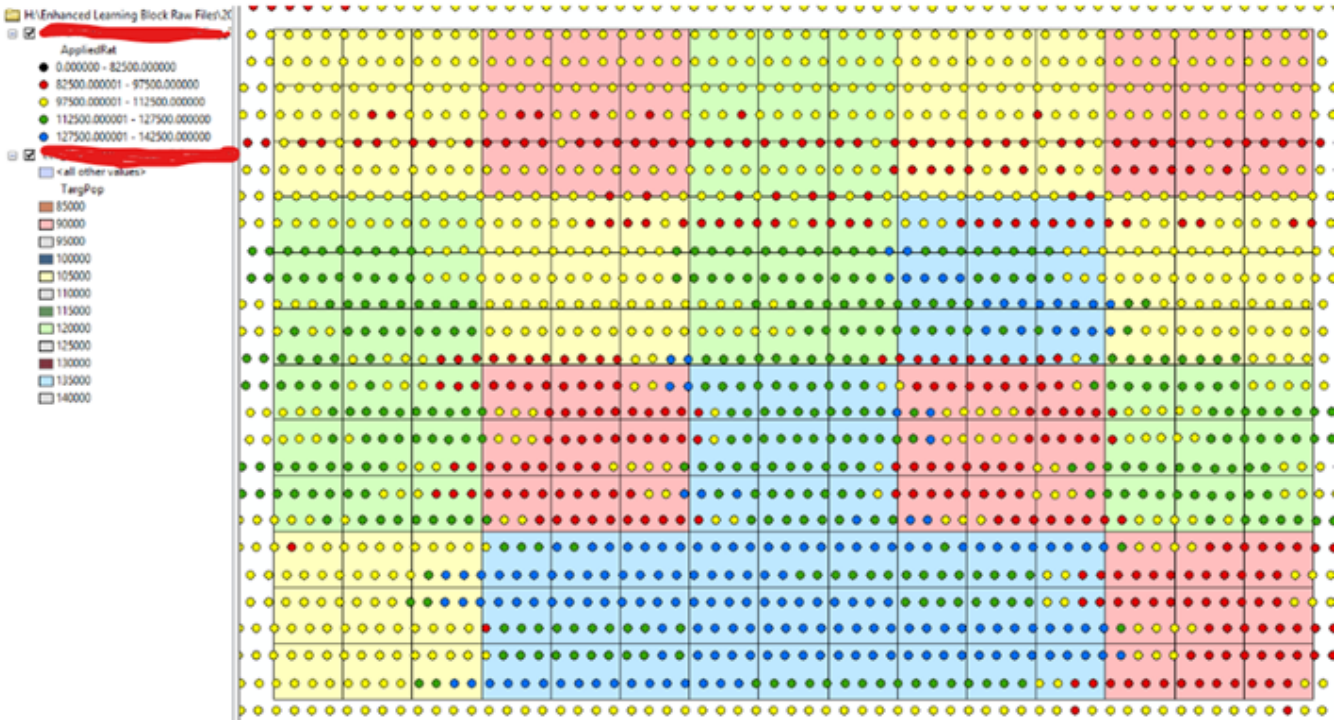
<u>Guidance line off/planter reporting at edge of replicates:</u>



Improper alignment is also something we understand often cannot be helped. Though it is sometimes out of your control, it does affect execution - the closer the centerline is to the edge of the replicate, the more “mixed” rates we’ll have as a result. This particular example is one that largely depends on harvest - if harvest passes straddle planter passes, it gives more leeway as we have more harvest data per applicator pass.

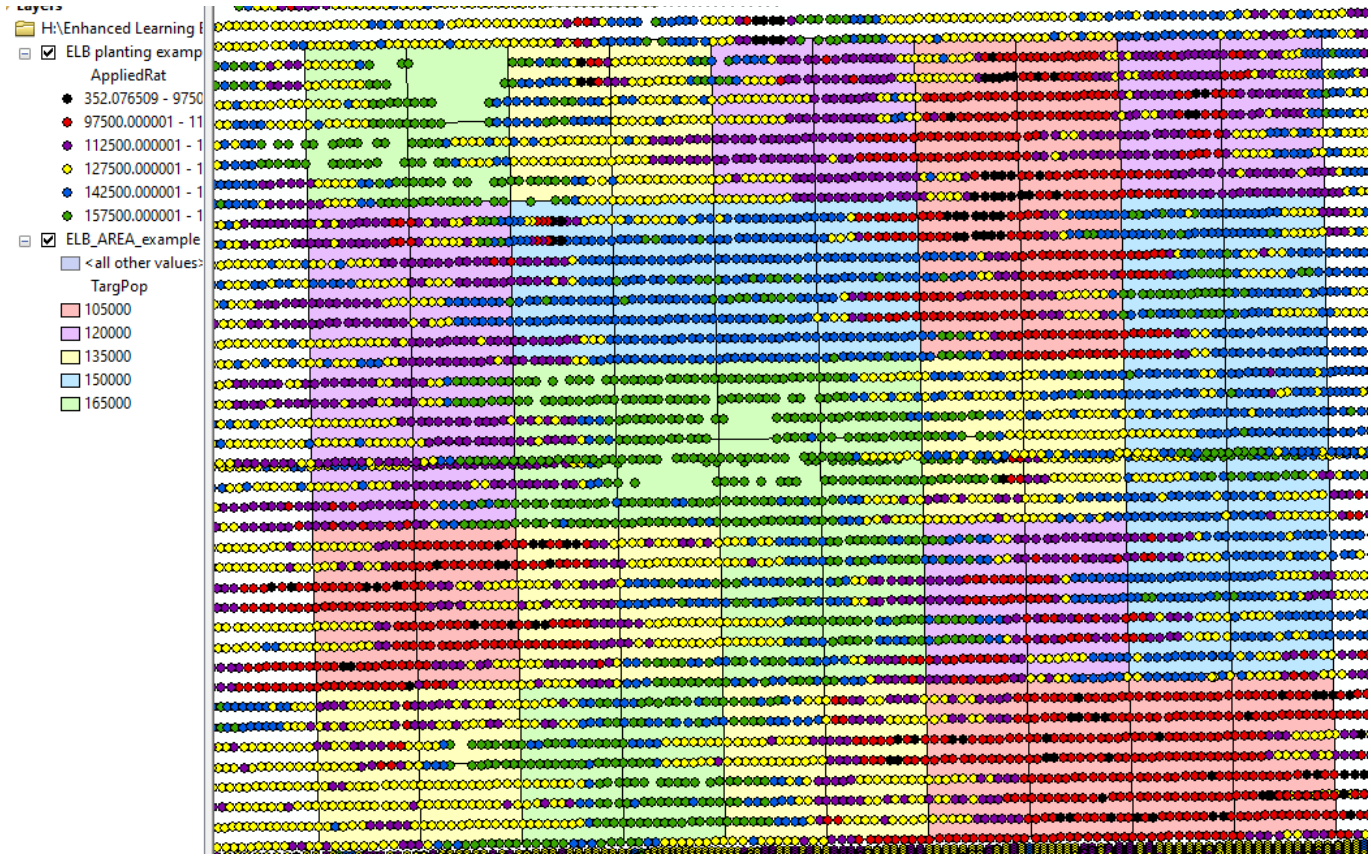
If you know which side of the field or guidance line your application will be based off of, it helps to try to create your ELB so that it has full-width cells along the guidance line boundary. Grid orientation can be manipulated with pin placement and heading as well. Application section control and equipment size are also factors. If unsure of what approach to take with your fields, consult your account manager.

Imprecise look ahead settings:



This varies by ELB type and equipment, and may require some trial and error from year to year. A 0 second look-ahead is typically appropriate for planting, as planting technology can more easily handle rate changes. Dry fertilizer ELBs would likely need the longest look-ahead at around 3 seconds.

Poor rate execution/high fluctuation in rates:



How well rates are reached, held, and recorded likely varies by equipment. It is possible speed also plays a factor. The example above is especially spotty and, thus, inadequate to analyze all five rates. If you notice this happening frequently with a particular grower or set up, you can try creating larger gaps between rates in the future - 10,000 to 15,000 sd/ac for soybeans, 1,000 - 2,000 sd/ac for corn. When rates are placed too close together, we often have to remove middle rates.

Other scenarios

- Target rates needing to be adjusted - this largely depends on whether rates are reached and held well. If it is a simple scale factor or flat increase/decrease for all rates, the ELB would still be considered well executed.
- Removal of rates - happens if there is an insufficient number of valid replicates for a rate (we typically need at least three per rate), whether rates aren't adequately reached or replicates are removed for other reasons aforementioned in this document
- ELB fields merged or split *after* the trial was created.
- Proper as-applied received after deadline (August 1st) - **these go to the very bottom of low priority ELBs**

NOTE: Not all of these factors necessarily disqualify an ELB from being successful/high priority. It's dependent on how much valid as-applied data we have left after conducting quality control. For example, if only one out of ten planter passes in an ELB contain a different variety, we still likely have plenty we can work with (assuming rates are reached appropriately). We understand some of these things can't be helped and try to factor that in.

We try to squeeze anything we can out of an experiment, and this is especially true for low priority ELBs - if you go to the trouble of conducting an experiment, we try to salvage something if at all possible. We just don't like to let the "borderline" cases take precedence over those with more ideal execution.

Lastly, how well an ELB is executed is dependent on harvest execution as well (harvesting in-line with planter/applicator or straddling planter/applicator passes help). Higher resolution data can provide more margin for as-applied error - 0.5 Hz is the absolute minimum, but 1 to 5 Hz is ideal. Upon reviewing as-applieds only, we determine a priority level with the assumption that yield data will be 1 Hz, as that is most common. Status and/or priority level is subject to change if resolution is different than expected.