

A B.A.D. Presentation

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Alabama Soil and Water Conservation Committee



A “B.A.D.” Presentation

(Another way to look at erosion control on a construction site.)

- What would be the number one reason most of the general public think that sediment is leaving a construction site?



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(Another way to look at erosion control on a construction site.)

- What about the educated public?
- Professor James McClintock, Marine Biologist at UAB, in his book *A Naturalist Goes Fishing*, states:
- “Siltation in the Cahaba River is the result of erosion from timber clear cuts, coal mining, and **construction sites with improperly maintained siltation fences**”.



A “B.A.D.” Presentation

(Another way to look at erosion control on a construction site.)

- Are most people (maybe not us, HA) seeing the real problem or just the symptom?



A “B.A.D.” Presentation

(Another way to look at erosion control on a construction site.)

- Bare
- Acre
- Day



Definition of B.A.D. and a B.A.D. Tool

- An acre left “bare or unprotected” at the end of a workday is a Bare Acre.
- Bare Acre Day is a day in which an acre of land is left bare or uncovered.
- To utilize our B.A.D. Tool, bare acres are estimated at the end of a workday especially when bare areas change on the construction site.
 - Vegetation removed from an area
 - Areas once bare are now covered



B.A.D. min and max

- Every project has a maximum number of bare-acre-days.
 - For example: A 10-acre project that has a construction period of 1 year (365 days). Nine acres of the site on average are left bare for the 1 year. The maximum total B.A.D. of the site would be **3,285** (9 X 365). The B.A.D. could be reduced by limiting clearing acreage, cover areas with buildings and roads, or establish areas to vegetative cover.
- Every project has a minimum number of bare-acre-days.
 - For example: If a project requires all exposed ground to be “covered” at the end of each day, then the construction site has a minimum total B.A.D. of **0 (zero)**.

Main Principles of Erosion Control

- **Minimize the area disturbed** by leaving existing vegetation that does not have to be removed.
- **Minimize the time of exposure** by shortening construction periods and staging a project when possible.
- **Sequence installation** in a manner that supports shortened construction periods and permits the use of temporary and permanent seeding when the practices can be most effective.

We can control these.

5 Pillars of Construction Stormwater

Management

(Barry Fagan)

(In order of Importance)

- Communication
- Work
- Water
- Erosion
- Sediment

All efforts to convey information among project stakeholders to increase effectiveness in project planning, design, and implementation. Measures and Practices may incorporate written or verbal interaction and operational systems and behaviors to effectively convey necessary information.

All operational efforts to ensure that work proceeds in a manner that is protective of the owner's interests and environmental responsibilities.


Measures and Practices incorporate prescribed operational practices and selected work methods, sequencing, and scheduling for enhanced water quality protection.

All efforts that address the flow of waters through the project to protect the work area and minimize the work of managing erosion and sediment. Measures and Practices address construction-related surface waters such as runoff, run-on, flow-through, and dewatering effluent.

Barry Fagan quote – “we can start out by focusing on sediment, but sooner or later we’ll be forced into walking through the five pillars – we’ll be communicating with the regulators, attorneys, and reporters and telling them how we’ll be managing our work differently in the future...”

“Green is Good and Sediment S___s!”

E&SC

- So what are we really trying to accomplish with Erosion Control and Sediment Control?

- Shouldn't it be doing whatever it takes to **Minimize Erosion** and **Capture Sediment**?
- According to many, “If you are mainly trying to control (capture) sediment, you are losing the battle.”
- Another Barry Fagan Quote “Sediment control alone is ineffective.”
- According to Dr. Rich McLaughlin “Groundcovers reduce erosion by 90%”
- So, if you are serious about protecting the environment downslope or downstream from your construction:
 - **EROSION CONTROL** is where the emphasis should be.
(That is, after you have covered Communication, Work, and Water.)
 - Then, Sediment Control is much easier.

How do you Minimize Erosion?



- First, stop or minimize splash and sheet erosion (also called interrill erosion).
- Interrill erosion is the “beginning” of the erosion process, and is caused by:
 - **Splash Erosion** that occurs when the raindrop impacts the bare soil surface and dislodges soil particles, and
 - **Sheet Erosion** that occurs either after the surface of the soil is saturated or the rainfall exceeds the infiltration rate of the soil. Then the soil detached by splash erosion and the additional soil particles detached by runoff/overland flow move downslope.
- Processes effecting “soil splash”
 - Intensity and duration of rainfall,
 - the amount of exposed soil, and
 - the structural stability of the soil.

**The only thing we can control is
“the amount of exposed soil
and the time it is exposed”**

Penn State Extension



Soil erosion is still taking its toll in Pennsylvania but can be addressed by using proper management

let's put them to work!

1. Combating interrill (sheet) erosion

Sheet erosion is a term we still use, but in reality, it is very rare to see erosion taking place in sheets. In the real world, erosion

starts when raindrops impact the soil, where it disperses aggregates, followed by very shallow runoff carrying it to rills of concentrated flow. **Eliminating what is called interrill erosion is the first and most important wall of defense.** The best thing farmers can do to eliminate interrill erosion is to **keep soils covered with mulch or living vegetation.** Keeping soils covered breaks the kinetic energy of raindrops, protecting soil aggregates from disintegration and the soil from sealing up. The cover also helps slow down runoff so water has time to infiltrate. This cover is also called 'armor'. To achieve continuous cover, it is highly desirable to use no-tillage and plant cover crops to compensate for insufficient cover from residue. The organic residue is also the food source for soil organisms that, with the living roots of plants assist in improving soil aggregation and macro-porosity so water can infiltrate quickly into the soil. Solid manure (or manure with solids) can be added as another way to improve soil organic matter and biological activity to improve soil aggregation and infiltration capacity.

Eliminating what is called interrill erosion is the first and most important wall of defense.

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So, How do you Minimize Erosion?

- Keep as much of your site covered at any one time as possible.
- “Covered”
 - Maintain or protect existing vegetation (DO NOT DISTURB)
 - Establish vegetation (seeding or sodding) with good coverage (Make it green)
 - Properly install other practices that cover the soil surface:
 - Erosion Control Blanket
 - Mulching (Straw or HECs)
 - etc.
 - Final landscaped areas.
 - Concrete, asphalt, aggregate, etc.
 - Buildings or structures.
 - NOT BARE GROUND!!!!
- To keep it simple, covered areas of the construction site are either “GREEN” or “GRAY”.

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Bare Acre Days

- There are several ways you can look at B.A.D.'s
 - Bare Acres for a single day
 - Bare Acres associated with cut or fill slopes
 - Bare Acres associated with all other surfaces (not cut or fill slopes)
 - Average B.A.D. for the construction site
 - Maximum B.A.D for the site
 - Total Bare Acre Days for the project
 - Bare Acre Days per Acre of development.
 - B.A.D. trends
 - How do B.A.D.s relate to seasonal rainfall and planting dates?
 - Etc.

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Here's a B.A.D. Tool (ver 1.0)

(thanks Mac Nelson)

		INPUT TABLE FOR BARE ACRES			From Date		Total Bare Acre Days	
		Date	Cut /Fill Slopes Ac.	All Other Ac.	To Date		Bare Acre Days per Acre	
Date this project updated		5/31/2021			9/15/2020		5,906	
Project updated by		PL Oakes			3/31/2021		148	
County		Lee County						
Total Job Site Acres		First day of project year						
40		1/1/2020						
Start Date								
9/15/2020								
End Date								
3/31/2021								

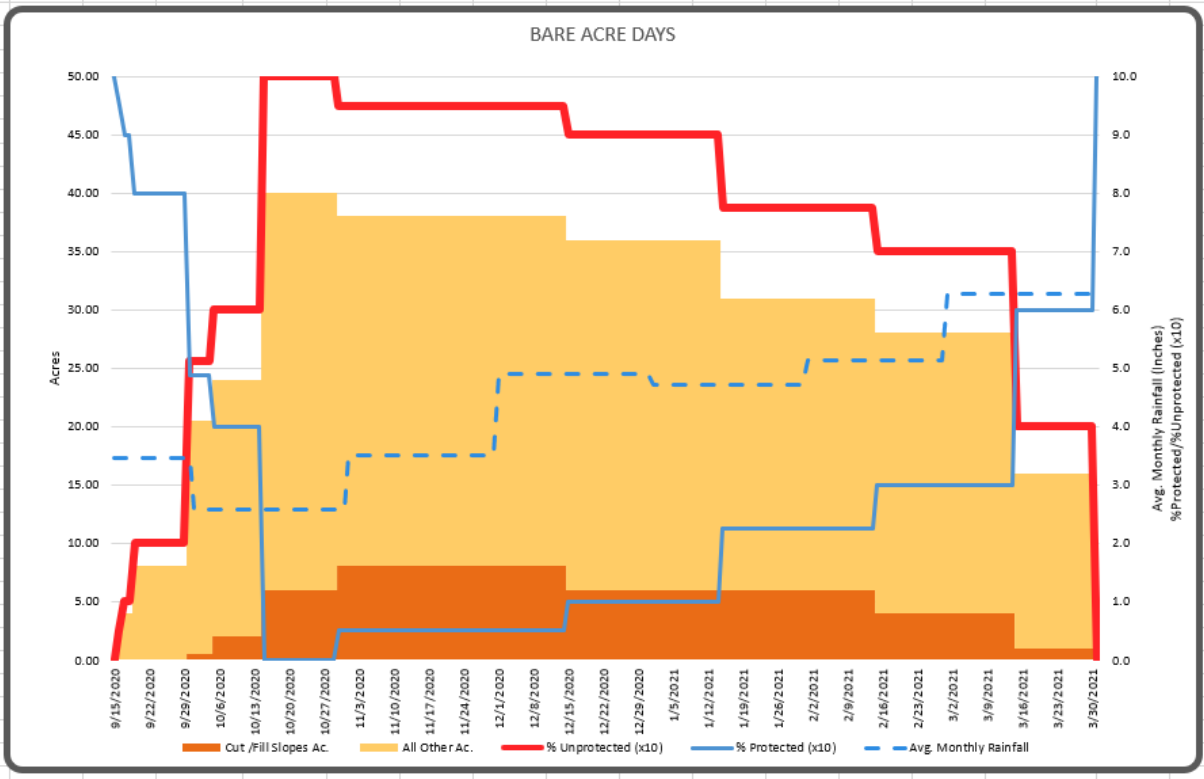
GENERAL INSTRUCTIONS

The purpose of this program is to assist the user (planner/contractor/owner) manage site work in a manner that will minimize erosion and sediment production during construction. Erosion and sediment production are minimized when the disturbed bare acres, and the time period that they are bare, are minimized. Good erosion control is achieved when disturbed areas are vegetated (temporary or permanent) as soon as possible after disturbance. Cut and fill slopes are generally more susceptible to erosion due to steeper grades and the degree of disturbance. The program allows the daily entry of the number of disturbed bare acres as construction progresses. The bare acres are compared to the "Total Job Site Acres" to determine the percentage of the job site acres that are protected. "Average Monthly Rainfall" amounts are included to indicate those months when erosion control is likely to be most critical. It is intended that the user make daily, or at least frequent, entries into the Input Table in order to track the progress of his erosion control operations. The data could also serve as documentation of his operations should inquiries be made at a later date.

GRAPH INSTRUCTIONS

The graph is automatically generated as data is entered into the input table. The "Start Date" and "First Day of Project Year" must be entered in the appropriate cells in order for the graph to be accurate. The horizontal and right vertical axis should not be modified or reformatted. The left vertical axis (Acres) may be formatted to provide a more readable range of acres. For instance, if the "Total Job Site Acres" are 15, a maximum value for the Acres axis of 100 would compress the vertical scale of the graph to a height that would be difficult to read. The Acres axis may be reformatted by clicking on the axis values in the graph to select the axis. The axis values will be surrounded by a box. Right click in the

- Can be used by:
- Planners
 - Designers
 - Project Engineers
 - Project Inspectors
 - Regulators



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The Spreadsheet (Tool) **does not** look at,

- Rill erosion,
- Gully Erosion, or
- Mass movement (streambank, landslides, etc.).
- Nor does it calculate tons of erosion.

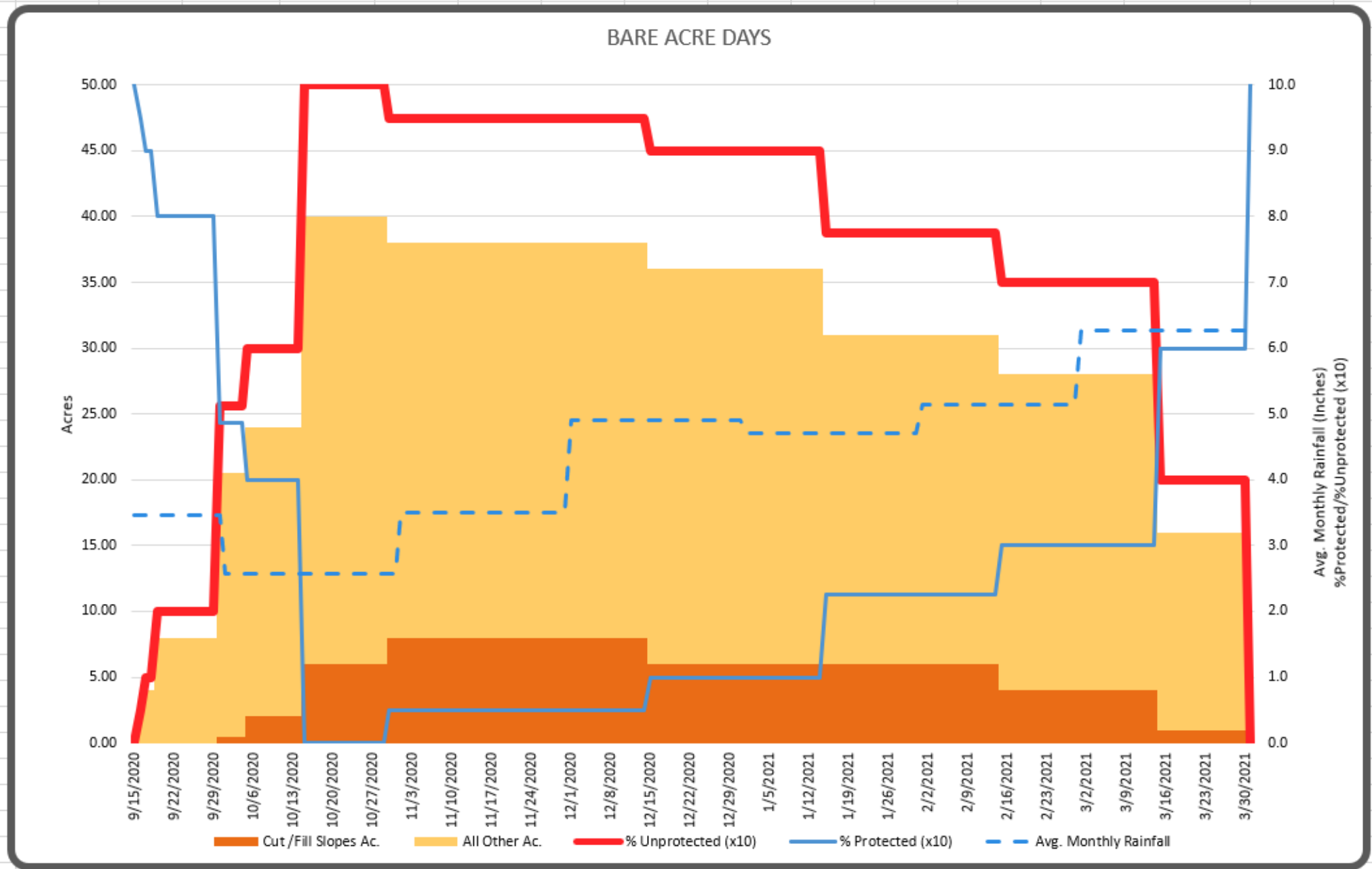
The Spreadsheet **ONLY** looks at,

- The Bare Acres on a construction site over time.

PROJECT	Example Project							
Date this project updated	5/31/2021					INPUT TABLE FOR BARE ACRES		
Project updated by	PL Oakes					Date	Cut /Fill Slopes Ac.	All Other Ac.
						9/15/2020	0	0
County	Lee County					9/16/2020	0	2
						9/17/2020	0	4
	Total Job Site Acres		First day of project year			9/19/2020	0	8
	40		1/1/2020			9/30/2020	0.5	20
						10/5/2020	2	22
	Start Date					10/15/2020	6	34
	9/15/2020					10/30/2020	8	30
						11/15/2020	8	30
	End Date					11/30/2020	8	30
	3/31/2021					12/15/2020	6	30
						1/15/2021	6	25
GENERAL INSTRUCTIONS						1/30/2021	6	25
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						2/30/2021	2	20
						3/15/2021	1	15
						3/31/2021	0	0

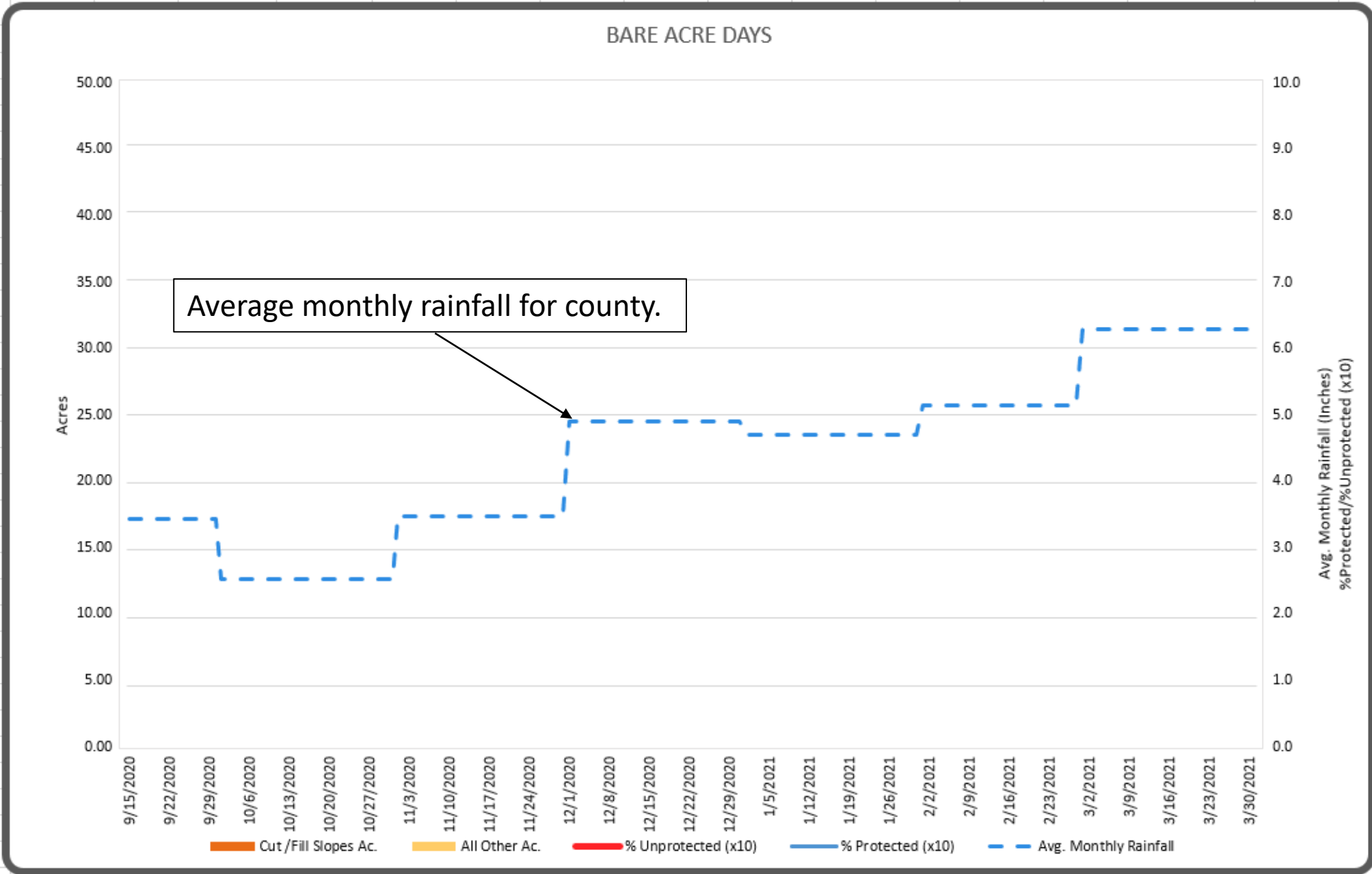
From Date	9/15/2020
To Date	3/31/2021

Total Bare Acre Days	5,906
Bare Acre Days per Acre	148



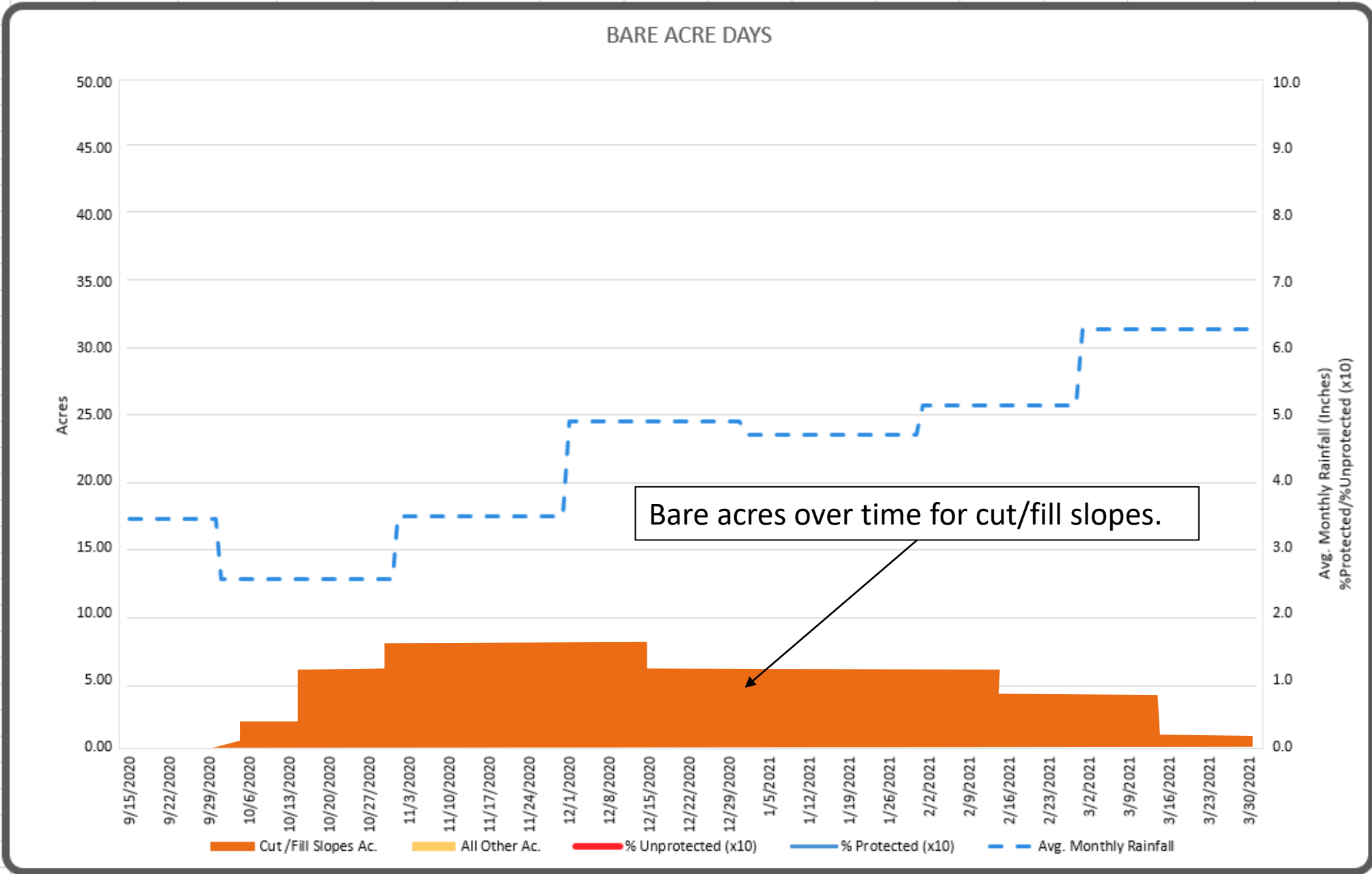
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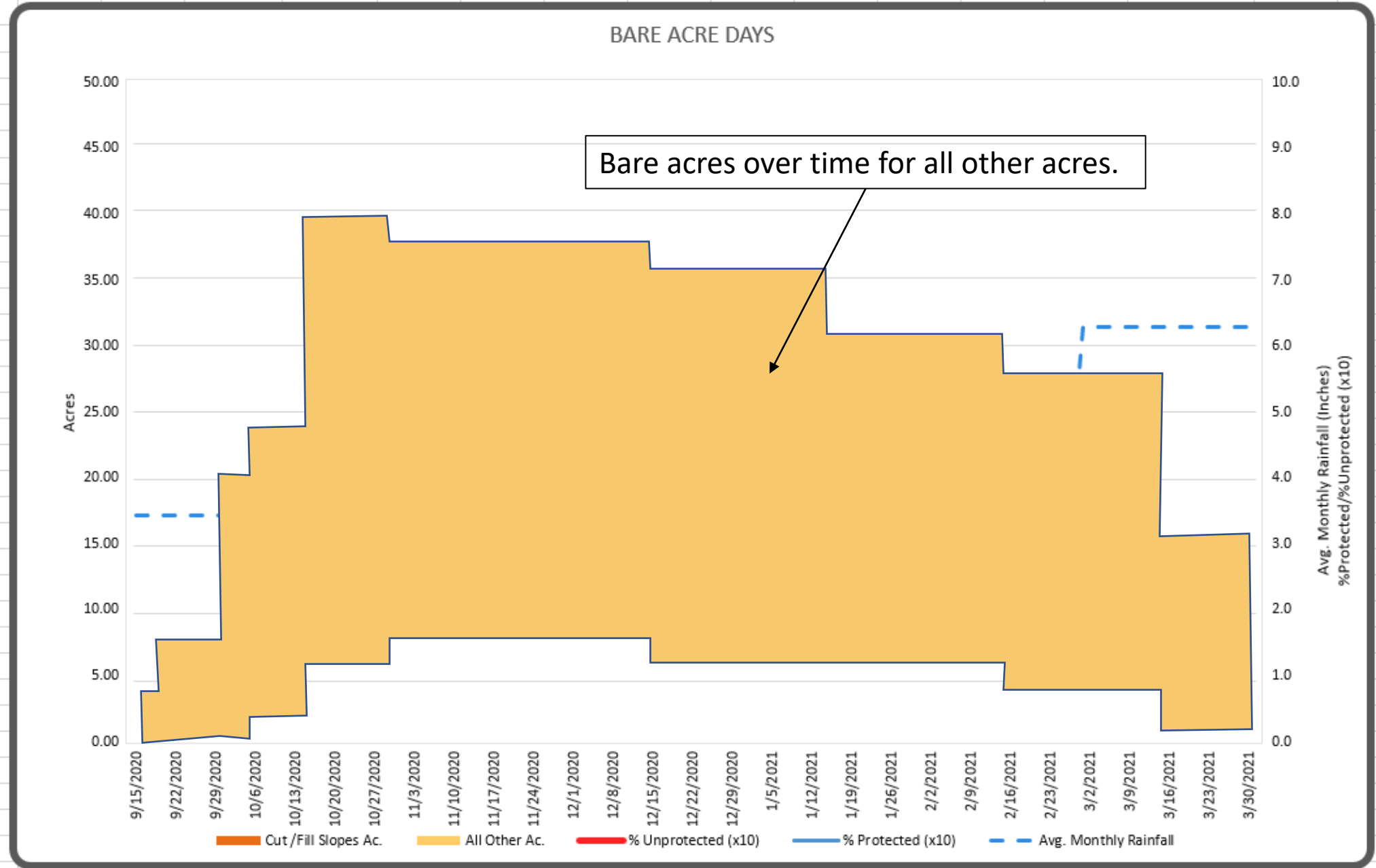
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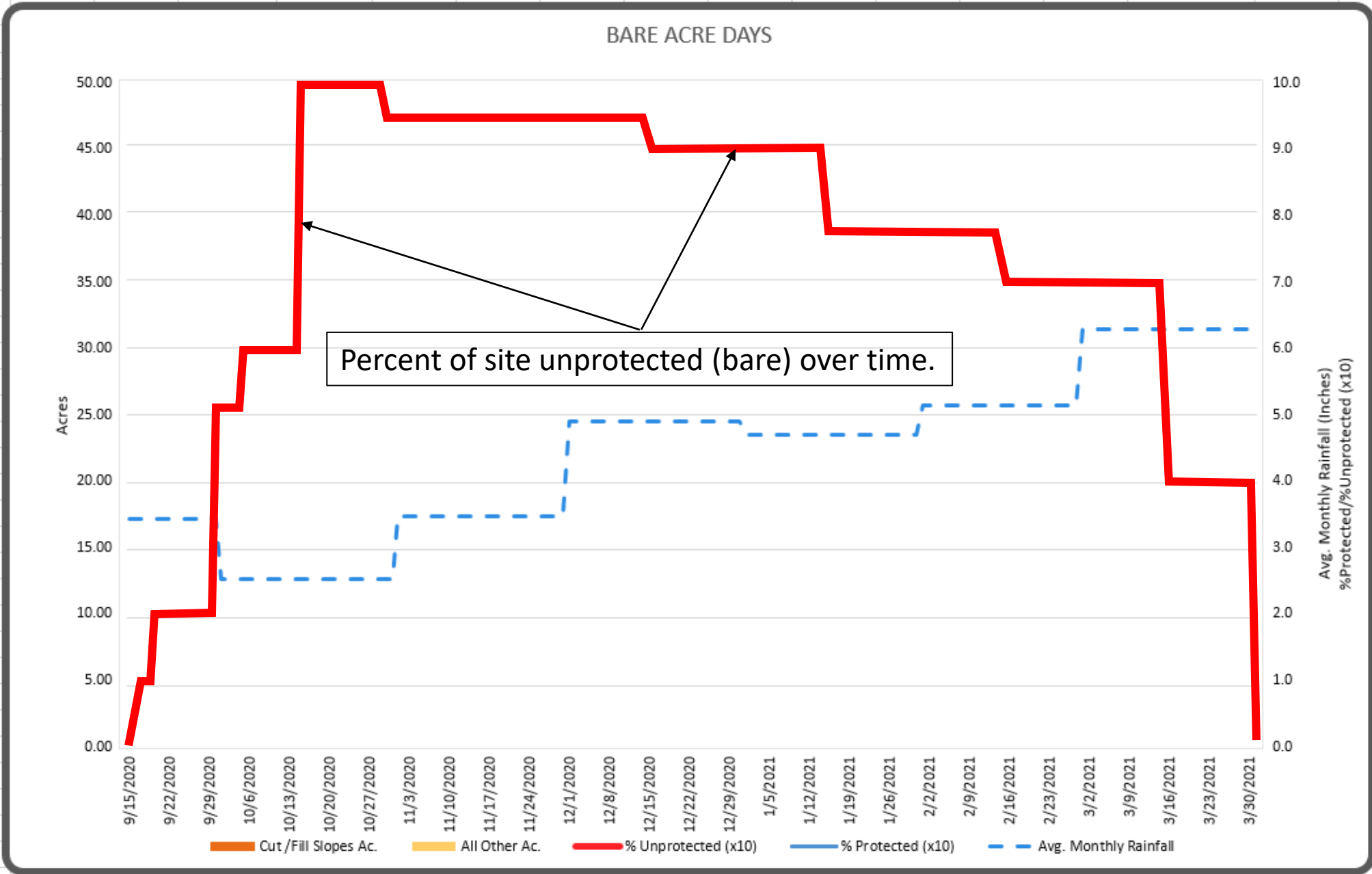
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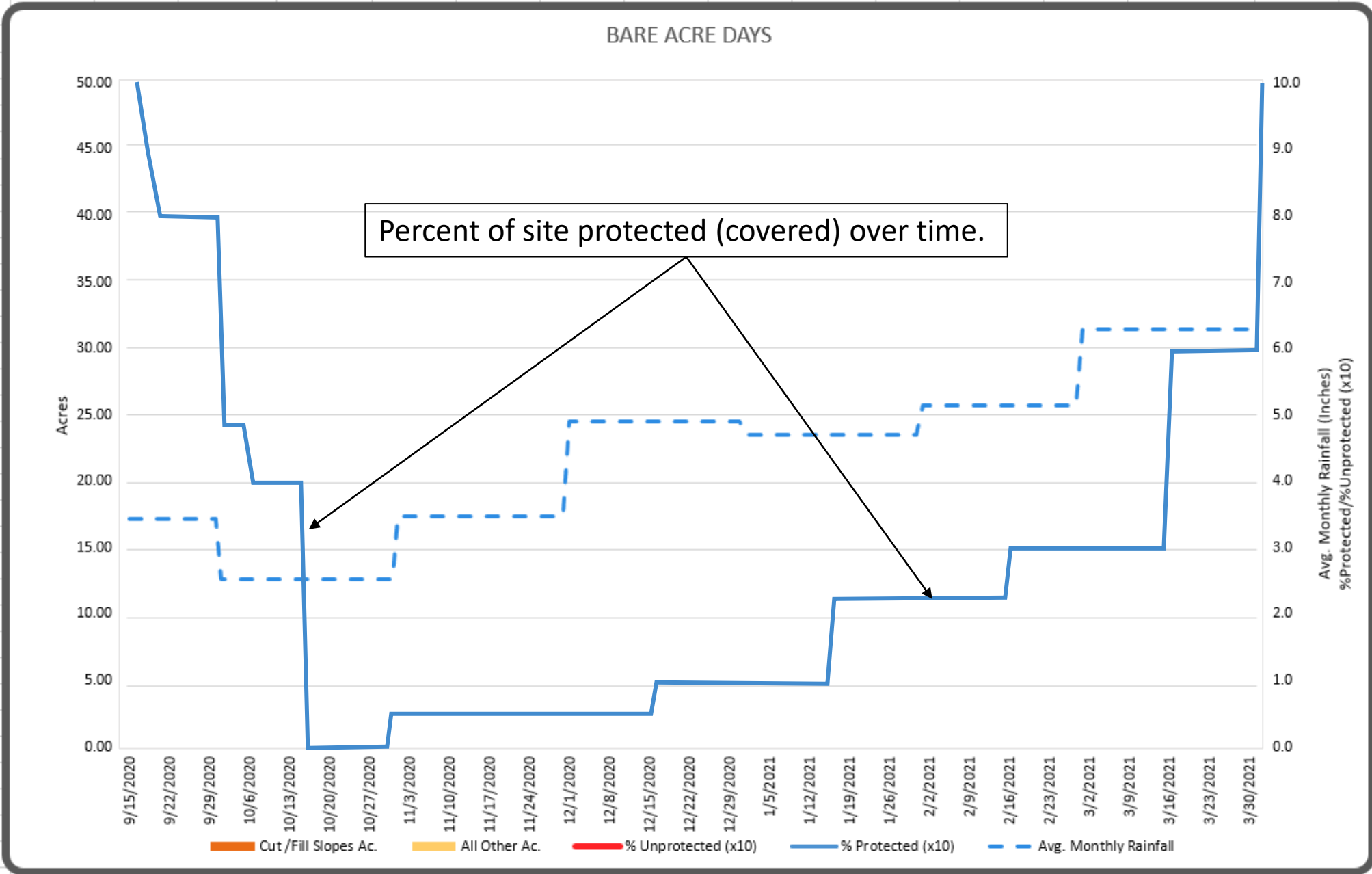
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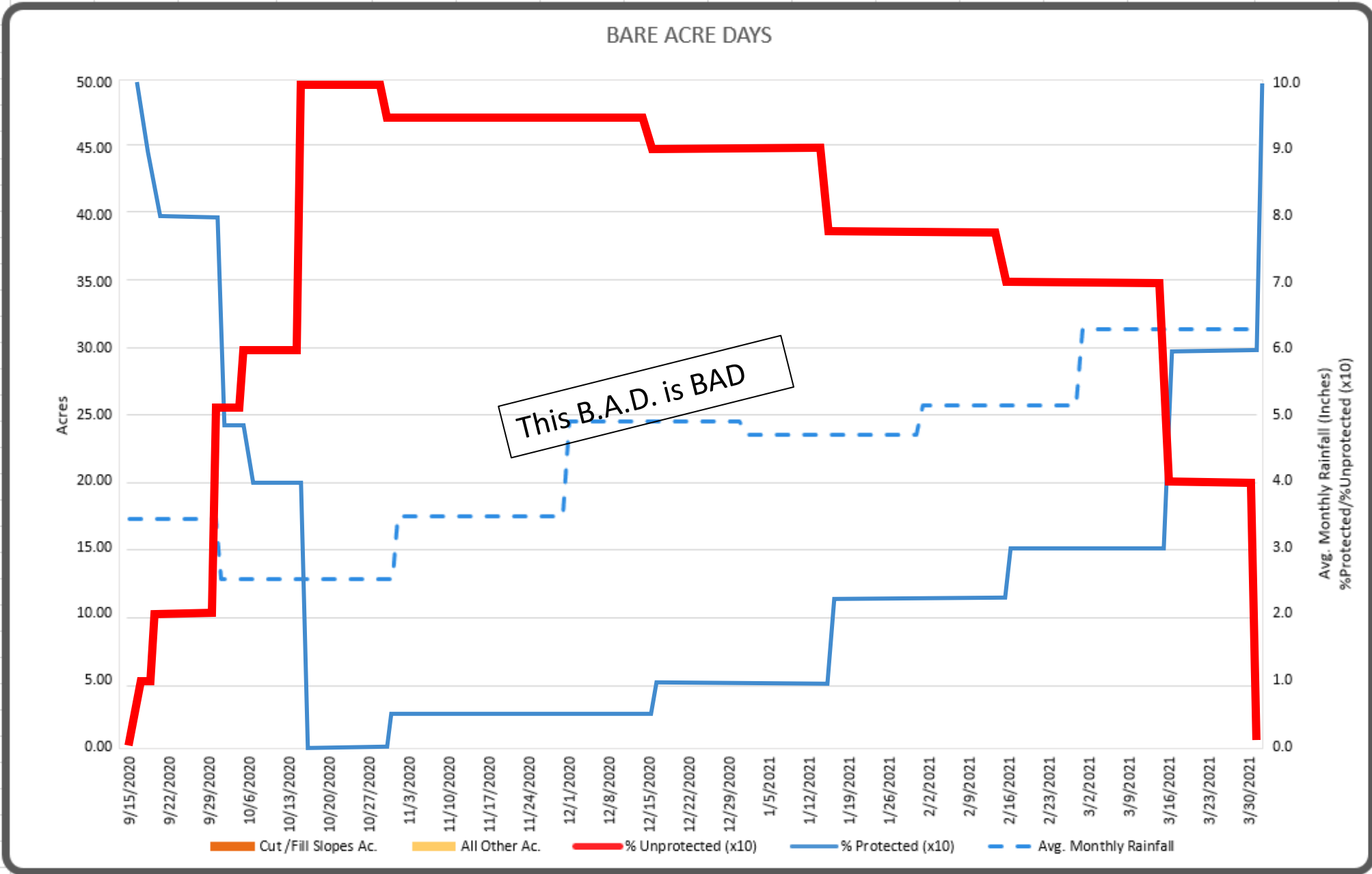
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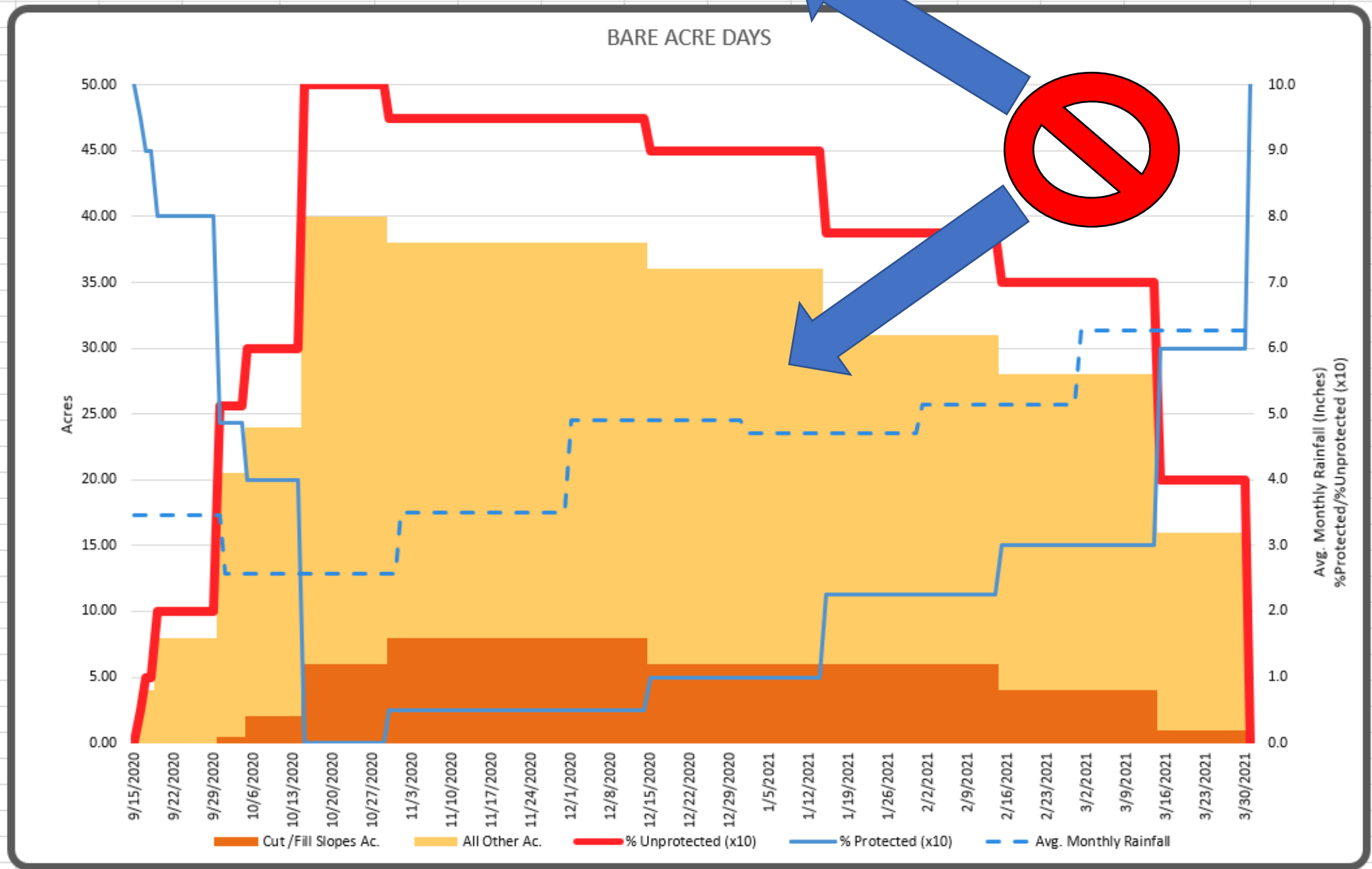
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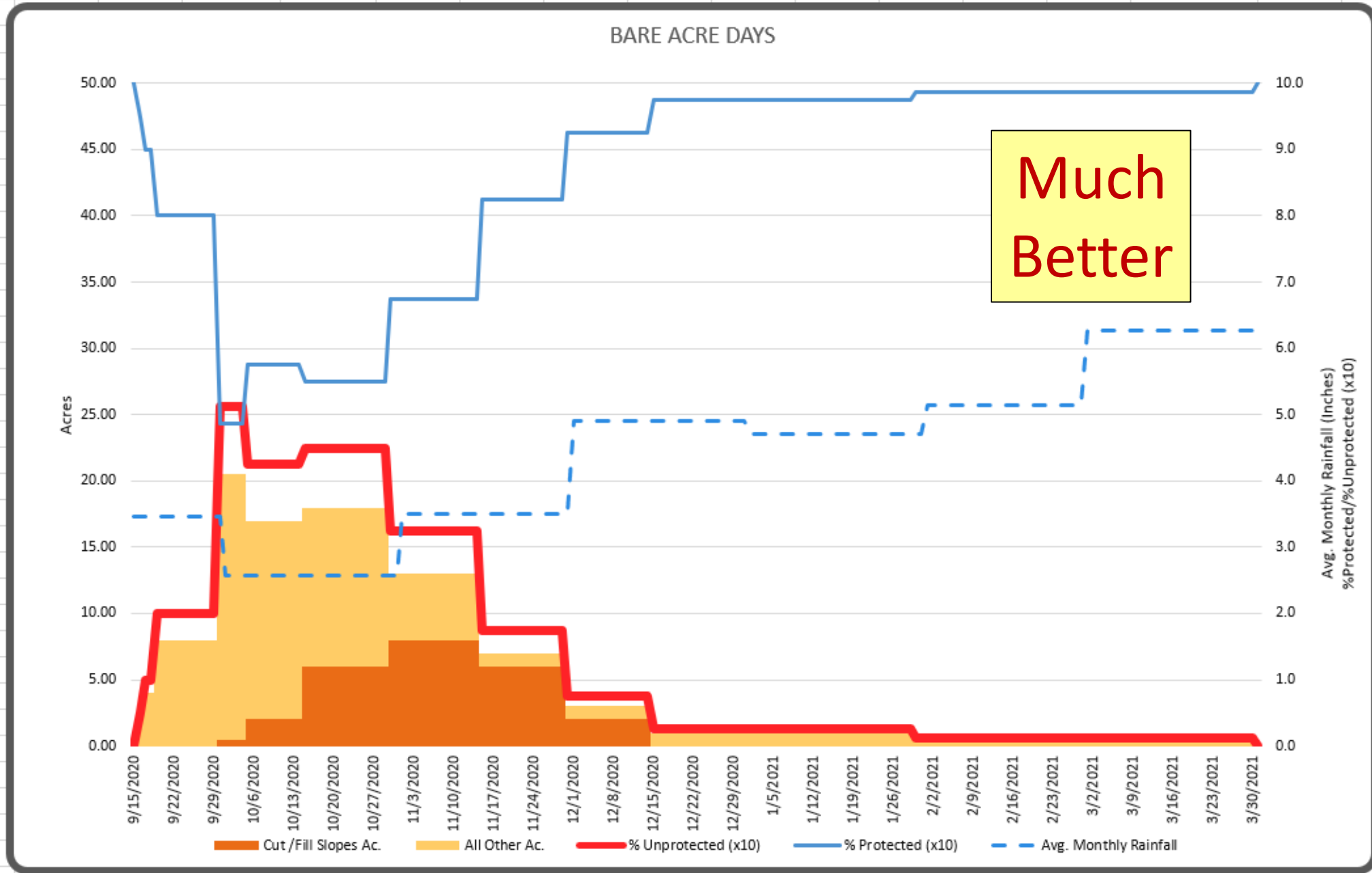


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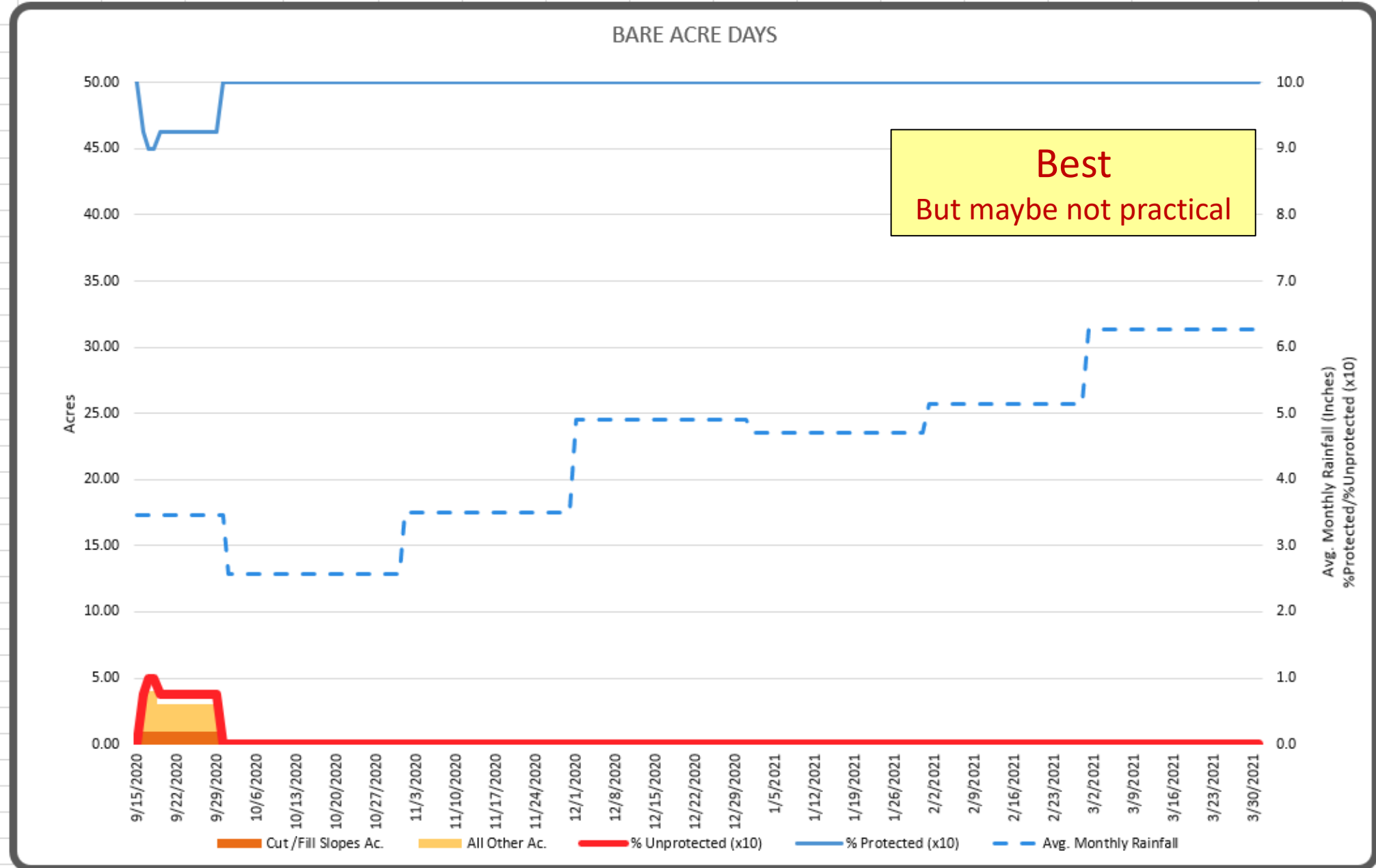


From Date	9/15/2020	Total Bare Acre Days	1,075
To Date	3/31/2021	Bare Acre Days per Acre	27



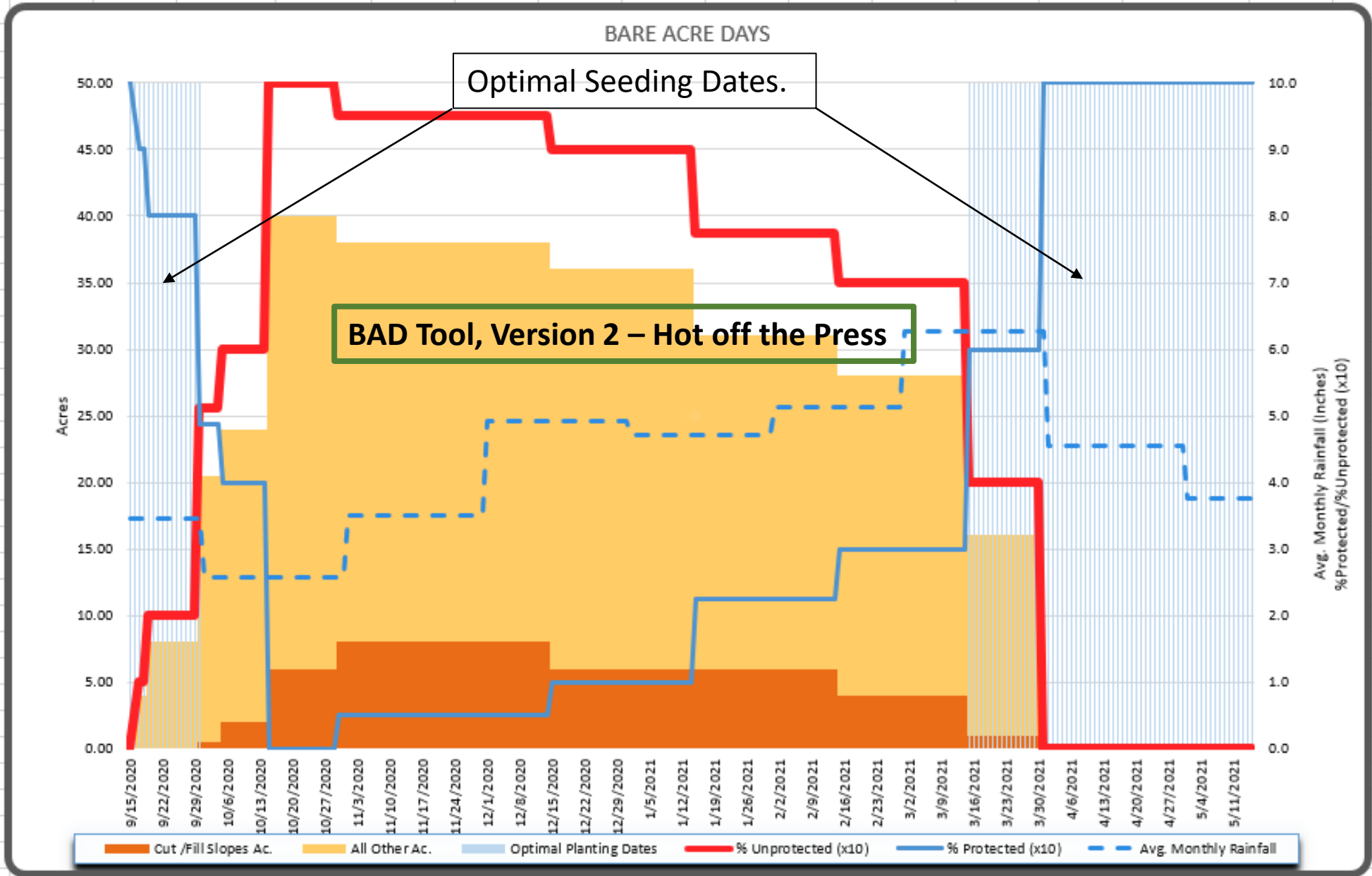
From Date	9/15/2020
To Date	3/31/2021

Total Bare Acre Days	44
Bare Acre Days per Acre	1



From Date	9/15/2020
To Date	5/15/2021

Total Bare Acre Days	5,906
Bare Acre Days per Acre	148



So why are B.A.D. numbers high on a site?

- It's TWWHADI (The way we have always done it.)
 - "The clearing contractor can't keep coming back to clear a little more."
 - "I don't want to maintain the vegetation longer than I have to."
 - "I want to blow it and go."
 - "The vegetation contractor can't come back over and over."
 - "I can't control the subs who destroy the vegetation."
 - "Oh, don't worry, the Silt Fence will catch it all."
- It's not Business as Usual anymore. We must THINK about how construction is performed on a site. Communicate the expectations and pay the contractor to perform.
- Don't be guilty of being TWWHADI

Pros and Cons of minimizing B.A.D.'s

Pros

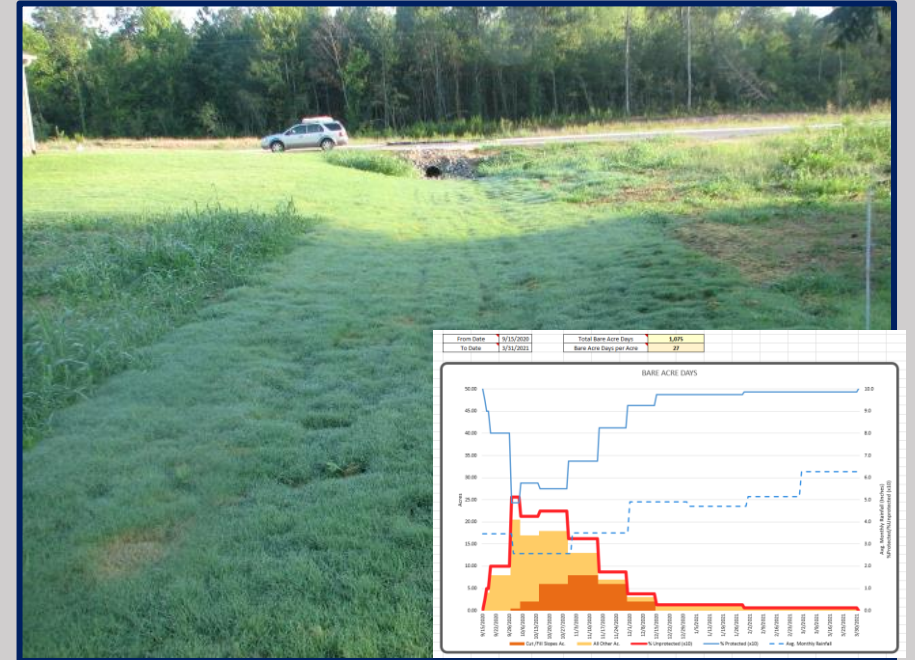
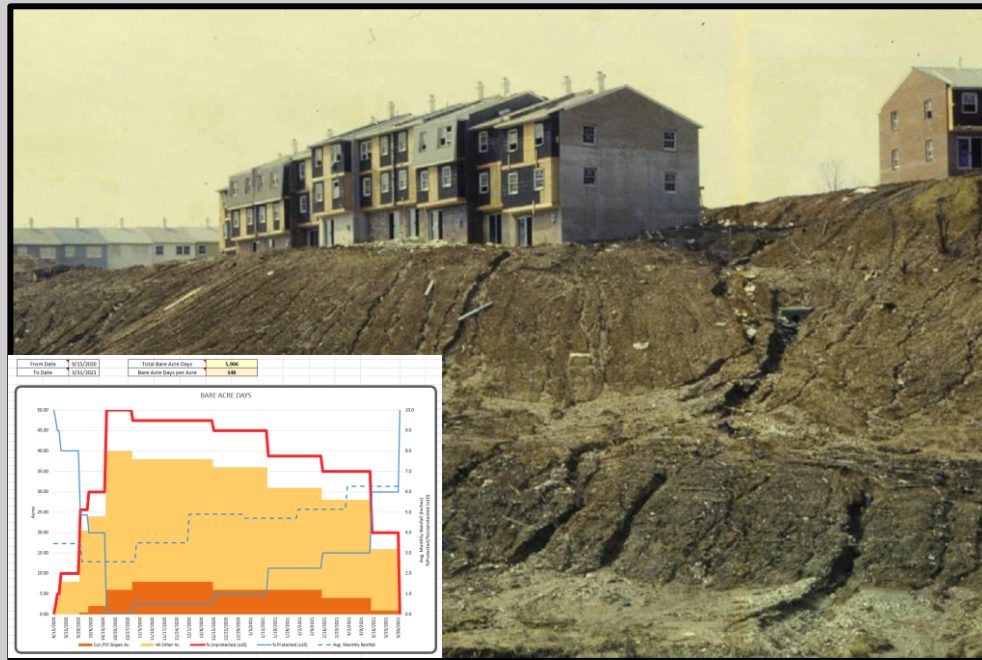
- Protects our environment
- Minimizes sediment production
- Less sediment cleanout
- Minimize “off-site” damage
- Less sediment control practices
- Less sediment volume storage requirements

Cons

- Requires more planning and communication of how work is performed
- “May” cost more for incremental clearing and vegetation

So:

How B.A.D. is your site?



Hopefully,

- Your site is a **G.O.O.D.** site.
- Green
- On
- Our
- Development



Vegetation success depends upon



- Sunlight
- Nutrients
- Correct pH
- Moisture (water)
- Favorable Temperature
- Growing Medium

Topsoil is Important

- DO NOT overlook the subsoil
- Correct pH in subsoil
- Loosen subsoil
- Good subsoil and topsoiling results in ...
 - **Increased rooting depth**
 - **Increased infiltration**
 - **Increased water holding capacity**
 - **Healthy plant**



Late-season Grass Plantings Have Less Chance for Success

- Inadequate soil moisture
- Insufficient days of temperature suitable for plant growth limit establishment
- More damage by freezing/heaving
- Bahia, Common Bermuda and Fescue **need a long growing season to become well established.**



SHOOTS FEED THE ROOTS



ROOTS FEED THE SHOOTS



SOIL CONSERVATION SERVICE

Erosion Control is very simple.....

- STOP or Minimize Interrill Erosion.
- As your parents always taught you, be GOOD and not BAD.

Thoughts, Comments, Questions.