

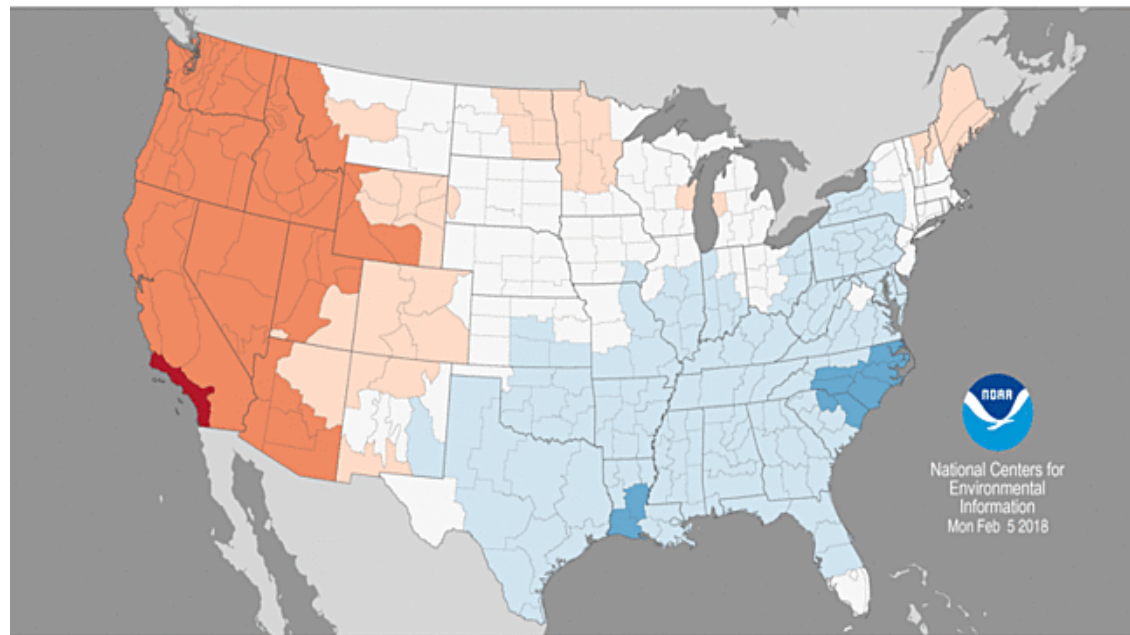
It was how cold???????

Tom Starkey

Divisional Minimum Temperature Ranks

January 2018

Period: 1895–2018



What causes problems

Freeze Injury

- Freeze injury
 - Occurs in nursery
 - Occurs in field
 - What we hear:
 - “My seedlings just aren’t growing like I think they should.”
 - “There is a lack of top and new root growth”



What causes problems

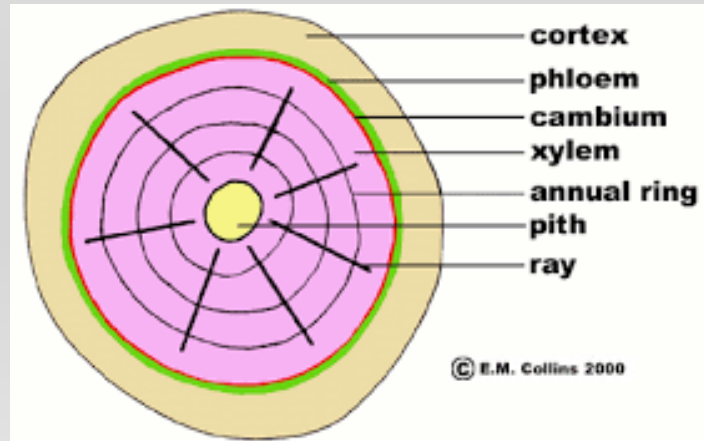
Freeze Injury

- **What to look for:**

- April - June best time to observe
- Shoot Symptoms
 - Lack of Shoot Growth (<1" growth common)
 - Often Chlorotic
 - Cambial Damage
 - Brown Streak generally on one side of stem and root ("north" side)
 - Poor to little new root initiation

Freeze Injury

Seedlings can (and do)
recover!



What causes problems

Freeze Injury

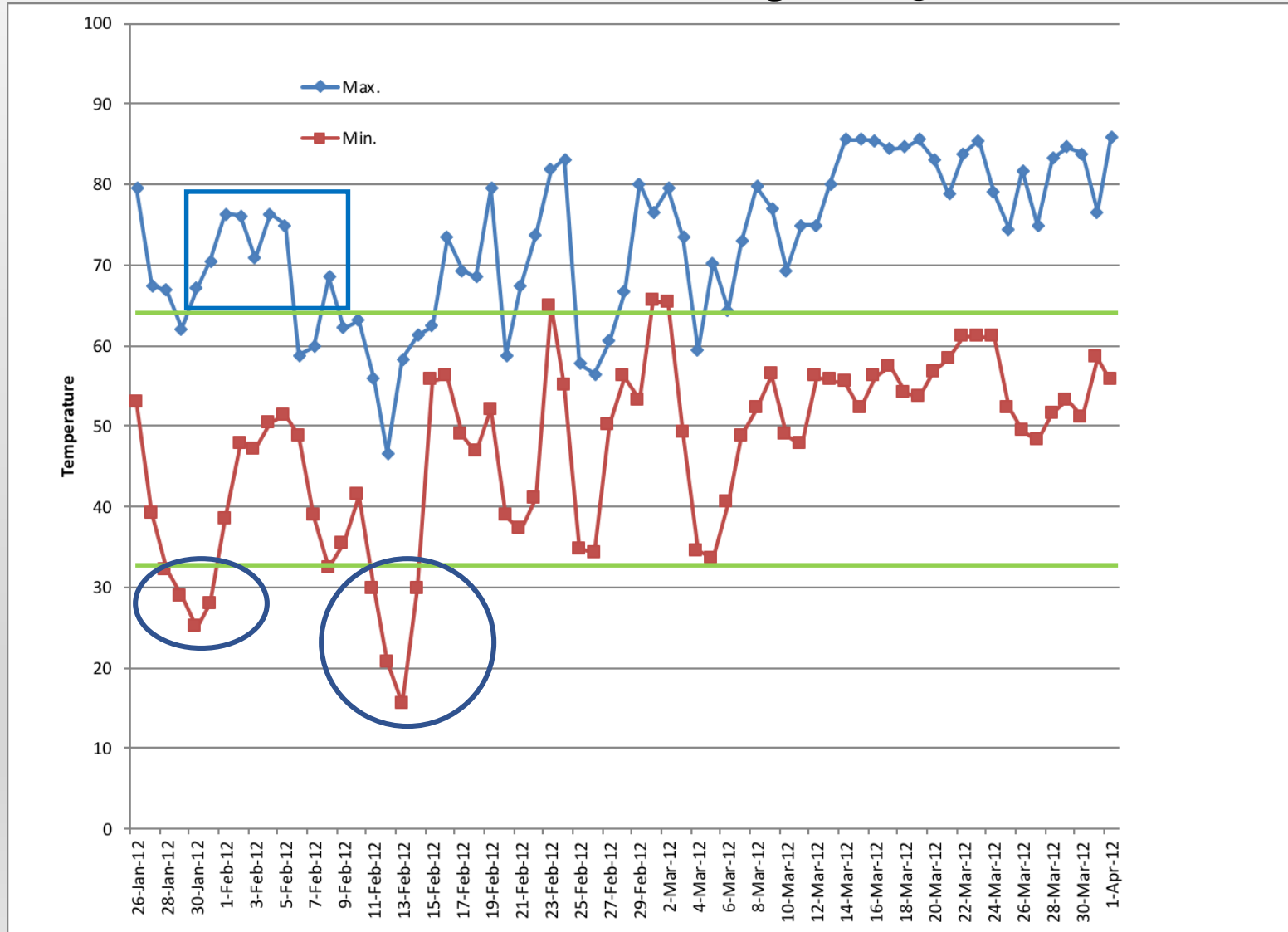
My Favorite Analogy:

- **Freeze injury on one side of the stem is like a 6 cylinder car trying to run on 4 cylinders, it runs, but rough, it sputters and hesitates.**
- First year freeze injury seedlings are like this, they struggle.
How much they struggle is directly related to how good the outplanting environment is.



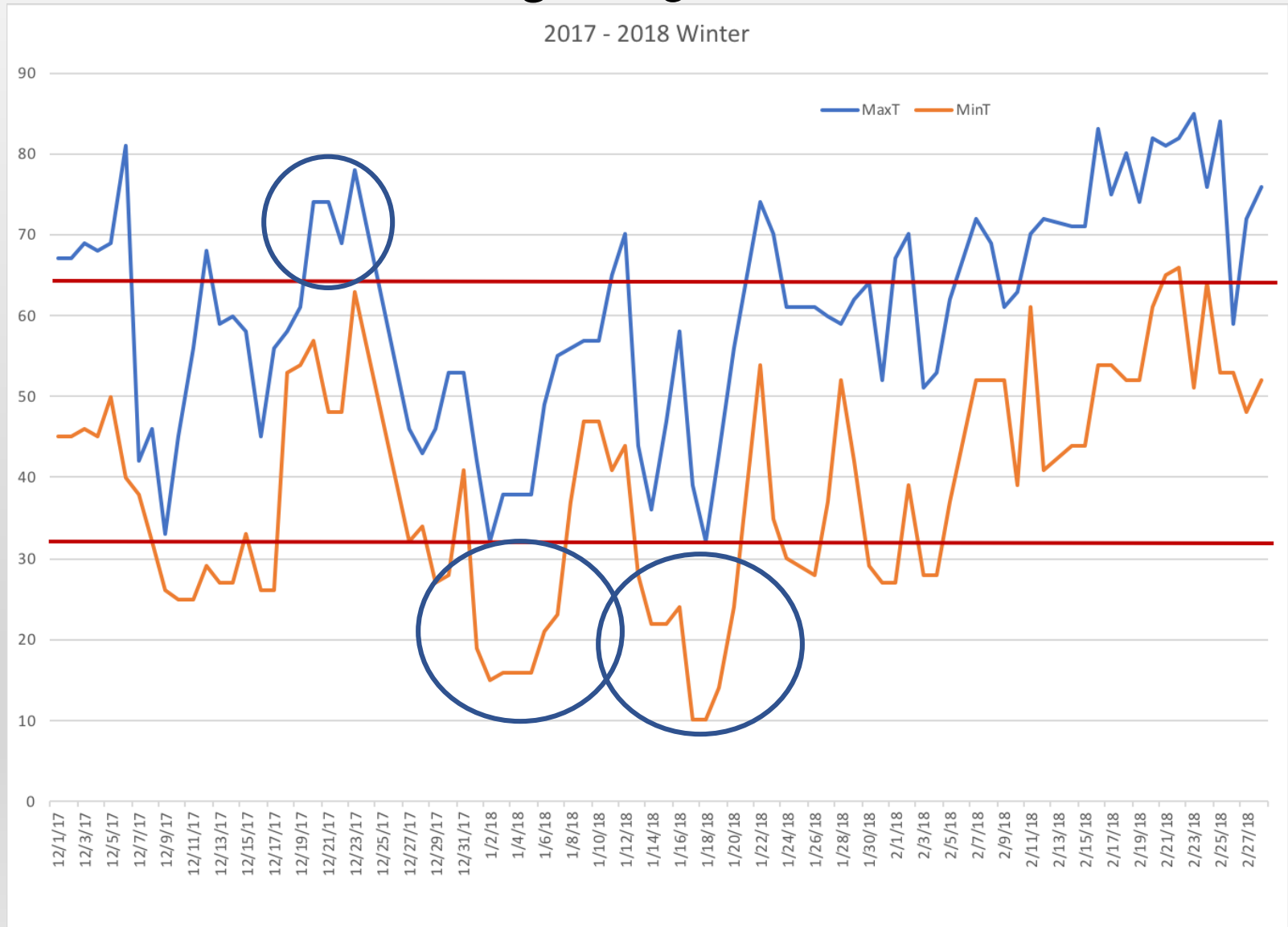
What causes problems

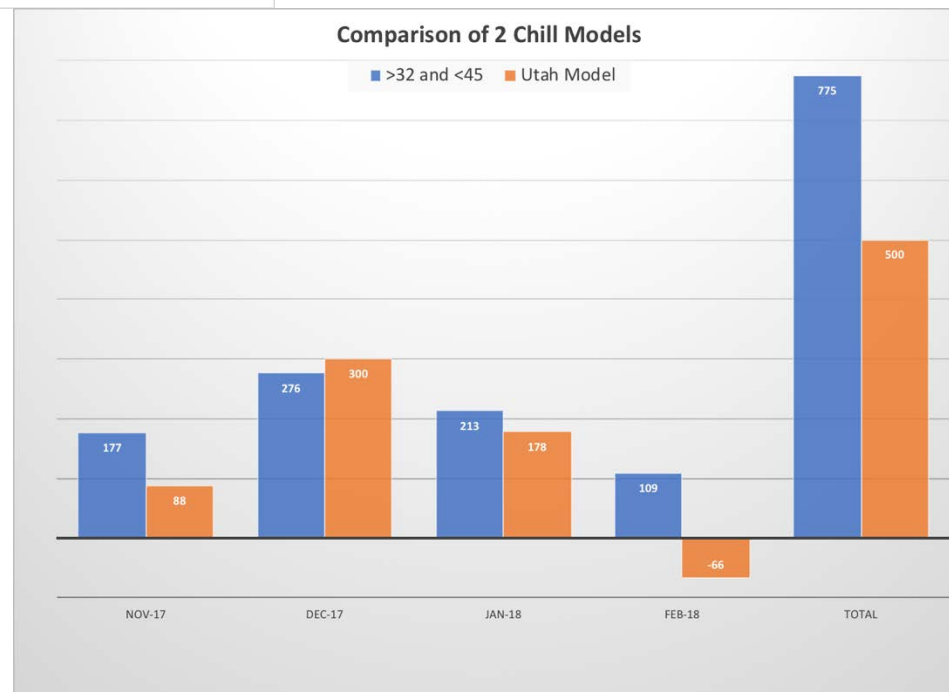
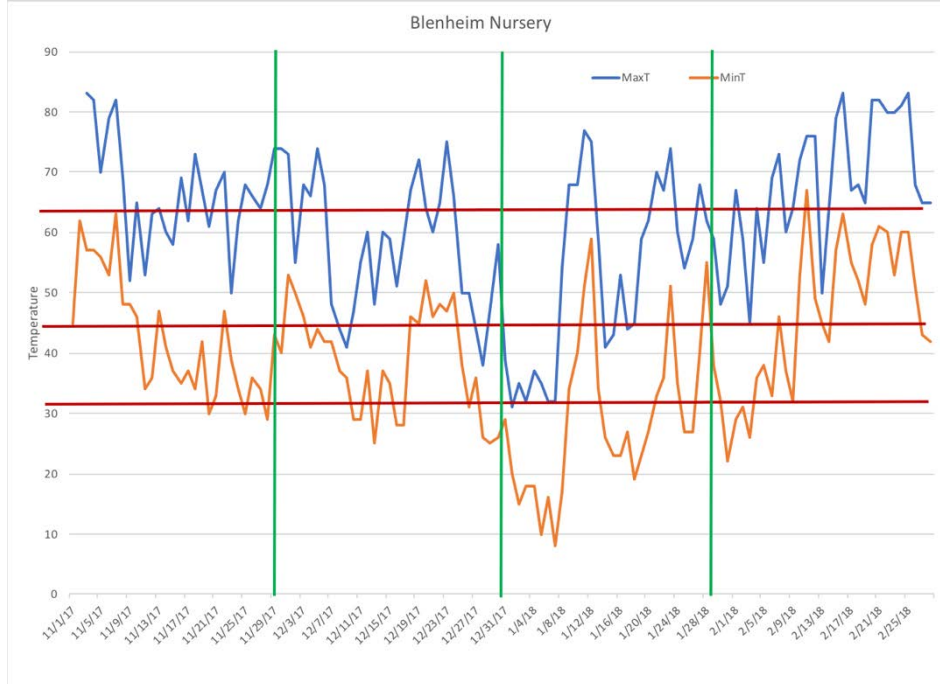
Freeze Injury



What causes problems

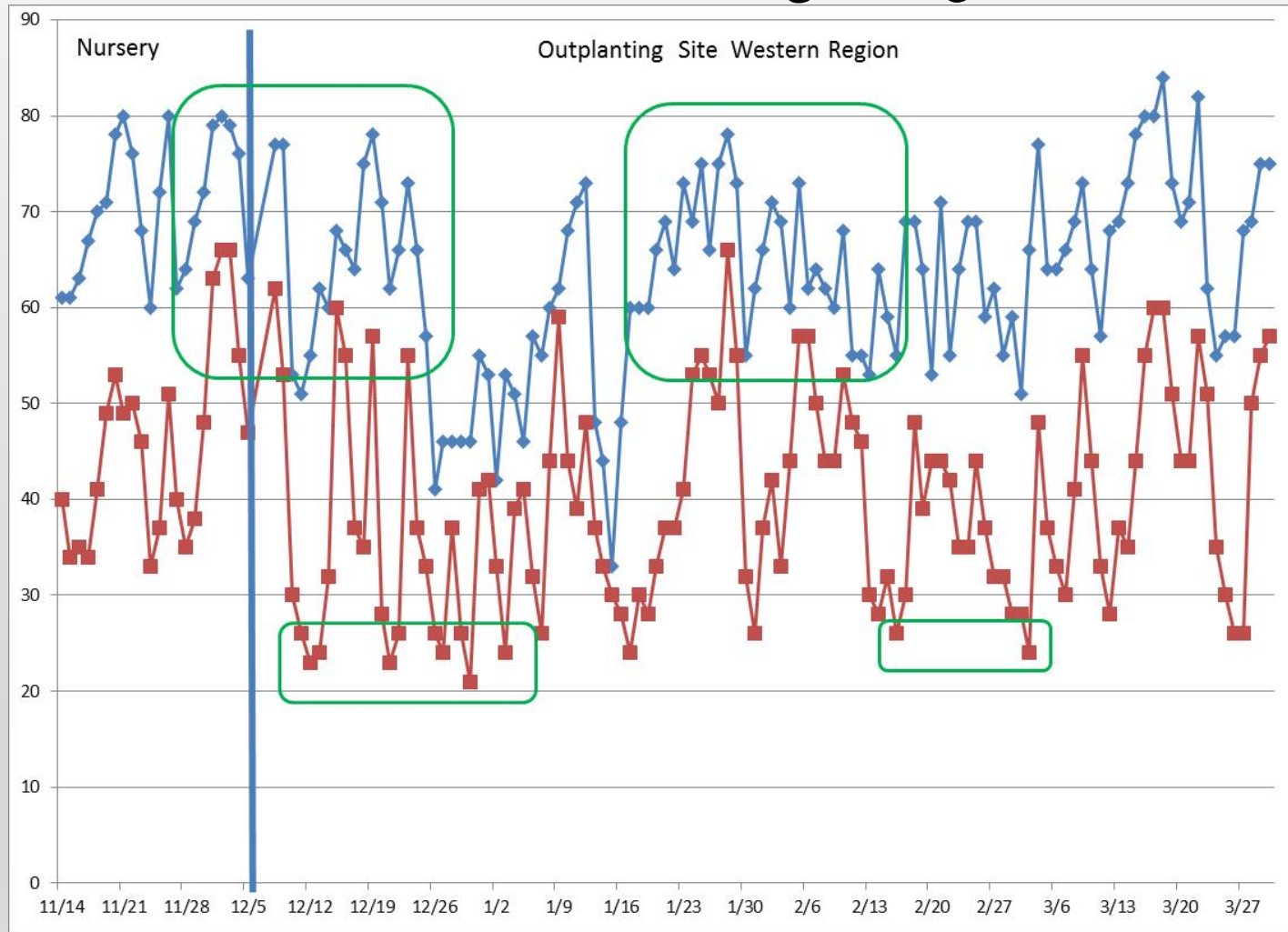
Freeze Injury 2017-2018





What causes problems

Freeze Injury



No freeze events in nursery but seedlings were probably deacclimated due to warm temperatures

Recovery of Freeze Injured Seedlings

