PG STUDY - PERFORMANCE OF SOUTHERN SECTIONS

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2018 NCAT Test Track Conference

ACCUMULATED TRAFFIC

- LEE ROAD 159
  - Difference in ESALs between inbound/outbound lanes
- US 280
  - Already more ESALs than Lee Road 159 in less than half the time

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LEE ROAD 159 (LOW VOLUME)

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US 280 (HIGH VOLUME)

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PERFORMANCE

- 3 Performance indicators help us see the "big picture"
- MAP-21 criteria

Category	% Cracking	Rutting, mm	IRI, in/mi
Good	< 5	< 5	< 95
Fair	5 – 20	5 – 10	95 – 170
Poor	> 20	> 10	> 170

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PERFORMANCE

- Cracking
  - Most influential
- Rutting
  - Good to fair
- IRI
  - No clear trends over time
  - Consider effect of section length

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LOW TRAFFIC SECTIONS

TREATED IN 2012

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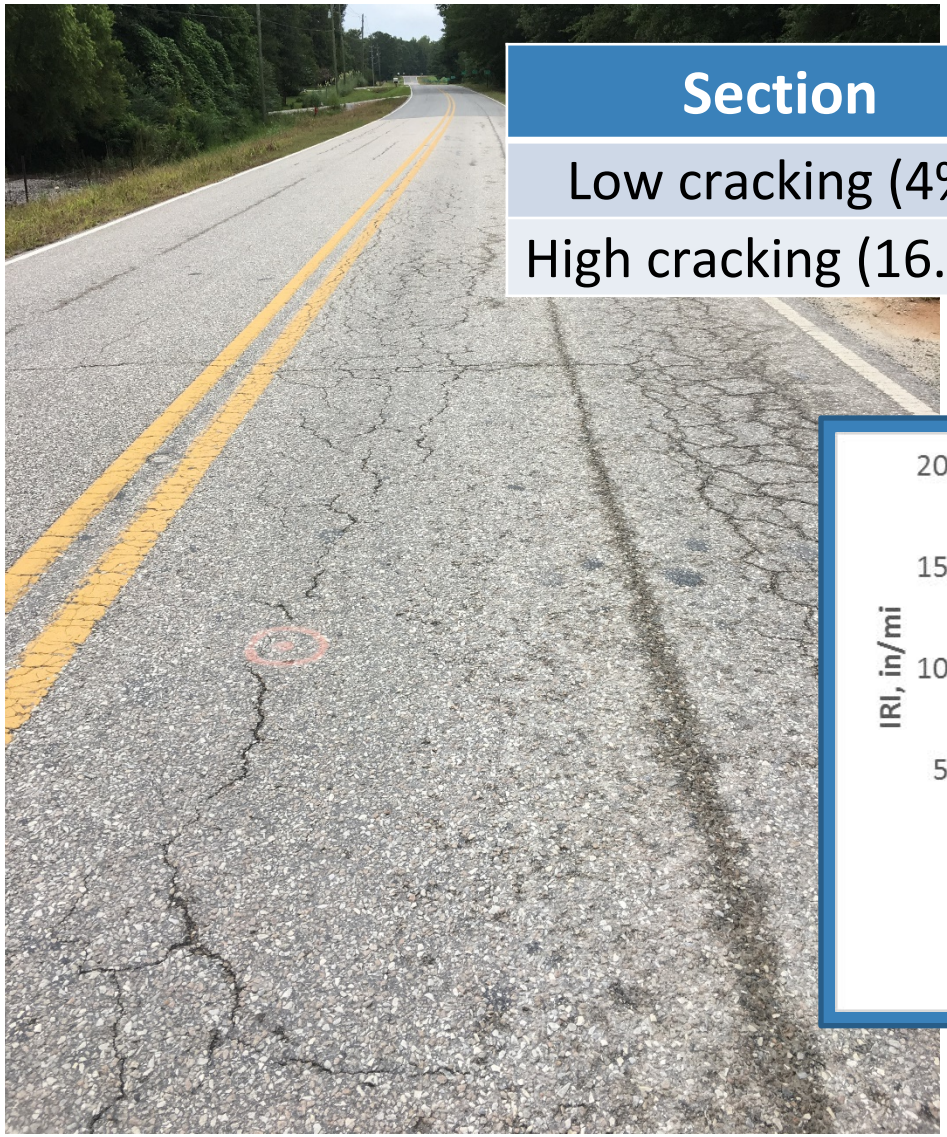
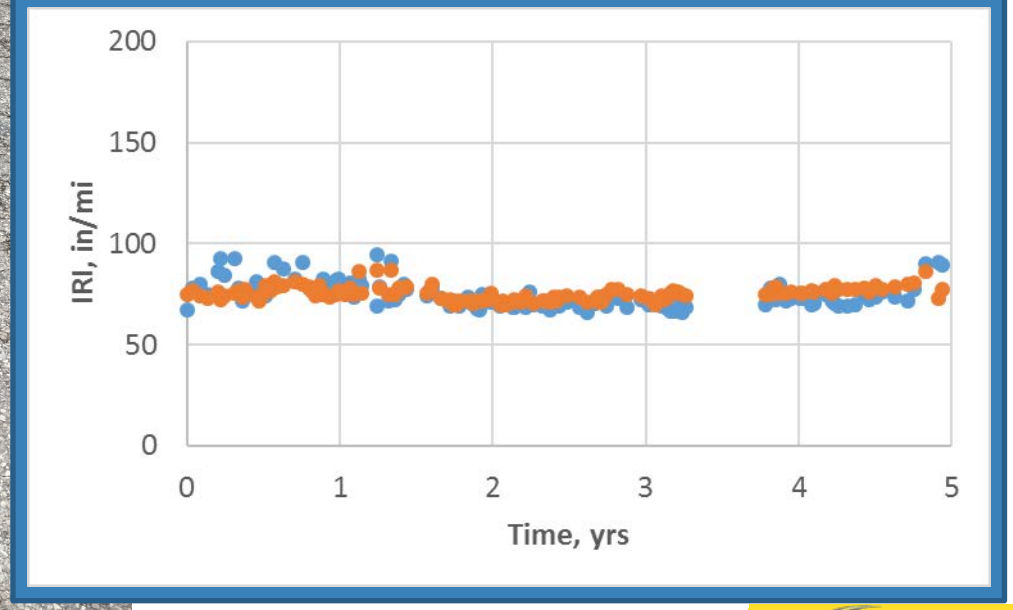
CONTROL SECTIONS



Section	Cracking	Rutting	IRI
Low cracking (4%)	P	G	G
High cracking (16.1%)	P	G	G



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LOW TRAFFIC CHIP SEALS

Treatment	Cracking	Rutting	IRI
CONTROL	P	G	G
Single chip seal	F	G	G
Single chip seal + crack sealing	F	G	G
Double chip seal	F	G	G
Triple chip seal	F	G	G
Scrub seal	F	G	G
FiberMat chip seal	F	G	G

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LOW TRAFFIC MICROSURFACING

Treatment	Cracking	Rutting	IRI
CONTROL	P	G	G
Cape seal	G	G	G
Single micro surface	P	G	G
Single micro surface + crack sealing	P	G	G
Double micro surface	F	G	F
FiberMat Cape seal	G	G	G
Scrub Cape seal	F	G	G

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LOW TRAFFIC THINLAYS

Treatment	Cracking	Rutting	IRI
CONTROL	P	G	G
HMA Cape seal	G	G	P
Virgin thinlay PG67-22	G	G	G
Virgin thinlay on 100% foamed base	G	G	F
Virgin thinlay PG76-22	G	G	F
Ultra thin bonded surface course	F	G	F
50% RAP thinlay	F	G	G
5% RAS Thinlay	F	G	G
HiMA Thinlay	G	G	F

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HIGH TRAFFIC SECTIONS

TREATED IN 2015

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HIGH TRAFFIC CONTROL SECTIONS

Treatment	Cracking	Rutting	IRI
Low Cracking	G	F	G
High Cracking	F	F	G
Low Rutting	G	G	G
High Rutting	G	F	G
Low IRI	G	F	G
High IRI	G	F	F

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HIGH TRAFFIC CHIP SEALS

Treatment	Cracking	Rutting	IRI
CONTROL	G-F	G-F	G-F
Single chip seal	G	F	F
Single chip seal + crack sealing	G	F	G
Double chip seal	G	F	G
Triple chip seal	G	F	G
Scrub seal	G	F	F
FiberMat chip seal	G	F	G

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HIGH TRAFFIC MICROSURFACING

Treatment	Cracking	Rutting	IRI
CONTROL	G-F	G-F	G-F
Cape seal	G	F	G
Single micro surface	G	F	F
Single micro surface + crack sealing	G	F	F
Double micro surface (SS)	G	G	G
Double micro surface (LMS)	G	F	F
FiberMat Cape seal	G	F	G
Scrub cape seal	G	F	F
HiMA Micro surface	G	F	G
Micro surface on thinlay	G	G	G
Micro surface with fibers	G	F	G

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HIGH TRAFFIC THINLAYS

Treatment	Cracking	Rutting	IRI
CONTROL	G-F	G-F	G-F
HMA Scrub cape seal	G	G	G
HMA Cape seal	G	G	G
HMA Fibermat cape seal	G	G	G
Virgin Thinlay	G	G	G
ABR Thinlay	G	G	G
Thinlay on foamed CCPR	G	G	F
Thinlay on foamed CIR	G	F	G
Thinlay on emulsion CCPR	G	G	G
Thinlay on emulsion CIR	G	F	F
Ultra thin bonded surface	G	G	G

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OGFCs

Treatment	Cracking	Rutting	IRI
CONTROL	G-F	G-F	G-F
OGFC w/ Spray paver	G	G	G
OGFC w/ Trackless tack	G	G	G
OGFC w/ PG 67-22	G	G	G
OGFC w/ Ultra fuse	G	G	G
OGFC w/ eTac	G	G	F

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NOTABLE FINDINGS TO DATE

PRELIMINARY OBSERVATIONS

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EFFECT OF PRETREATMENT CONDITION

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PRETREATMENT CONDITION

- Treatment performance is highly dependent on pretreatment condition
- More deterioration at time of treatment → shorter life extension
- Importance of timely intervention

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HOW IS INITIAL CONDITION ADDRESSED?

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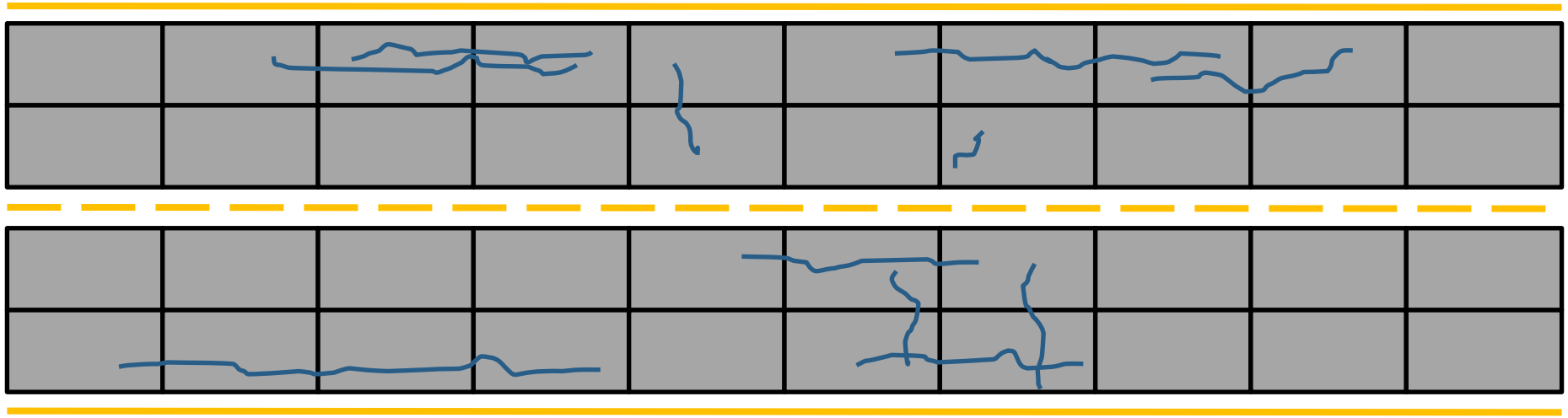
TEST SUBSECTIONS



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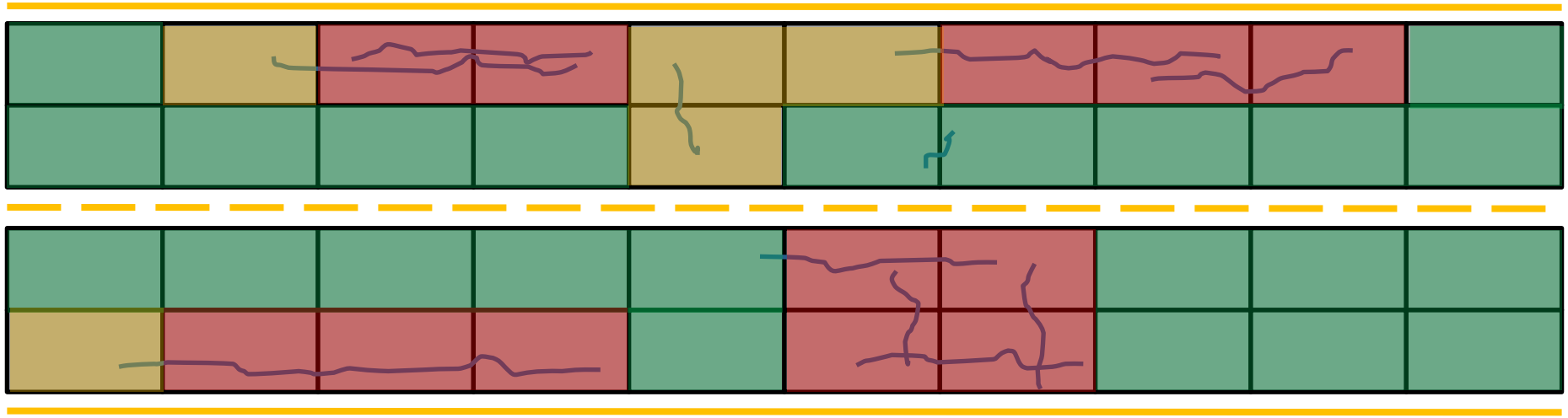
TEST SUBSECTIONS



Good: < 5%
Fair: 5 - 20%
Poor: > 20%

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Age, Yrs
0
1
2
3
4
5
% Cracking
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5
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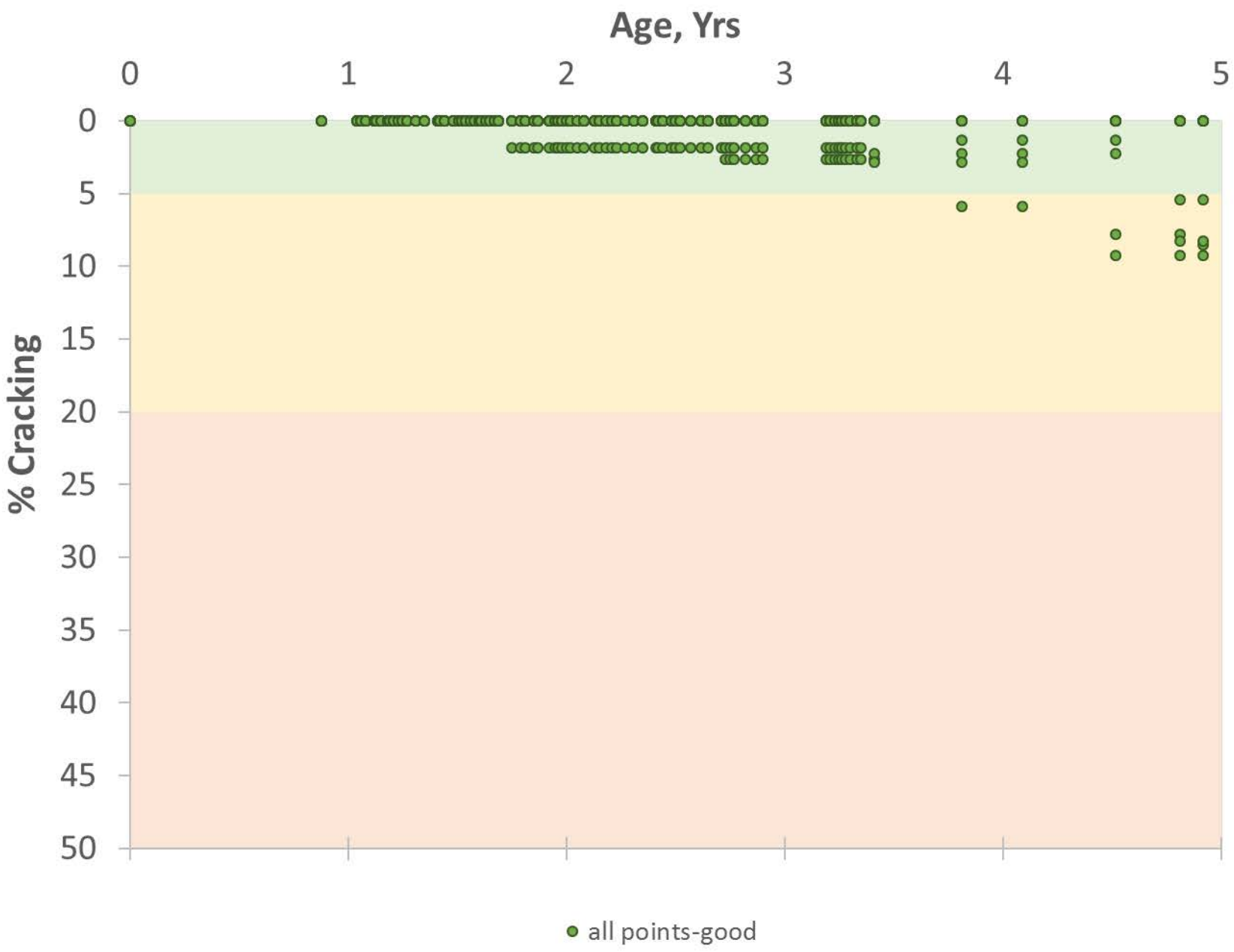
15
20
25
30
35
40
45
50


Age, Yrs
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% Cracking
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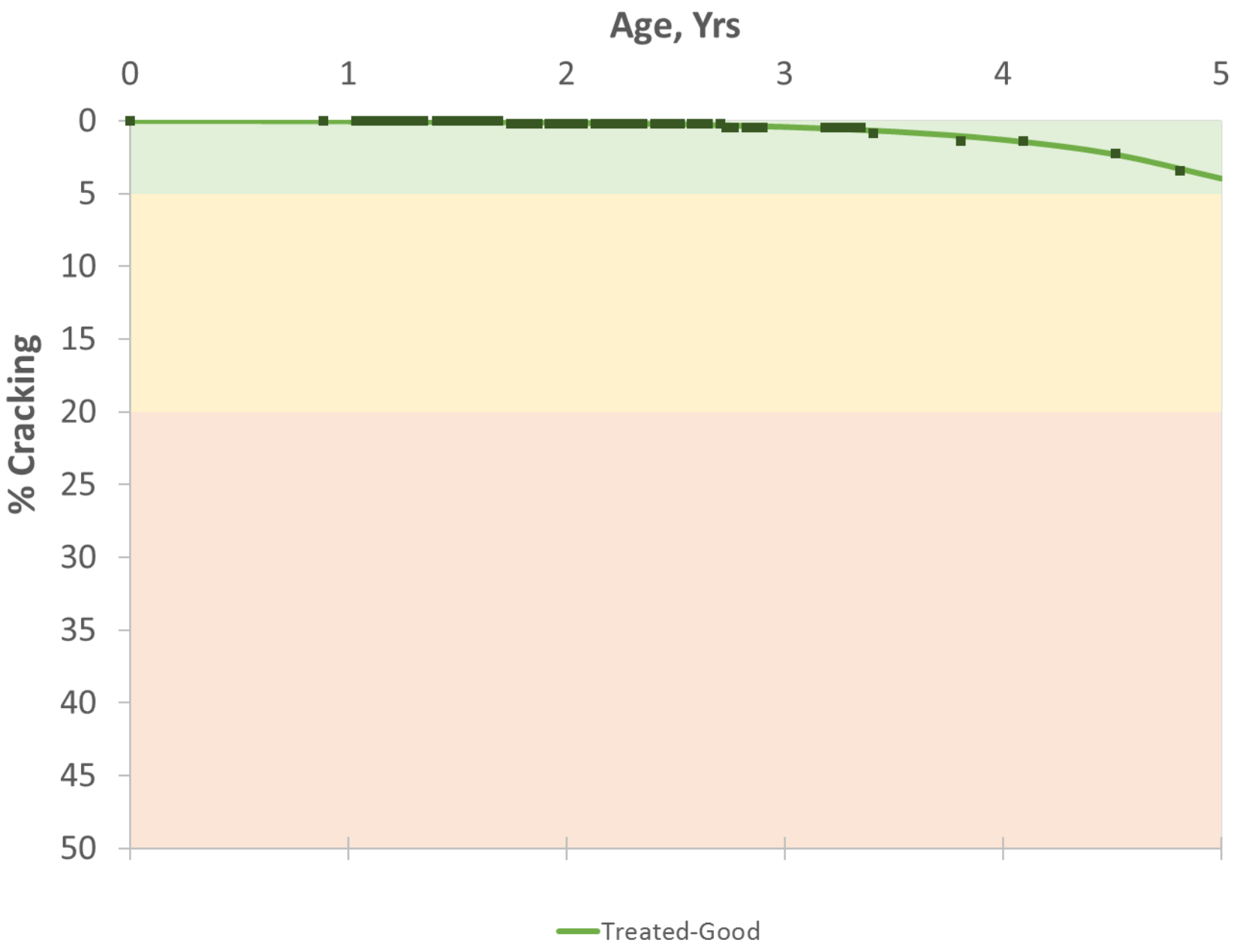
all points-good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% Cracking
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Treated-Good

Age, Yrs
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% Cracking
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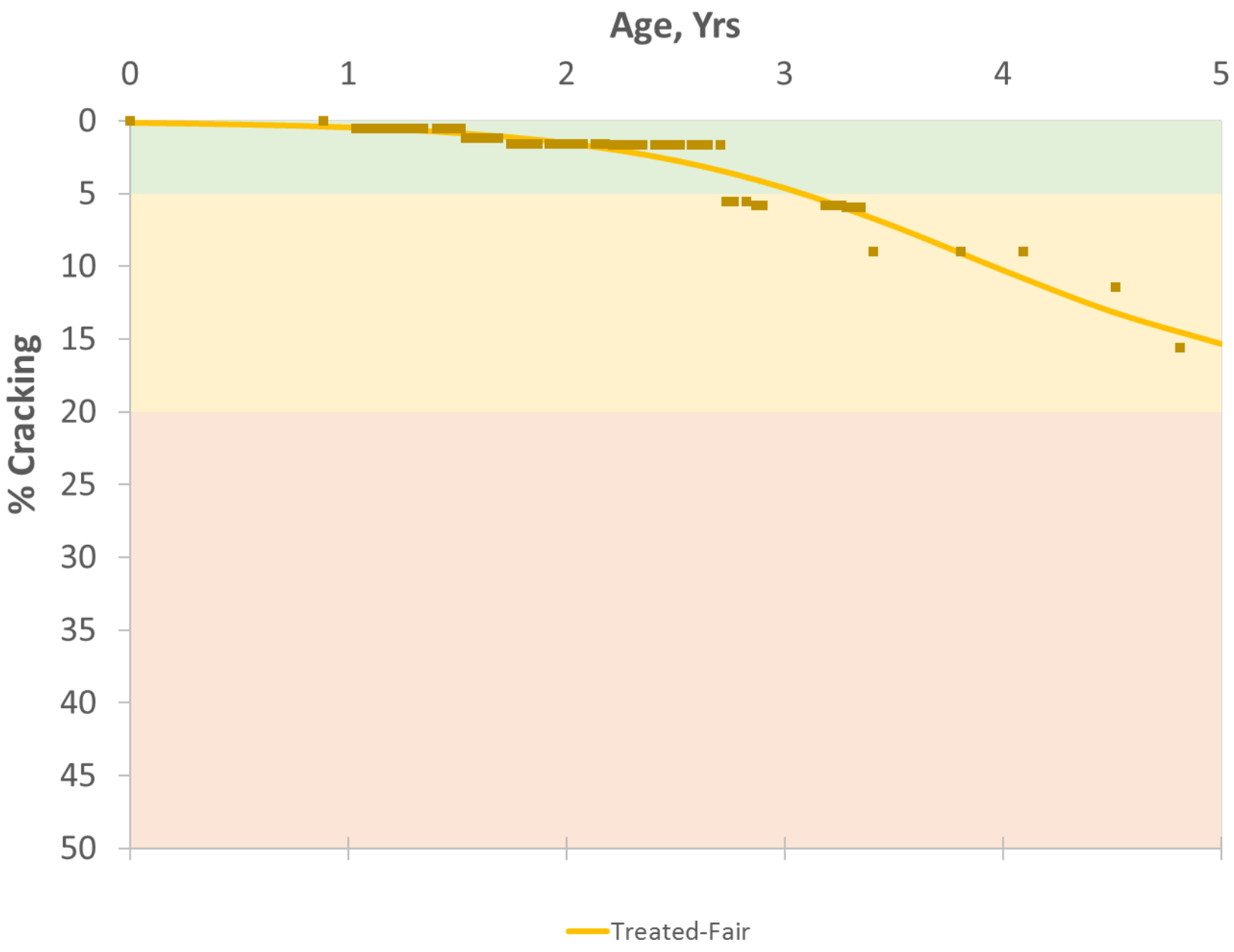
all points-fair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Treated-Fair

Age, Yrs
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% Cracking
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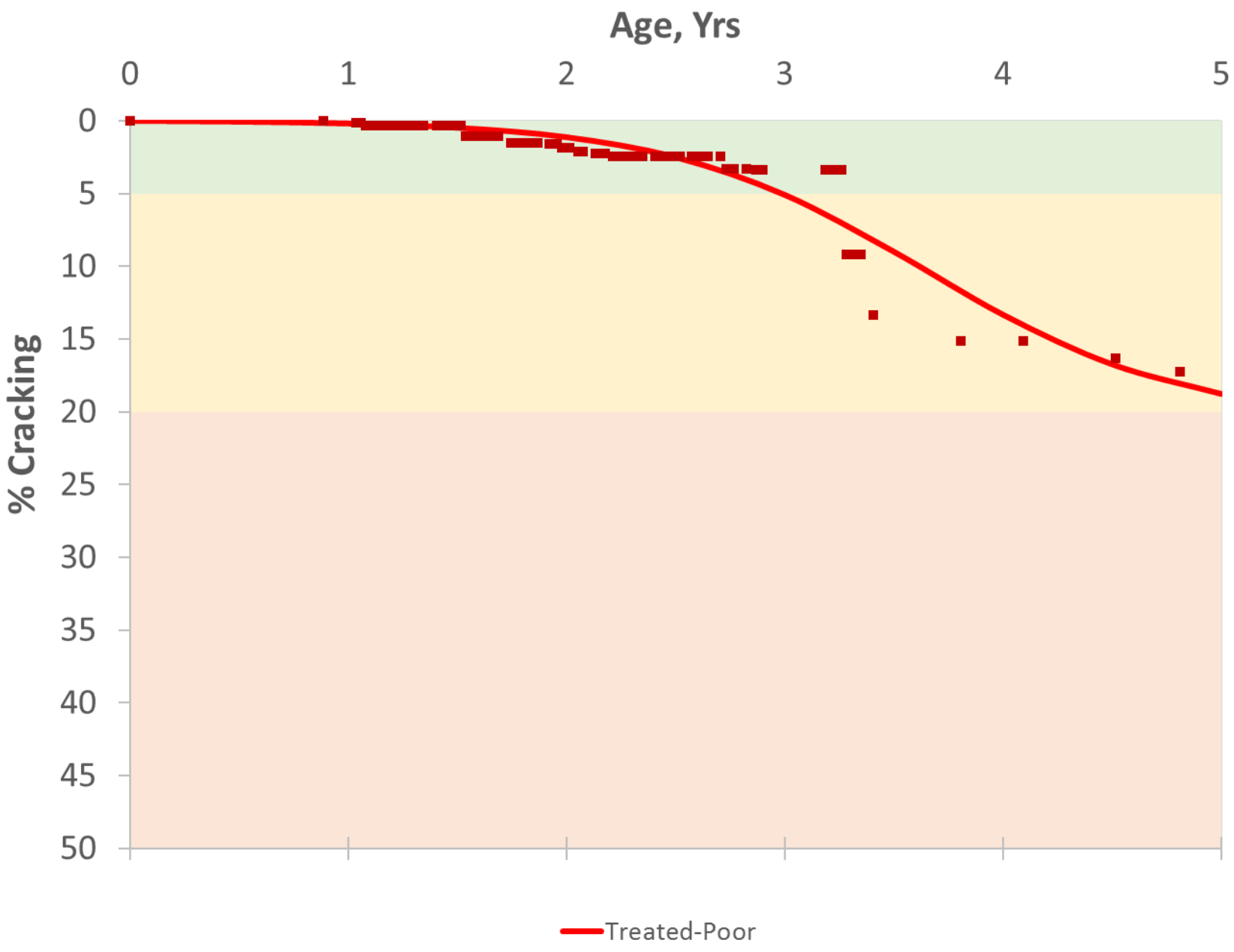
all points-poor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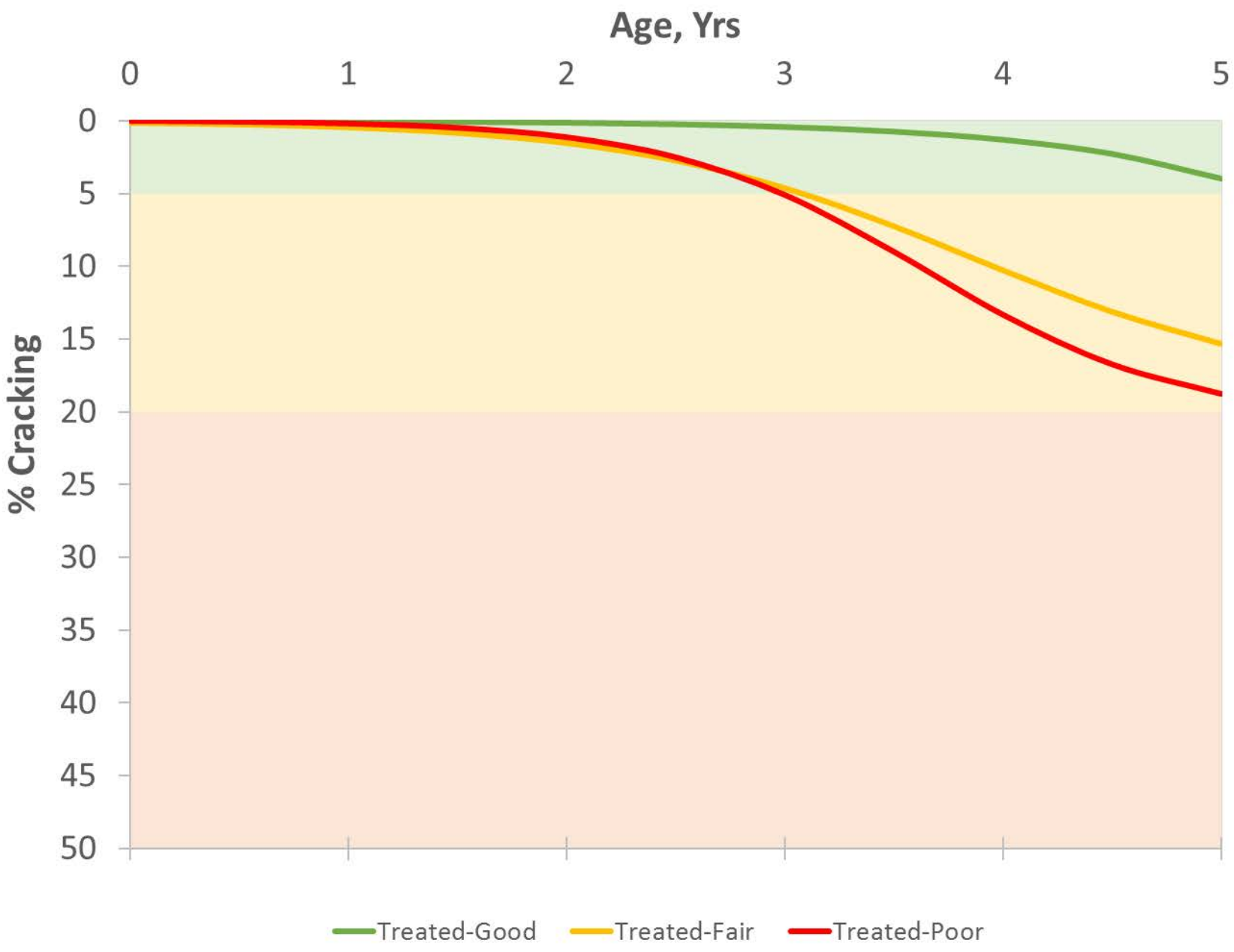
Treated-Poor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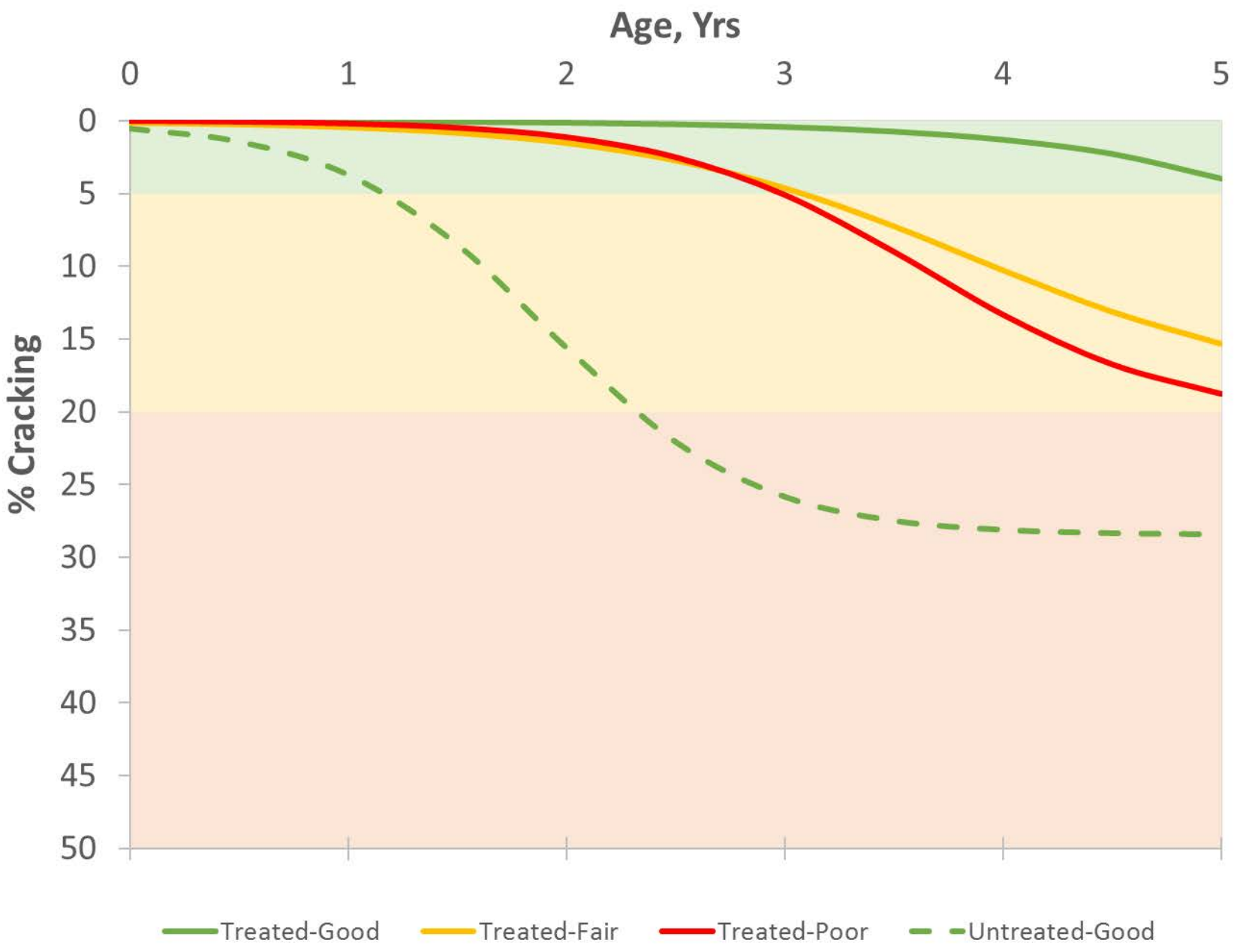
Treated-Good
Treated-Fair
Treated-Poor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% Cracking
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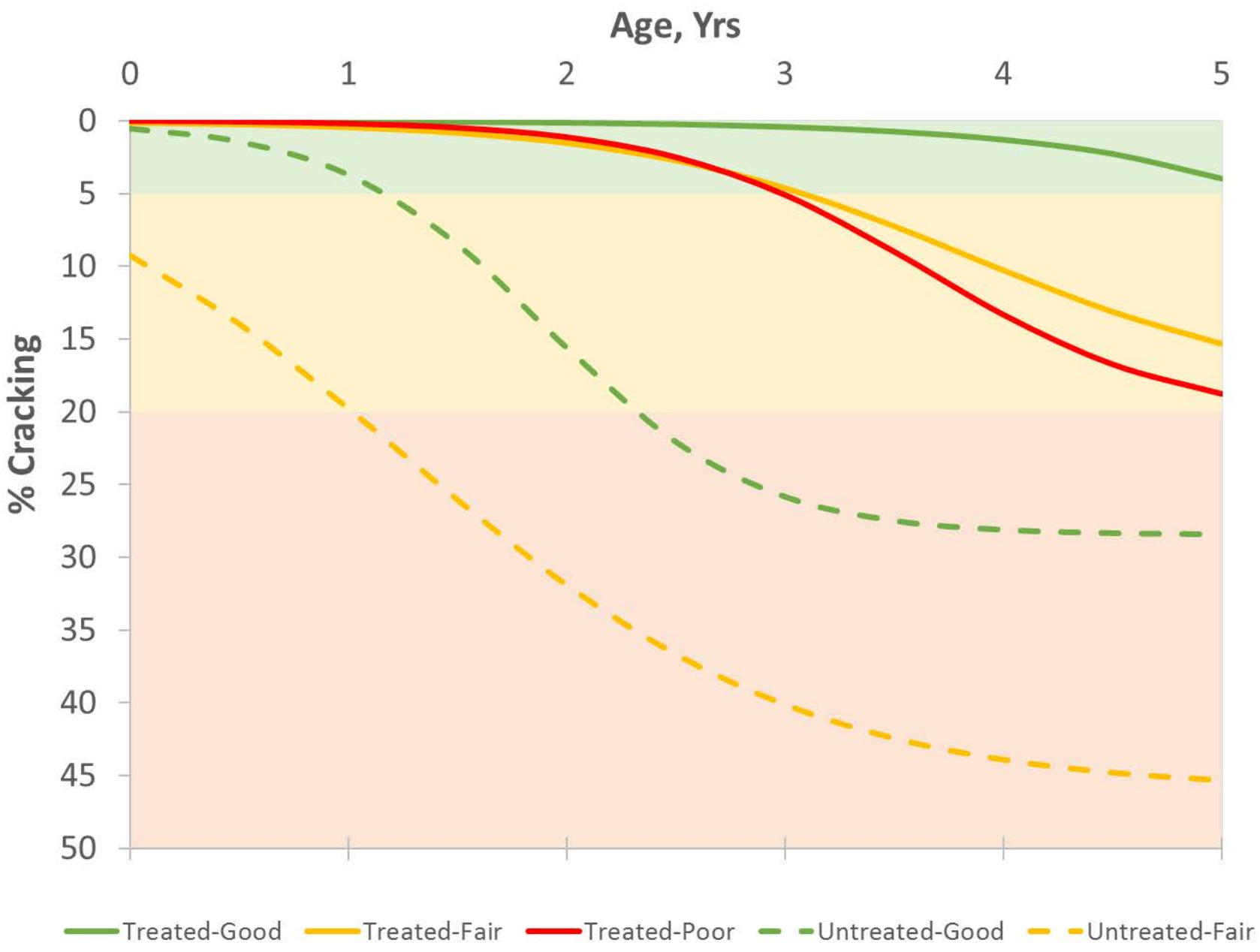
Treated-Good
Treated-Fair
Treated-Poor
Untreated-Good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Treated-Fair
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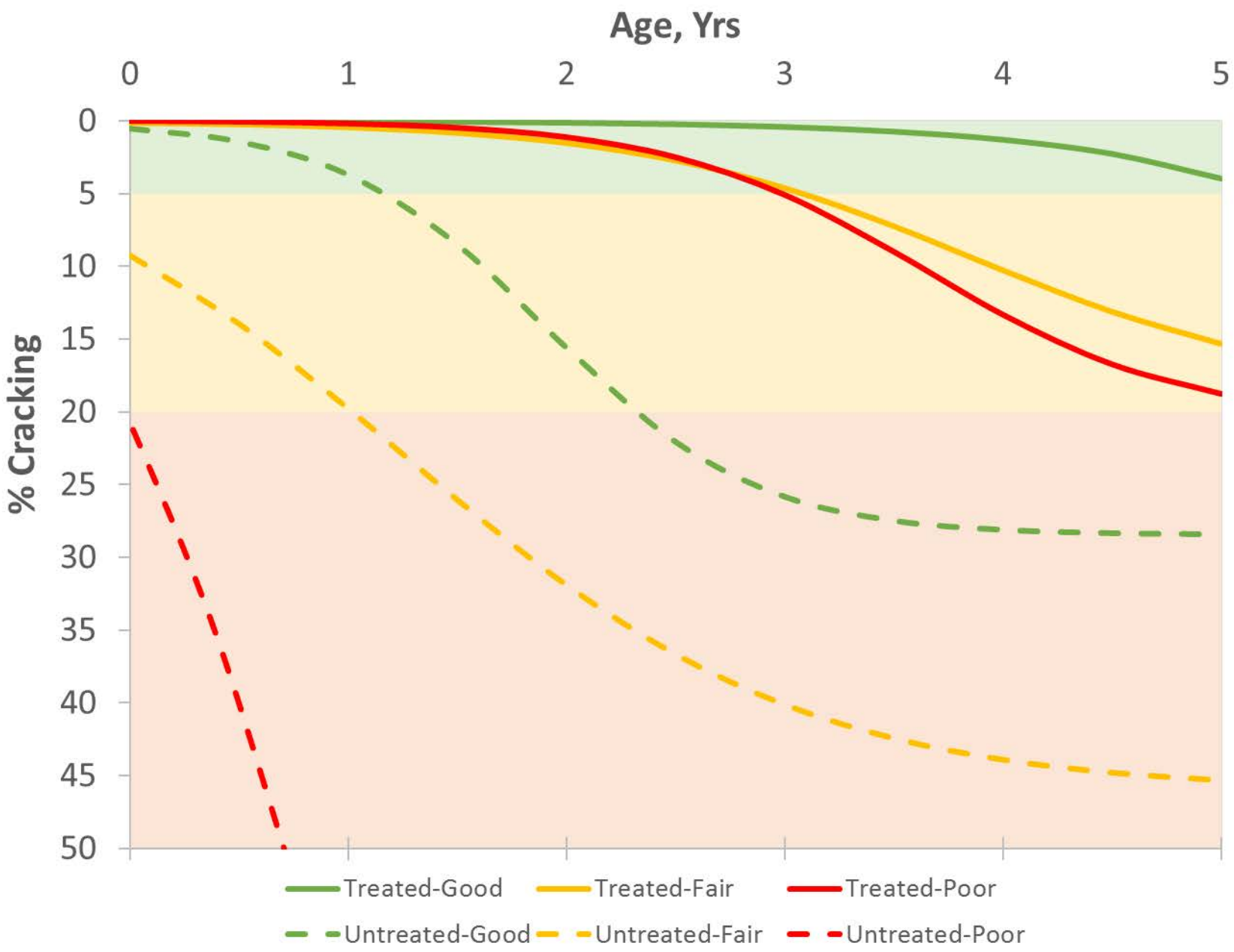
Untreated-Good
Untreated-Fair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Treated-Good
Treated-Fair
Treated-Poor
Untreated-Good
Untreated-Fair
Untreated-Poor

KEEP IN MIND:

- Continued data collection and analysis required
  - More data = better models
- It may be possible to combine curves

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CRACK SEALING WORKS

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CRACK SEALING WORKS

- Sections with crack sealing in combination with surface treatment:
  - Single layer chip seal
  - Single layer microsurface

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WITHOUT CRACK SEALING

WITH CRACK SEALING

KEEP IN MIND:

- Rout and seal works better as stand-alone treatment
- If used in combination with other treatments, overband technique is better

TRIPLE CHIP SEALS IN HIGH VOLUME ROADS

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TRIPLE CHIP SEALS

- Triple layer chip seals have performed well under low traffic volume
- However, high traffic conditions have resulted in bleeding

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KEEP IN MIND

- Friction testing is performed monthly
  - No safety concerns to date
- Consider adjustments in treatment design to prevent bleeding

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CAPE SEALS, MULTI-LAYERS AND THIN OVERLAYS

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COMBINATIONS AND THINLAYS

- More robust treatments have shown improved cracking performance
  - Double and triple-layer chip seals
  - Double-layer microsurfacing
  - Thin overlays
  - Cape seals
  - HMA Cape seals
- RAP/RAS thin overlays more susceptible

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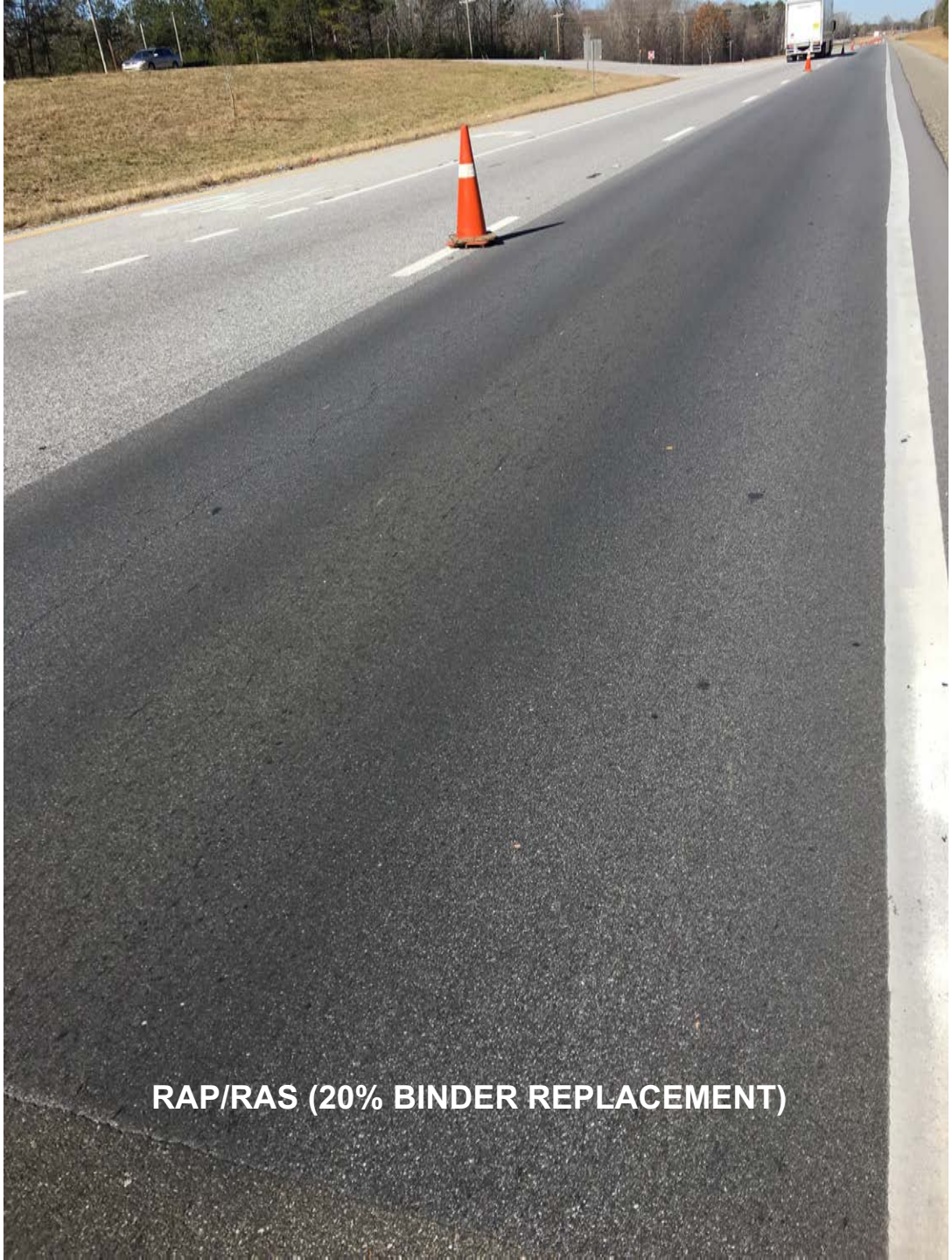
RAP (54% BINDER REPLACEMENT)

RAS (19% BINDER REPLACEMENT)


RAP/RAS (20% BINDER REPLACEMENT)

KEEP IN MIND

- Some trends still not clear
  - Too little cracking!
- Cost-effectiveness
- Look out for factors that may create “perfect storm”

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KEEP IN MIND

Slope

+

Trucks breaking =

+

Drainage issues

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KEEP IN MIND

Same treatment on US 280:

COLD RECYCLING SHOWS PROMISING RESULTS

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COLD RECYCLING

- Sections on US 280:
  - 1” Thin overlay on:
    - Foamed CCPR
    - Emulsion CCPR
    - Foamed CIR
    - Emulsion CIR
- Lee Road 159:
  - 3/4” Thin overlay on foamed CCPR

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COLD RECYCLING

- Performance:
  - Cracking performance significantly improved
    - < 5% cracking area – GOOD CATEGORY
  - Roughness
    - No significant changes over time
  - Rutting
    - Slight increasing trend
    - Sections in GOOD to FAIR category

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THINLAY ON FOAMED CCPR

THINLAY ON EMULSION CCPR

THINLAY ON FOAMED CIR

THINLAY ON EMULSION CIR

KEEP IN MIND:

- It’s still early to obtain trends/projections
- Rutting could be more significant than cracking on US 280

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SUMMARY

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OVERALL OBSERVATIONS

- All treatments outperform control sections
- Deterioration rate depends on initial condition
- Models based on cracking, but rutting and IRI are also checked
  - Other parameters also considered (macrotexture, friction, FWD)

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THANKS!

Any questions?
Reach me at
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