

Michigan Local Agency 2018 Treatment Life Study

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Tim Colling, PhD, PE, Director
Victoria Sage, Report Technical Editor

Peter Torola, PE



**Michigan
Technological**
University

Agenda

Definitions

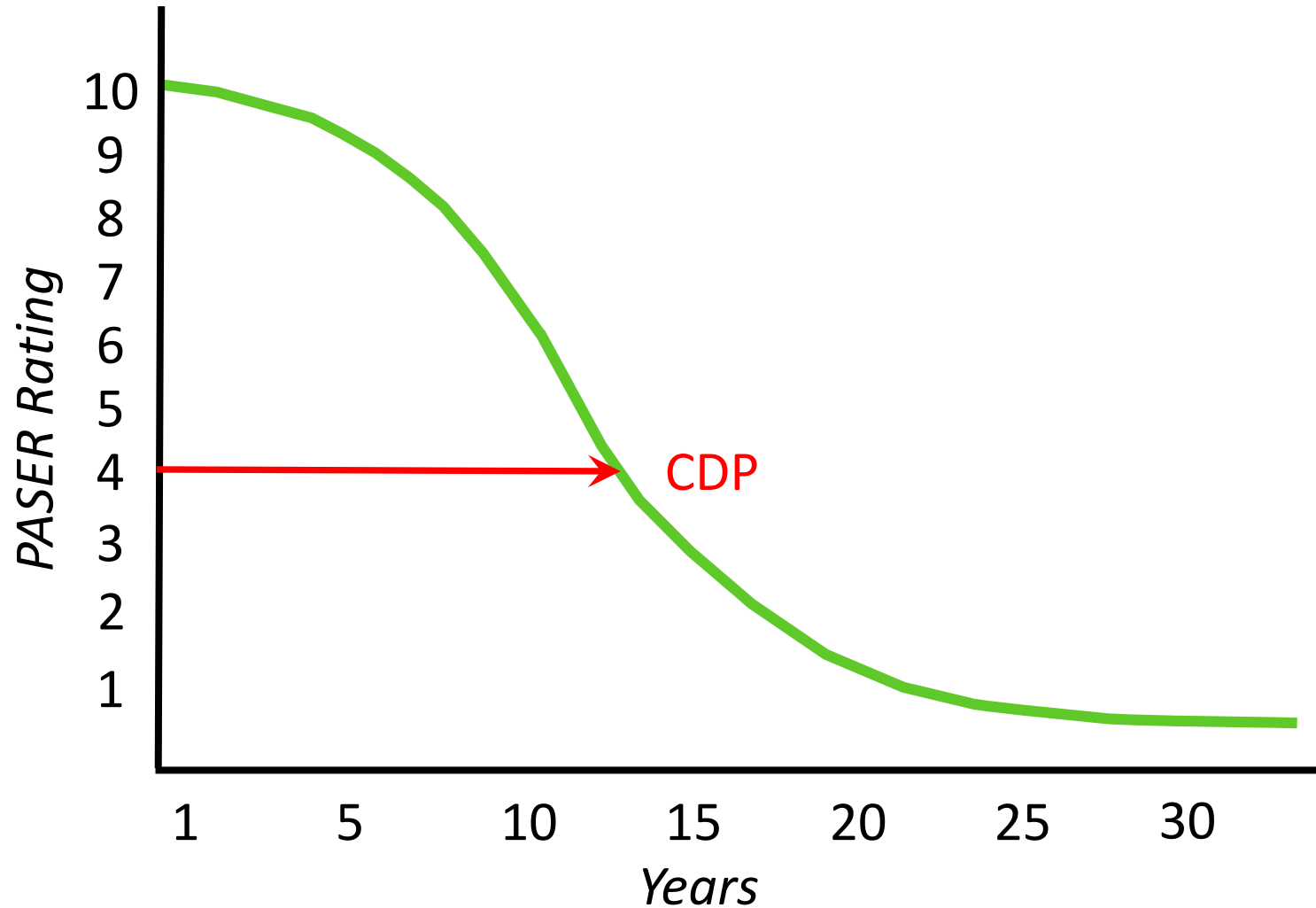
Key Finding

ESL Background

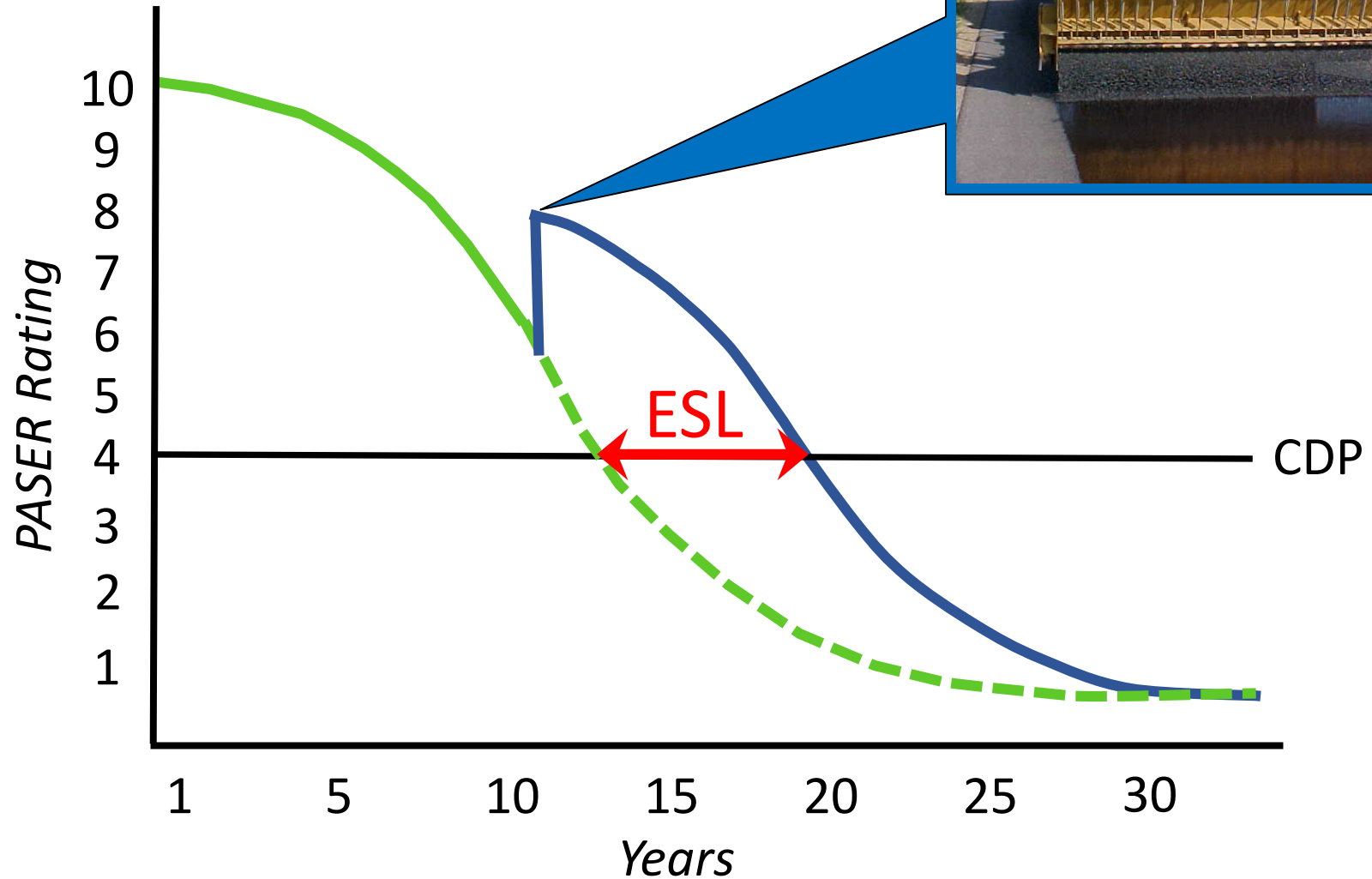
Study Overview

Results

Critical Distress Point




Extended Service Life



Key ESL Finding

Chip Seal	4.1 years
Chip Seal + Fog	7.1 years

Roadsoft Tool Background



Extended Service Life Calculation

Options

Data points before treatment(minimum) 1
Data points after treatment(minimum) 2
☒ Network(Optional) All Season Roads
[Select a saved network...](#)
[Open Road Network Builder...](#)
ESL Calculation method
☒ Additional Years until CDP reached
☐ Years until Rating repeats
☒ Manage Analyses(Optional)
[Open a saved analysis...](#)
[Save analysis...](#)
[Delete analysis...](#)

Surface Type	Surface SubType	Treatment
Asphalt	Asphalt-All Season	Sealcoat Single
Asphalt	Asphalt-Standard	
Asphalt	Composite	
Brick	Brick	
Concrete	Concrete-Standard	
Earth	Graded Earth	
Earth	Unimproved Earth	
Gravel	Gravel-Standard	
Seal Coat	Sealcoat-Standard	

Date	Treatment	Rating	Use Rating?
9/6/2011		3	<input checked="" type="checkbox"/>
8/23/2010		3	<input checked="" type="checkbox"/>
9/22/2009		5	<input checked="" type="checkbox"/>
9/25/2008		5	<input checked="" type="checkbox"/>
10/30/2007		5	<input checked="" type="checkbox"/>
9/28/2006		7	<input checked="" type="checkbox"/>
9/14/2005		8	<input checked="" type="checkbox"/>

Use	TreatDate	FullName	Bmp	Emp	ESL
<input checked="" type="checkbox"/>	7/20/2004	F 41	2.696	2.835	1
<input checked="" type="checkbox"/>	7/20/2004	F 41	2.835	2.984	1
<input checked="" type="checkbox"/>	7/20/2004	F 41	0.000	0.991	1
<input checked="" type="checkbox"/>	7/20/2004	F 41	0.991	0.993	1

Roadsoft Extended Service Life Report (Detail)

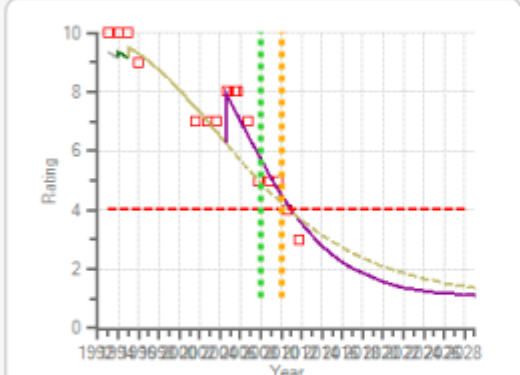
1/2/1993 Reconstruction - 6" base, 3" top (AspAS) 10

Date	Treatment	Treatment Date	Name	Bmp	Emp	RSL Rating	ESL
10/21/2014	Sealcoat Single	8/17/2004	N Barlow Rd	10.233	10.57	-4	2

Deterioration Curve for N Barlow Rd, Segment: 10.233-10.577

Surface Subtype: Asphalt-All Season, Treatment: Sealcoat Single

ESL Method: Additional Years until CDP reached

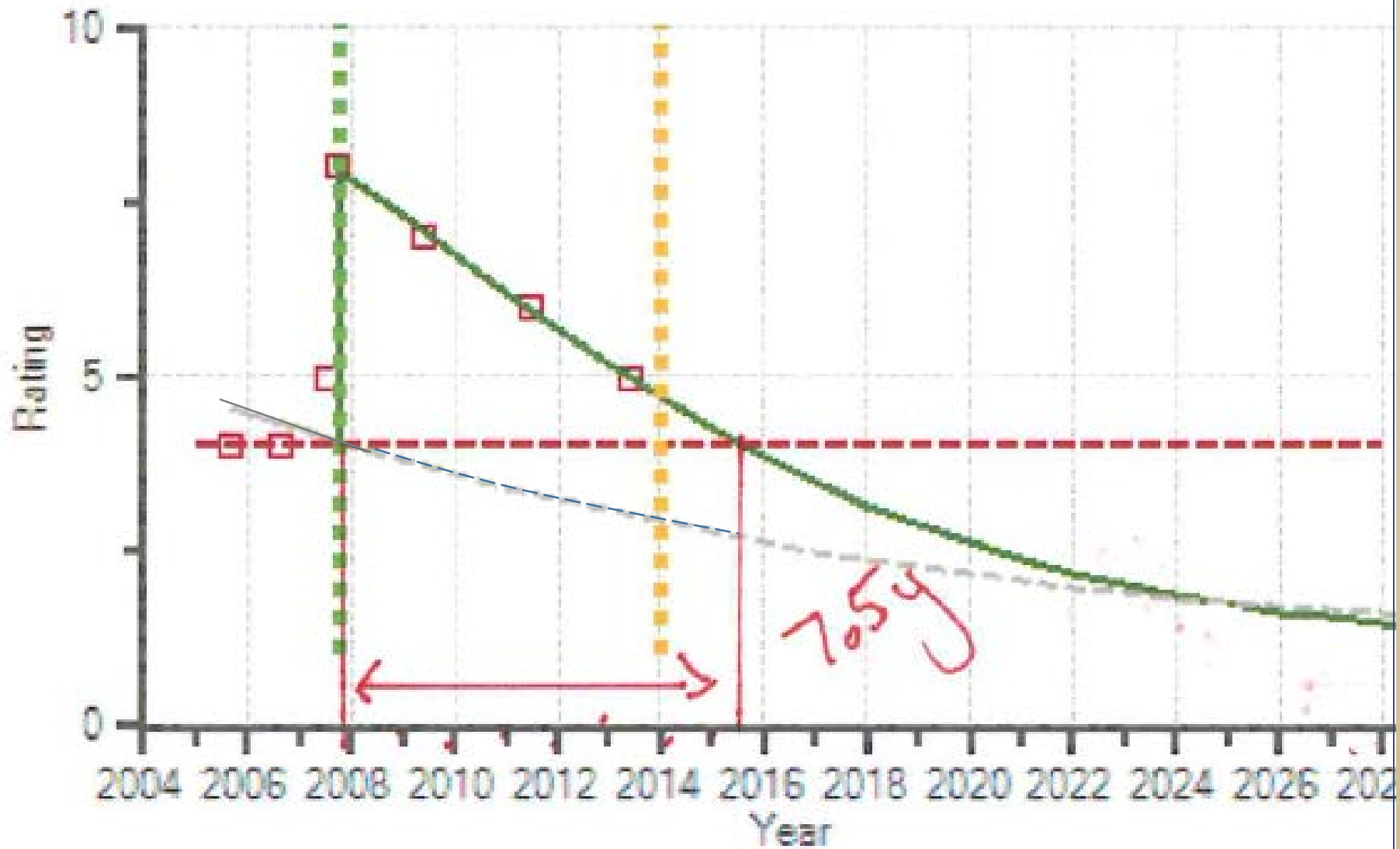


Legend

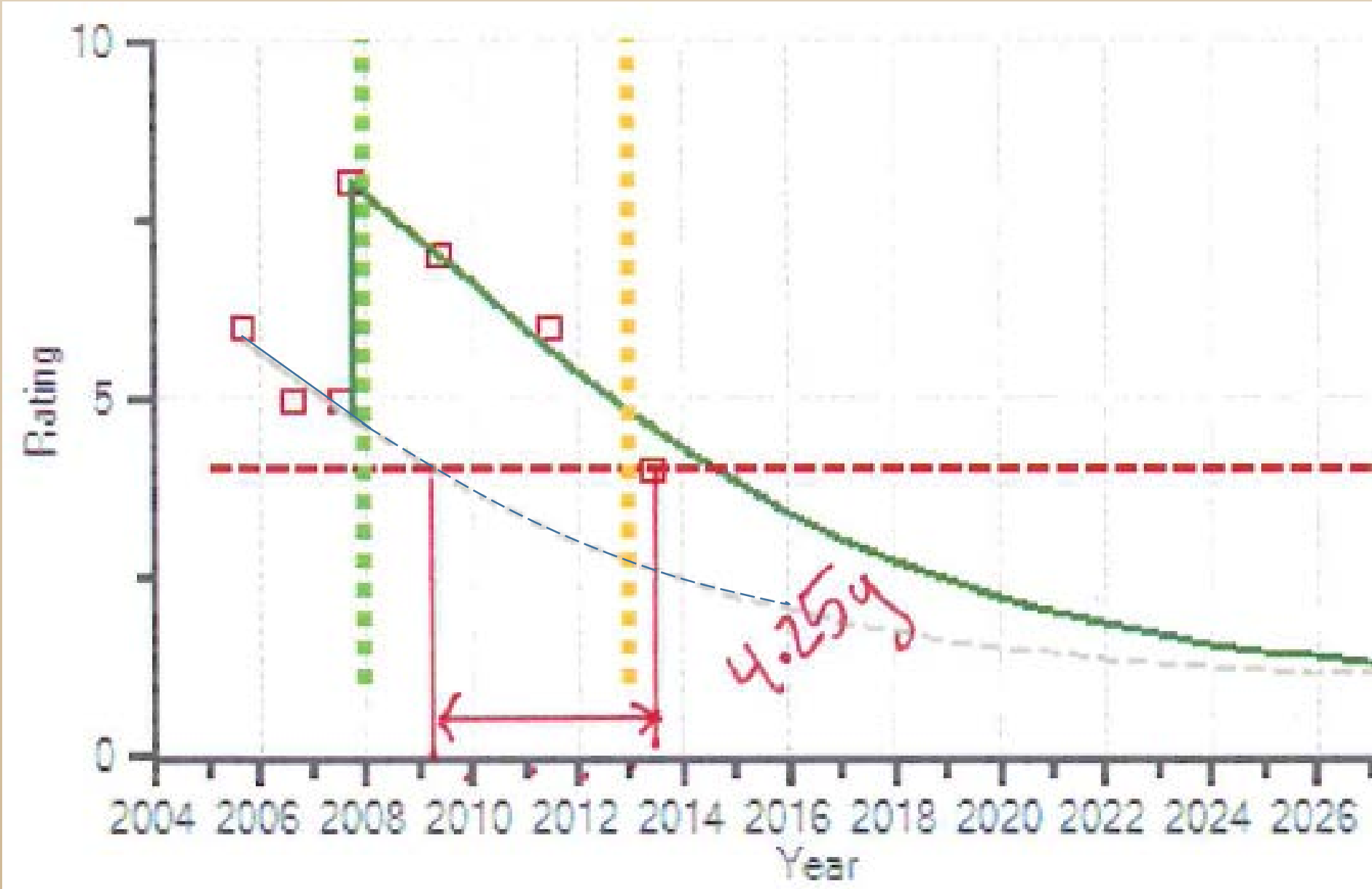
- Rating Points
- Reconstruction - 6" base, 3" top (AspAS)
- Treatment Inferred From Rating
- Sealcoat Single
- cDP Rating
- ESL Year1
- ESL Year2

Date	Treatment	Rating	Use Rating
9/6/2011		3	<input checked="" type="checkbox"/>
8/23/2010		4	<input checked="" type="checkbox"/>
9/22/2009		5	<input checked="" type="checkbox"/>
9/25/2008		5	<input checked="" type="checkbox"/>
10/30/2007		5	<input checked="" type="checkbox"/>
9/28/2006		7	<input checked="" type="checkbox"/>

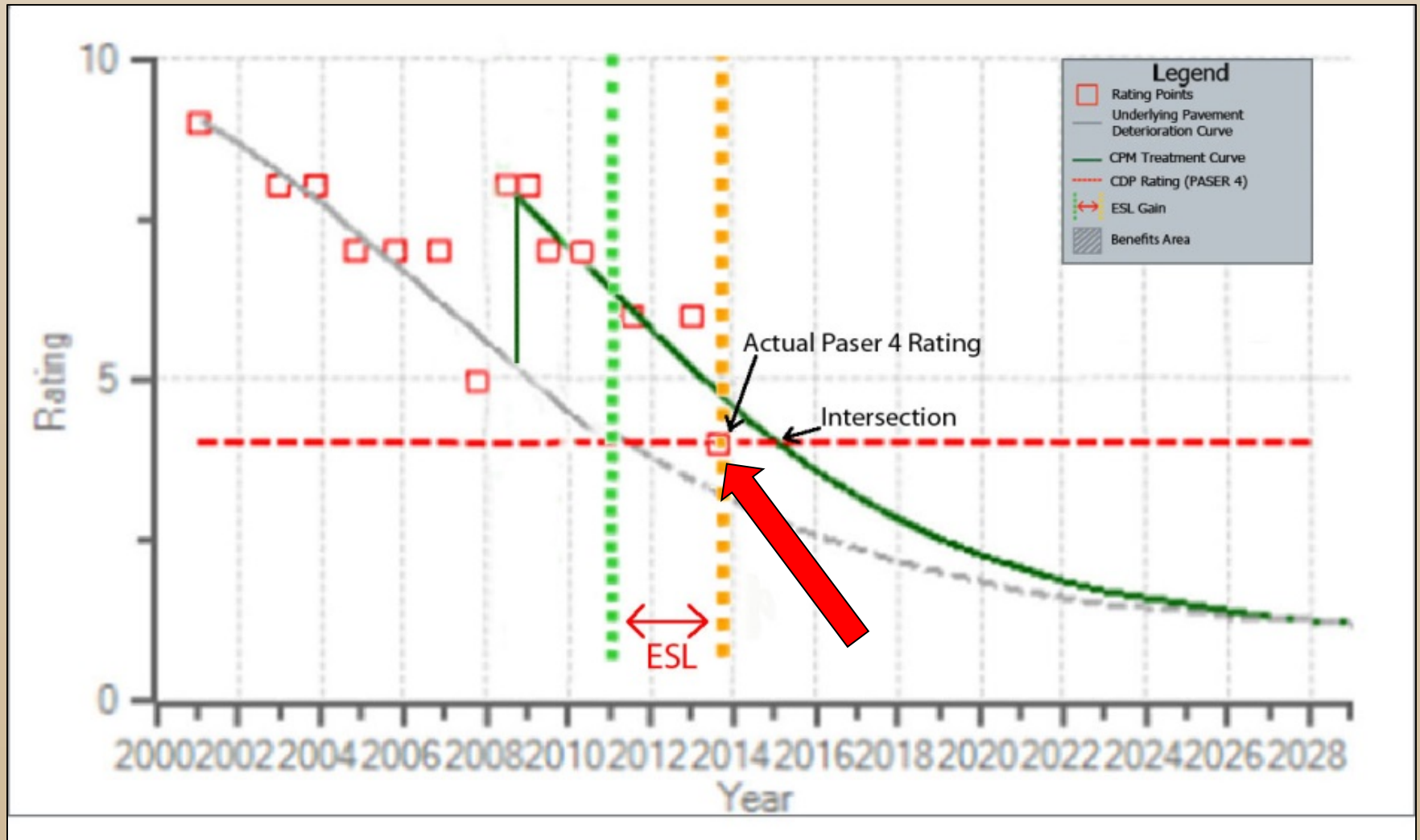
Needed ESL Calculator Updates



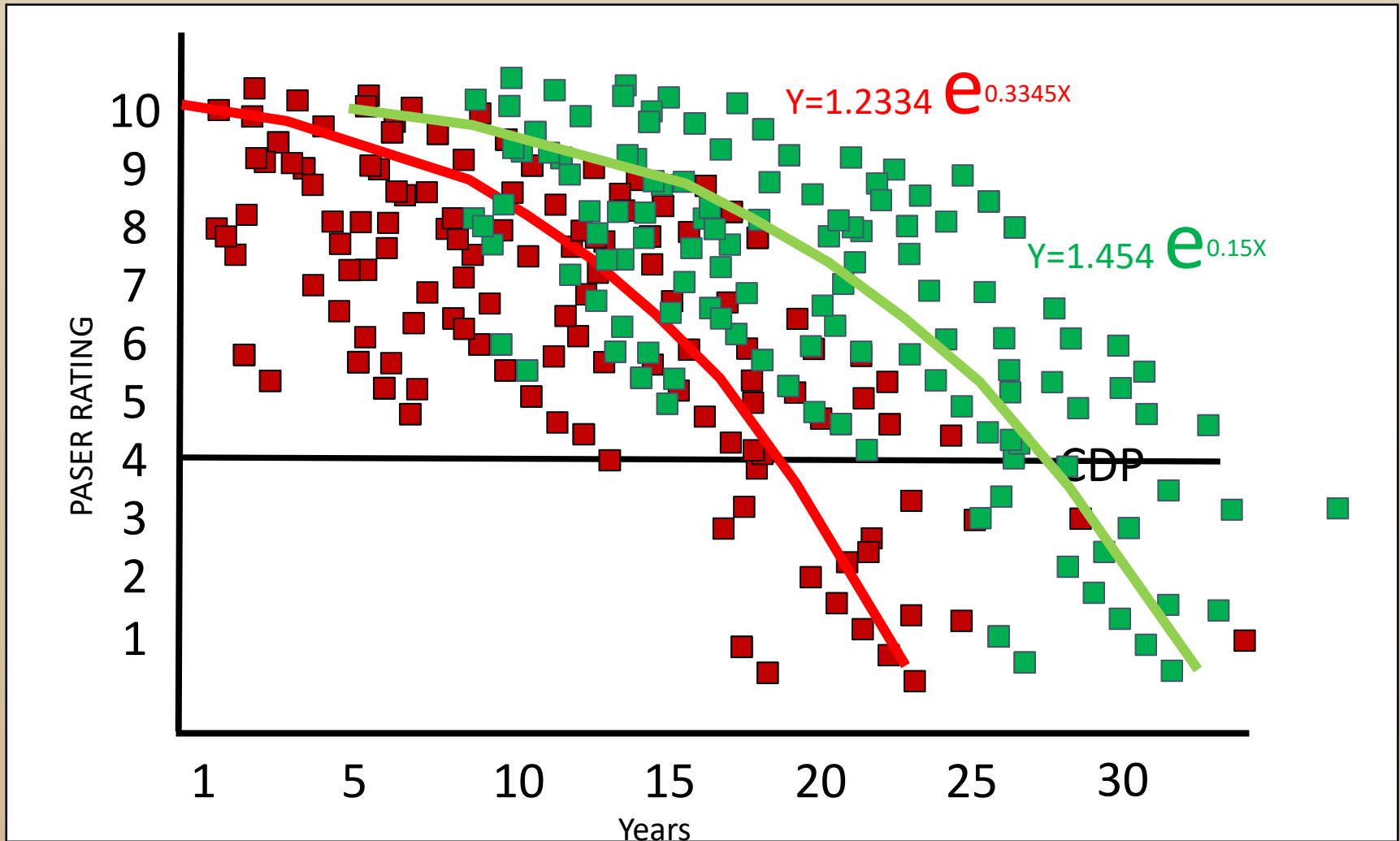
Needed ESL Calculator Updates



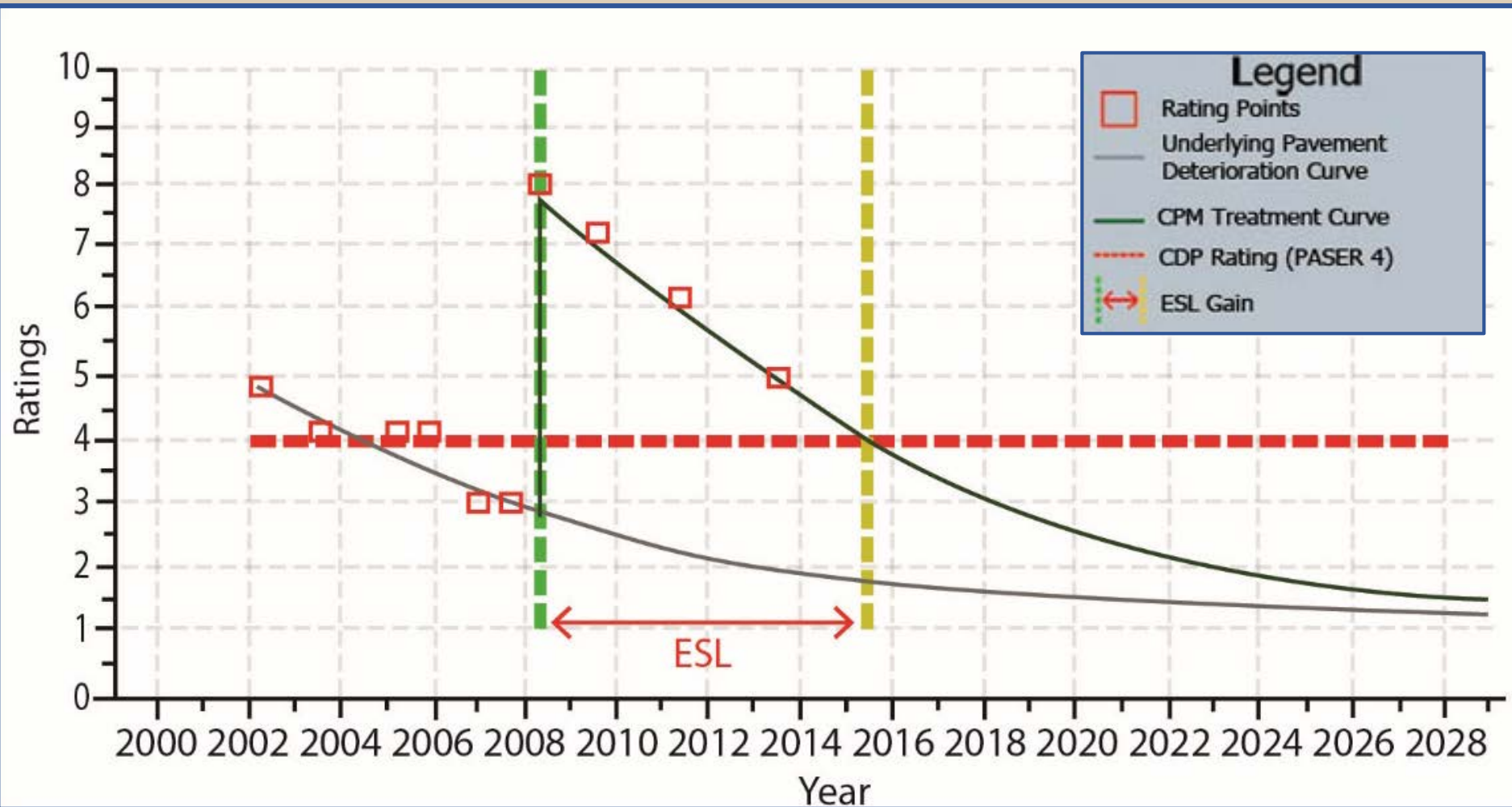
Measuring ESL: Actual vs. Modeled



Other Studies use Aggregate Modeling Techniques



We used Individual Element Modeling



Why don't more people use this method for analysis?



Study Data Selection Criteria

- Asphalt pavements
- Federal aid eligible roads
- 1st applied treatment ever or after a heavier treatment
- 3 rating points before and after treatment
- Only rating data prior to 2000



PASER Rating/Treatment	
8/30/2010	# PASER Rating 8 - Very Good
6/22/2009	# PASER Rating 10 - Excellent
9/29/2008	# PASER Rating 7 - Good
9/19/2007	# PASER Rating 7 - Good
9/18/2006	# PASER Rating 7 - Good
8/24/2005	# PASER Rating 7 - Good
10/18/2004	# PASER Rating 7 - Good
8/27/2003	

Surface

Segments

14 Treatments Meeting Criteria

Cape Seal

Chip Seal

Chip Seal + Fog

Microsurface

Slurry Seal

Thin Overlay

Cold in Place (CIP) + Overlay

Crush & Shape

Hot in Place (HIP)

HIP + Overlay

HMA Wedge + Chip Seal

HMA Wedge + Overlay

Thick Overlay

Reconstruction

5 Treatments with Enough Data

Chip Seal

Chip Seal + Fog

Thin Overlay

Crush & Shape

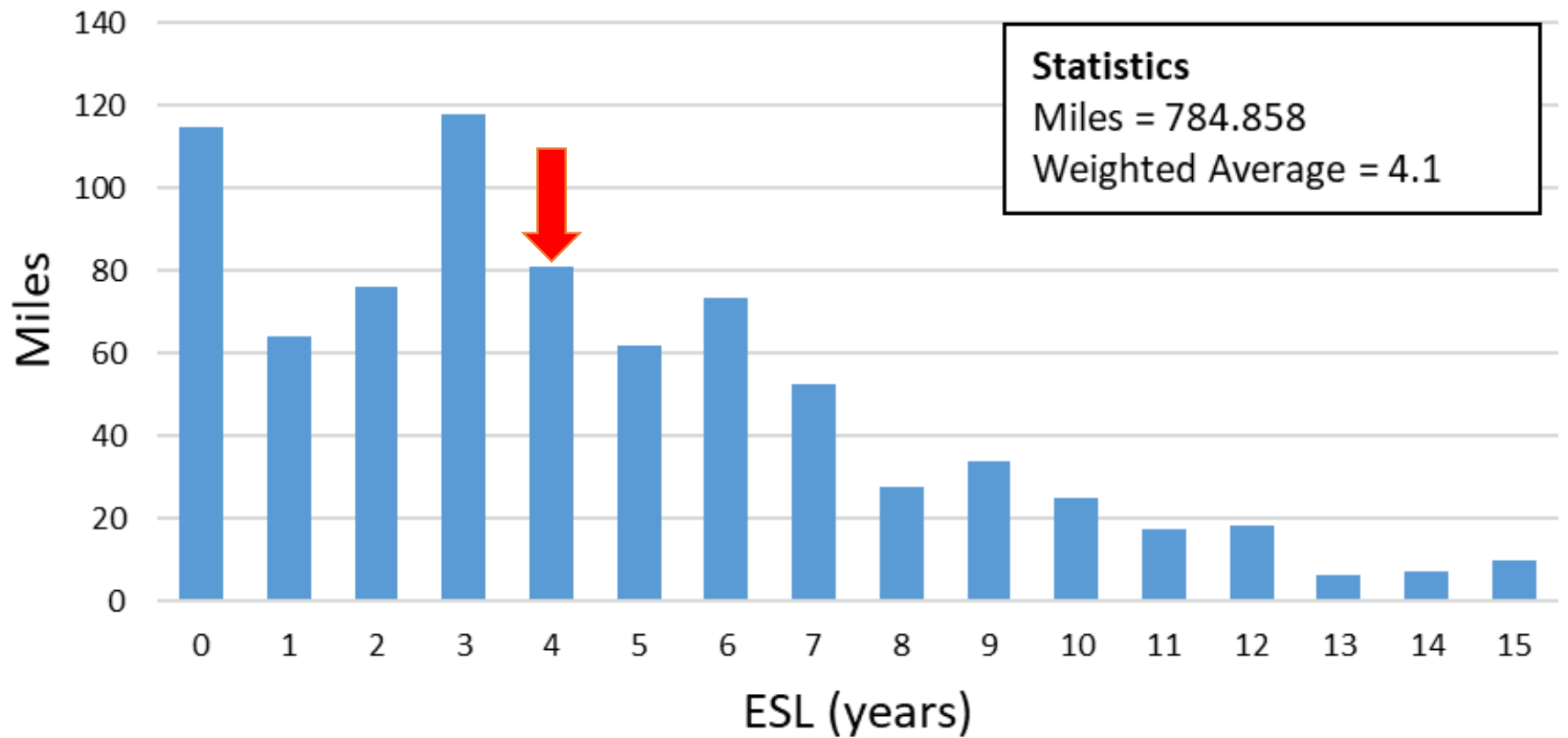
Thick Overlay

Seal Coat (Chip Seal)



Chip Seal Results

Chip Seal ESL

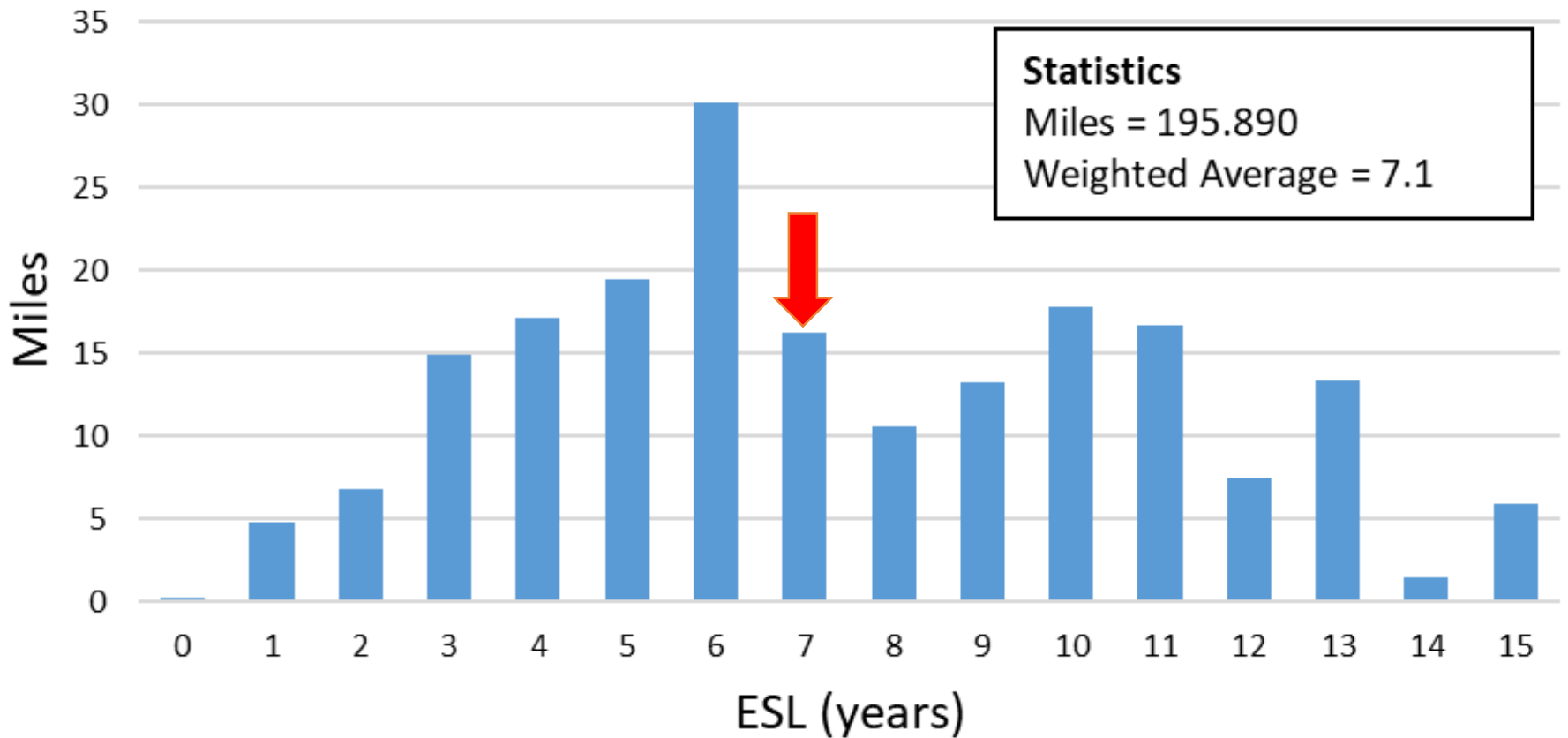


Chip Seal + Fog Seal



Chip With Fog

Chip Seal + Fog ESL

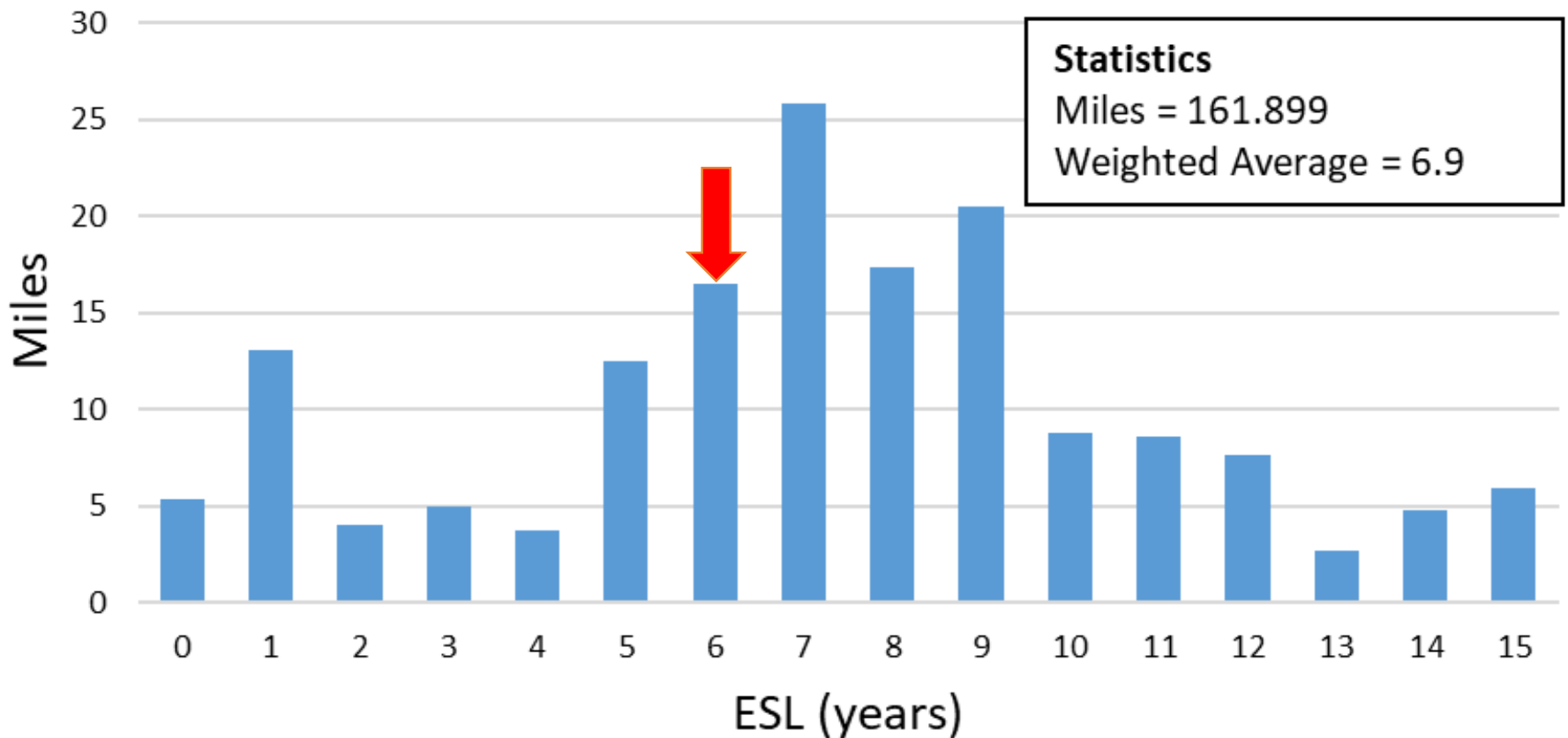


Thin Asphalt Overlay



Thin Asphalt Overlay

Thin Overlay ESL

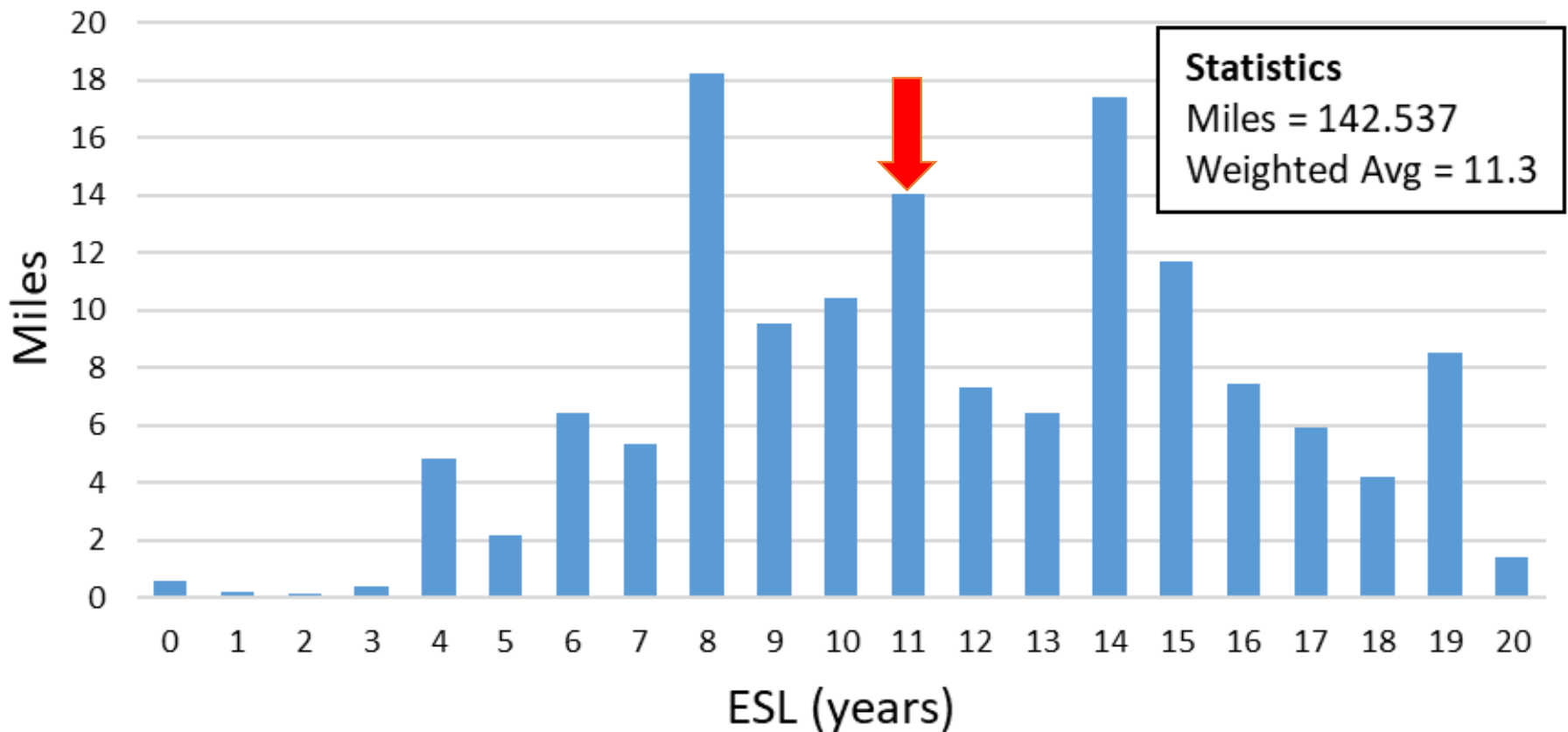


Crush and Shape



Crush and Shape

Crush & Shape ESL

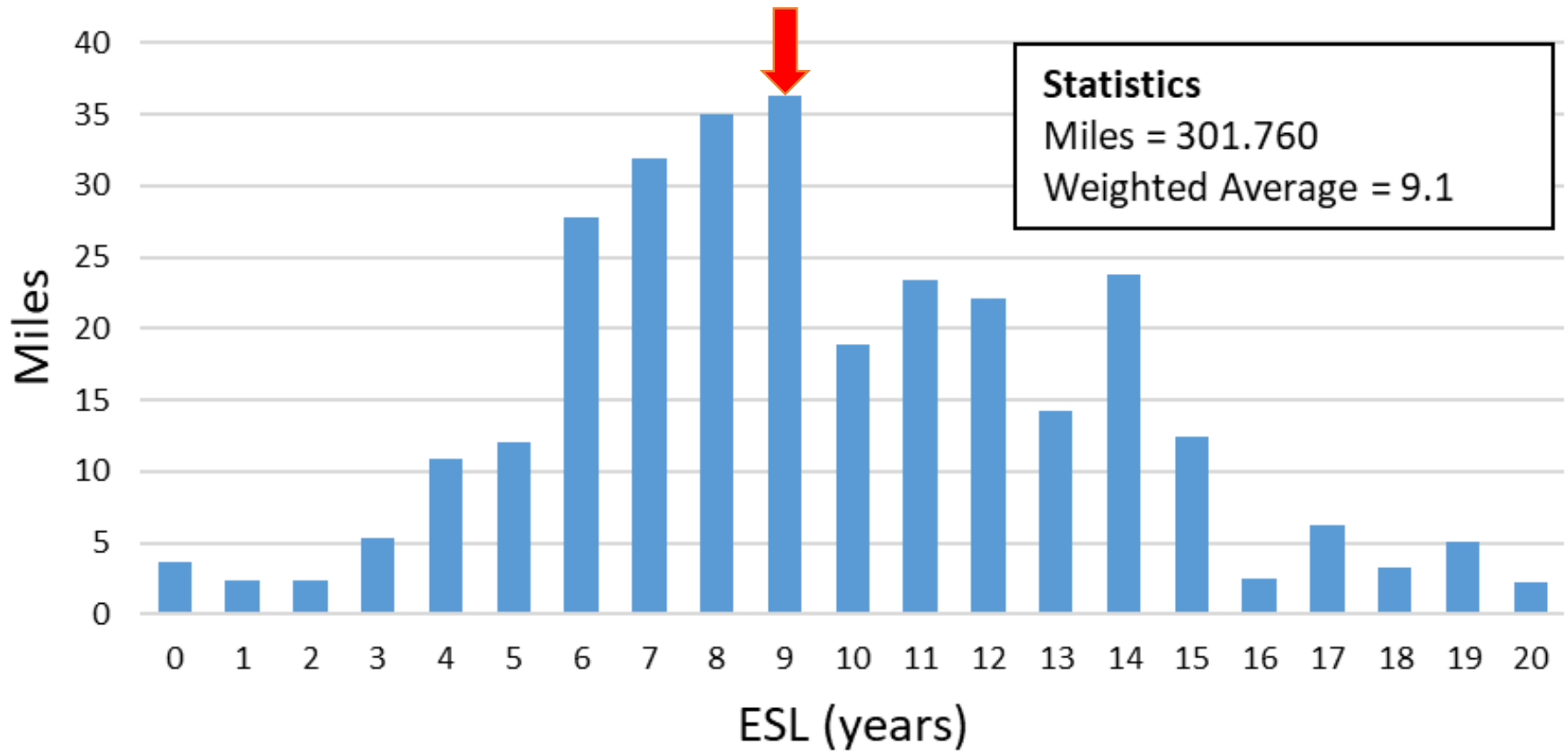


Thick Asphalt Overlay

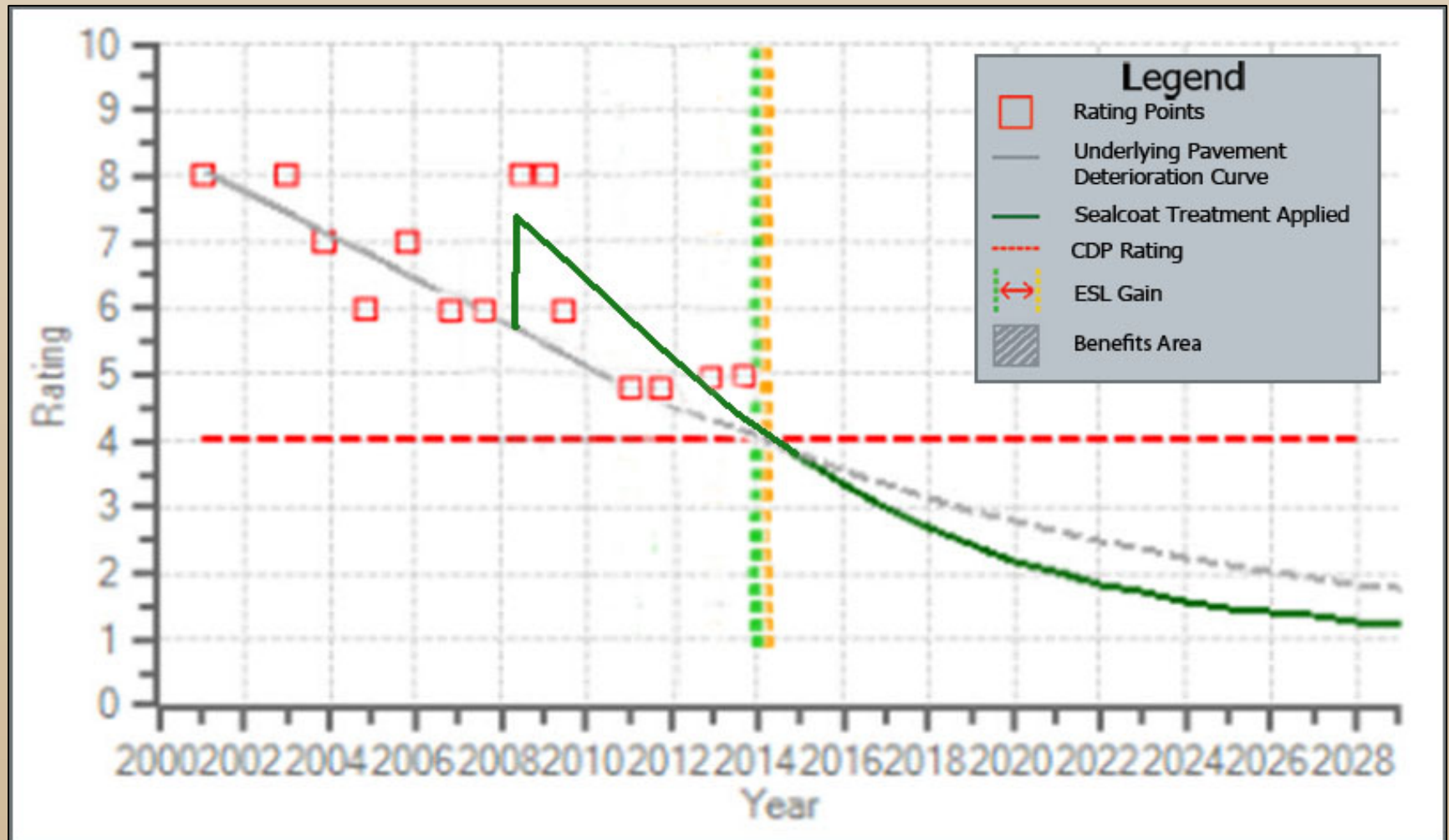


Thick Asphalt Overlay

Thick Overlay ESL



Zero or Low ESL Gain?



Age VS Load Related Distress

Age Related Distress



Transverse Cracking



Longitudinal Cracking



Block Cracking

Load Related Distress



Rutting



Cracking in the Wheel Path



Alligator Cracking

Other Variables

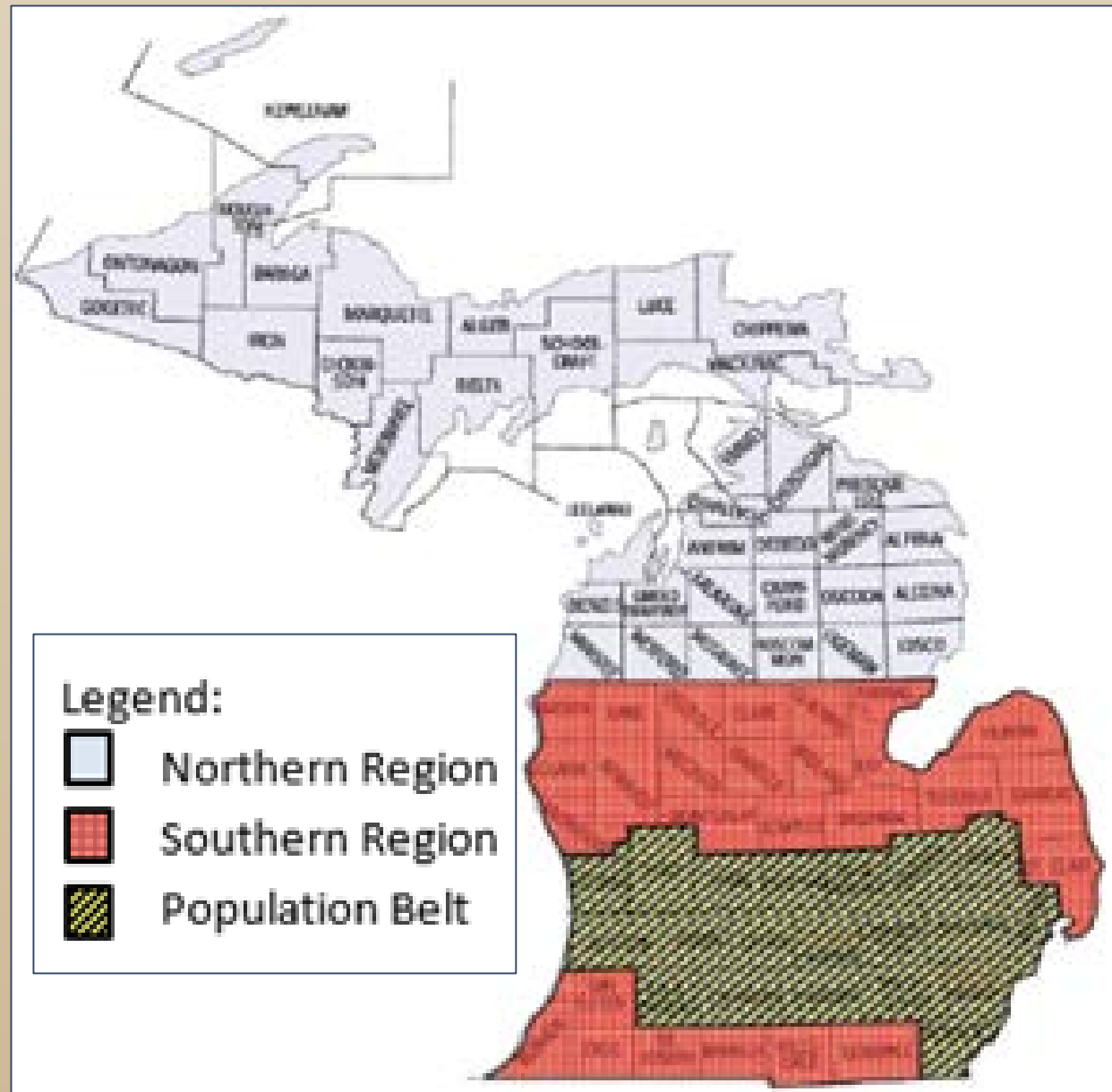
Legal System

National Function Class

Lanes

Region

Chip Seal Thick Overlay



Points To Take Away

Study looked at worst case analysis for ESL

Local agencies are collecting high quality data

Local agencies gain significant benefit with treatments

Cost effective analysis should drive practice

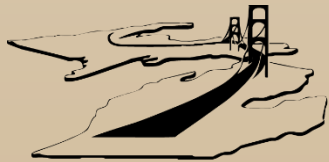
You have the data and tools to do this yourself

Contact Information



Michigan
Transportation Asset
Management Council

www.michigan.gov/tamc



**Michigan's
Local Technical
Assistance Program**

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