

MHCC Wind Task Force

Project Update

MHCC Meeting – Tulsa, OK

April 28, 2010

History

Original proposal – received during 2008 Standards revision cycle

- Based on work by NFPA 501 committee
- Updating the wind loads
- ASCE 7 – Minimum Design Loads for Buildings and Other Structures
 - Wind loads in 1994 HUD Standards based on ASCE 7-1988
 - Revisions since '88 – 1995, 1998, 2002, 2005
 - Proposal to use the latest version – 2005

Eight Teleconferences

- 1st – Sept 2008
- Two more in 2008
- Three in 2009
- Two in 2010 (not counting Tulsa)

Task Force Participation

- Major work by “proponent” David Low
 - Underline/strikeouts, calculations, tables, graphs, maps, etc.
- Continuous input from Rick Mendlen
- Task Force participation has varied
 - Changes in MHCC Membership
 - Very detailed, technical work
 - Low & Mendlen made every call

Results of 1-1/2 Years Work

- Complete proposed wording changes to 3280 & 3285
- New wind zone maps
- Table of Design Pressures
 - Following existing table form
 - Using ASCE 7-05 methods
 - Tailored to manufactured housing

Table of Wind Pressures

Table of Wind Design Pressures Wind Zone 2 (110 mph 3-second gust)			
Building Element	Roof Slope (Note 1)		
	3:12 - 4.3:12	5:1 2	7:1 2
Anchorage for lateral and vertical stability			
Net horizontal drag	25	25	25
Uplift (Notes 9 and 10)	-16	-14	-13
Horizontal / lateral load applied to vertical projection of roof	8	11	15
Main Wind Force Resisting Systems			
Shearwalls	25	25	25
Ridge beams and other main roof support elements (Note 9 & 11)	-20	-13	-17
Components and Cladding (Note 12)			
Roof trusses:			
Within 4 ft of endwalls and eaves	+/-42	+/- 42	+/- 31
All other areas	+/-24	+/- 24	+/- 26
Exterior roof coverings, roof sheathing, and fastening:			
Within 4 ft of endwalls and eaves (and ridge for 7:12)	+/-42	+/- 42	+/- 31
Within 4 ft of corners	+/-62	+/- 62	+/- 31
All other areas	+/-24	+/- 24	+/- 26
Eave Overhangs (Note 13)	+/-49	+/- 49	+/- 45
Gable Overhangs	+/-49	+/- 49	+/- 45
Corner Overhangs	+/-83	+/- 83	+/- 45
Wall Studs in sidewalls and endwalls, exterior windows, and sliding glass doors (glazing and framing), exterior coverings, sheathing and fastening			
Within 4 ft of corners	+/-35	+/- 35	+/- 35
All other areas	+/-29	+/- 29	+/- 29

Table of Wind Pressures (cont.)

- Wind speeds increased – from fastest mile to 3-second gust
- Table for each wind zone (instead of one table)
- Wind zone designations changed from I, II, III to 1, 2, 3
- Wind zone 1 now incorporated in the tables
- New wind zone – Wind Zone 4 (150 mph)
- Roof slope a significant variable

Table of Wind Pressures (cont.)

- New Categories
 - Lateral load on vertical roof projections
 - Corner (roof) overhangs
 - 3 ft corners increased to 4 ft
- Additional notes allowing more variation
 - Higher overall heights than 15 ft
 - Wind parallel to ridge
 - Uplift for low-slope roofs

New Wind Zone Maps

- Based on ASCE 7-05
- Conservatively skewed when county is split by isotach
- Shifted to avoid “decreased protection”

Decreased Protection

- Straight ASCE 7-05 gives lower pressures for some situations

	<u>WZII (existing)</u>	<u>WZ2 (proposed)</u>
Net horiz. Drag	39	25
Uplift	27	16 to 13
Eave overhangs	51	49 to 45
Gable overhangs	73	49 to 45
Wall studs in corners	48	35

- Good performance by post-1994 homes in 16 years of storms
- Reason for reduction in pressures between 1994 & 2005?
 - 1994 assumptions?
 - Newer weather data?

Decreased Protection Alternatives

1. Shift the wind zones

Move critical portions of zone 2 to zone 3

Move critical portions of zone 3 to new zone 4

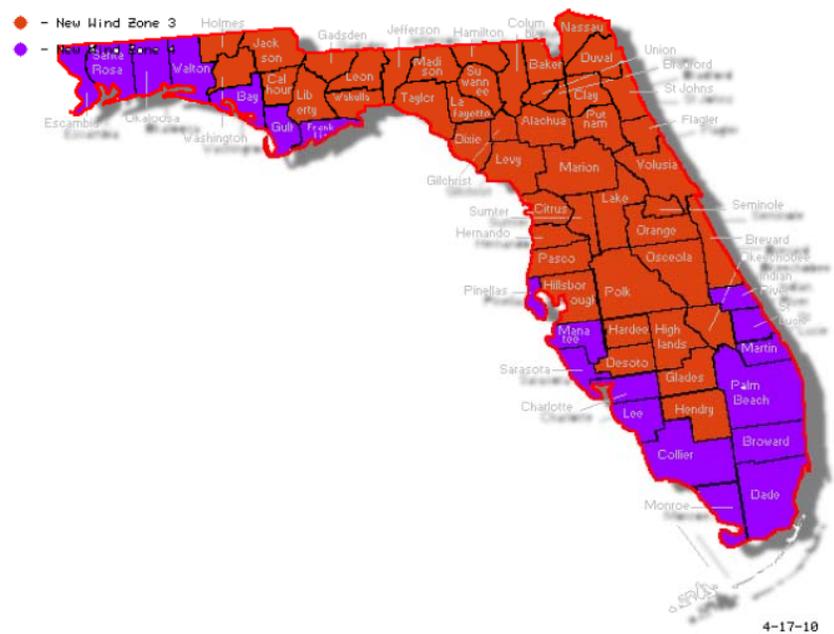
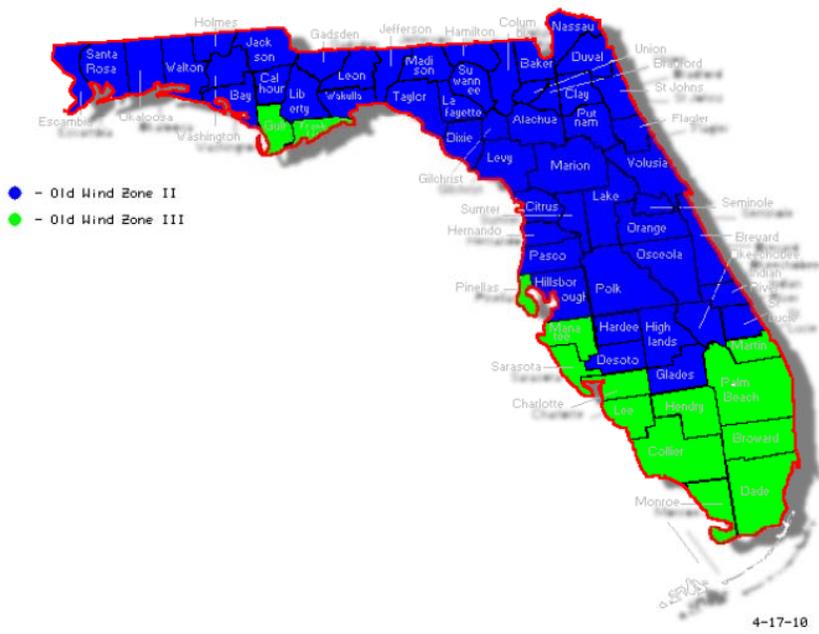
(see examples)

2. Revise the pressure tables (no value less than existing 3280 values)

3. No change at all

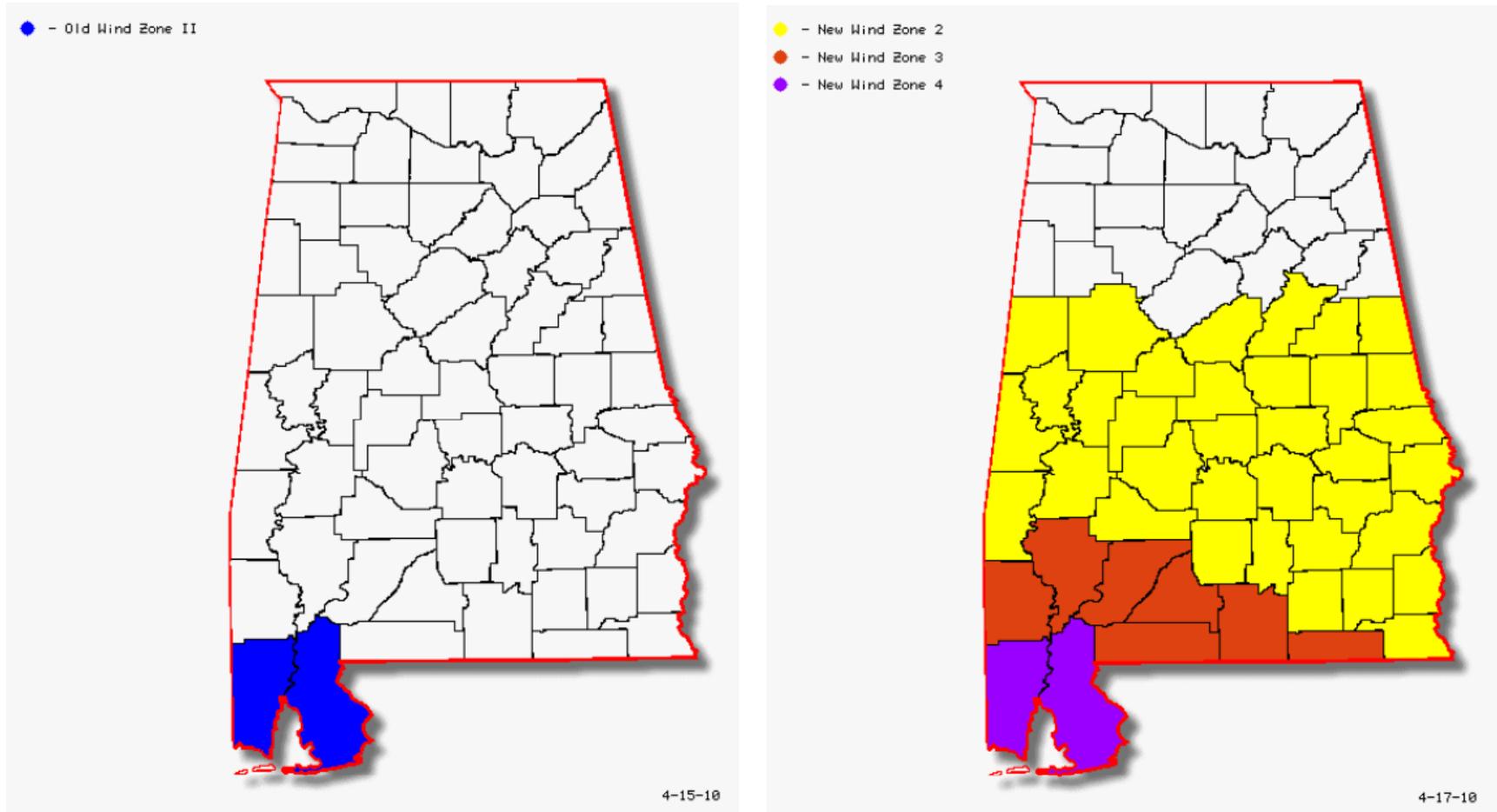
4. “Alabama Compromise”

Florida



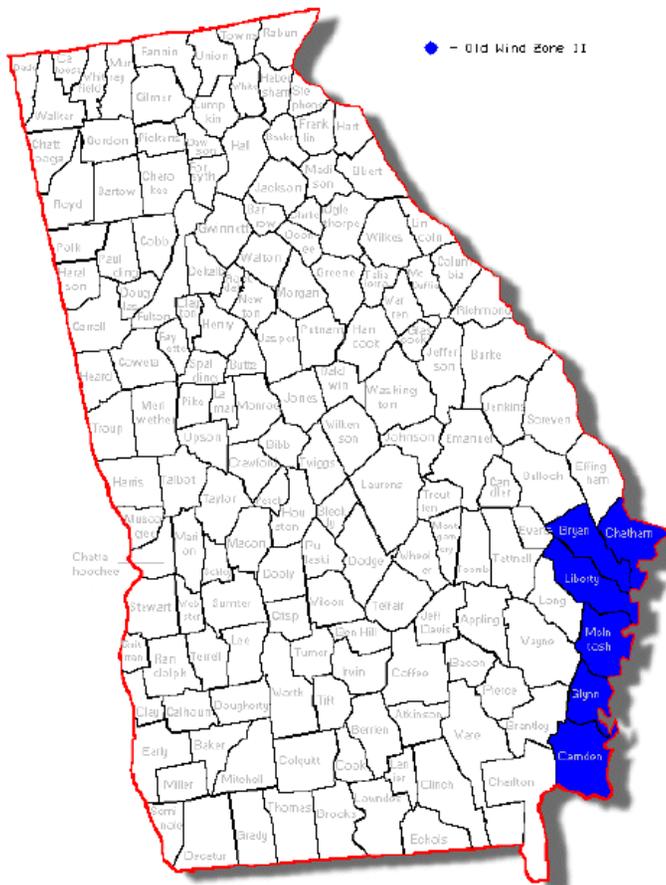
Decreased Protection Alternatives (cont.)

Shifting Wind Zones

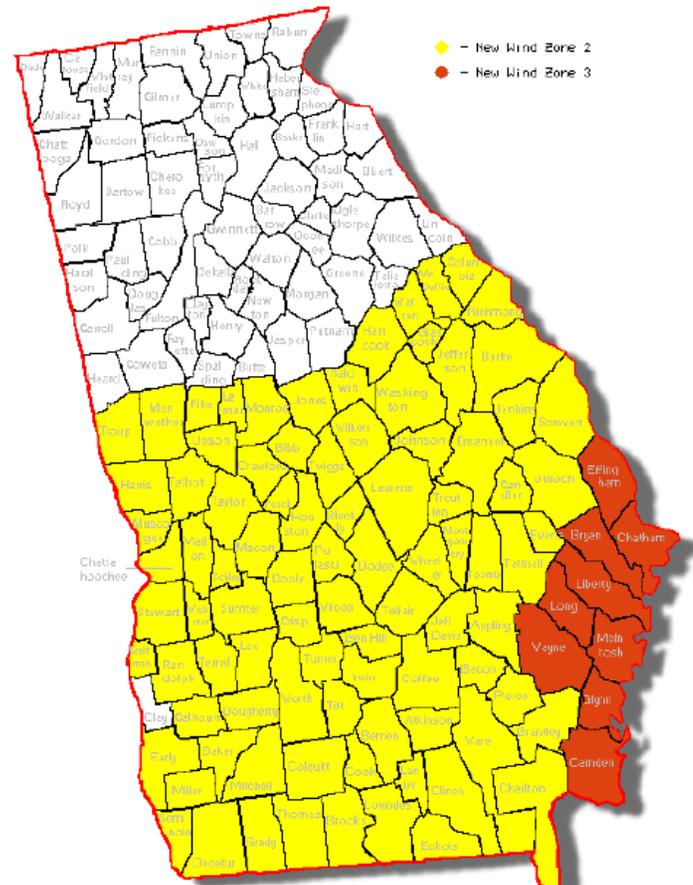


Decreased Protection Alternatives (cont.)

Shifting Wind Zones



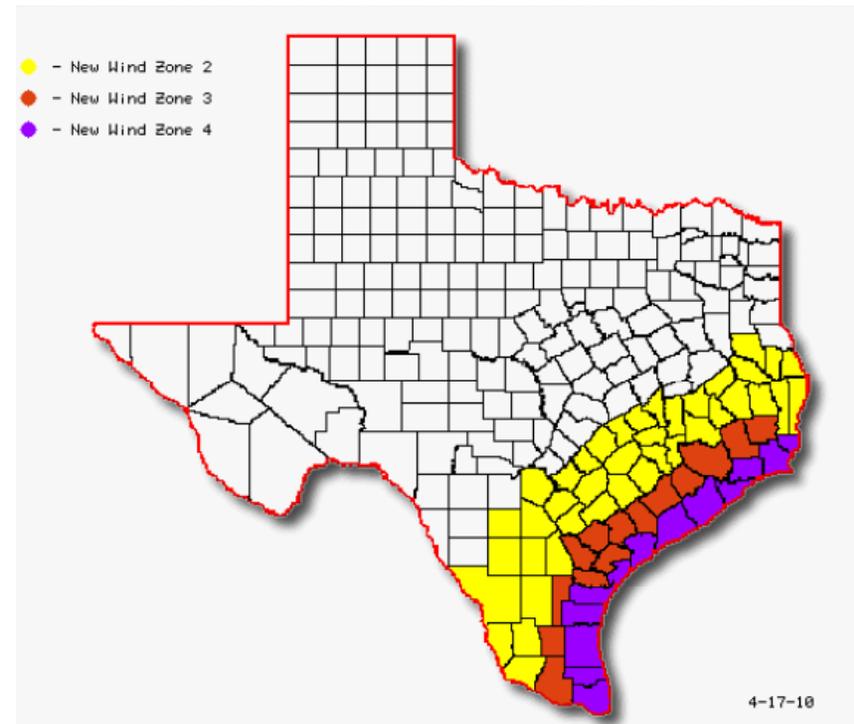
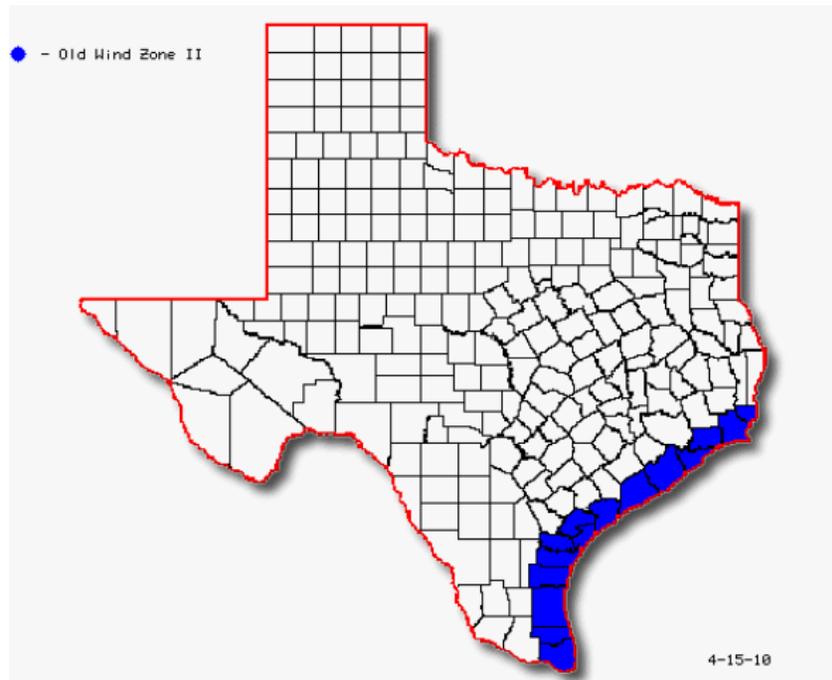
4-15-18



4-15-18

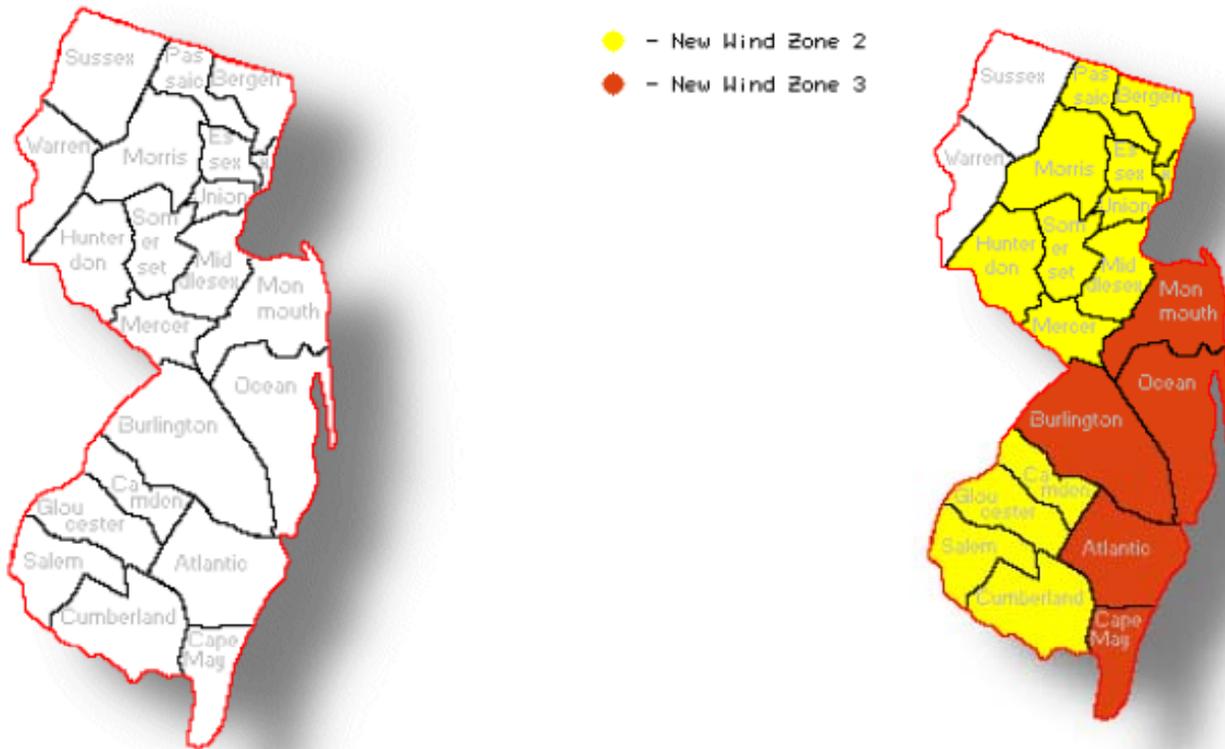
Decreased Protection Alternatives (cont.)

Shifting Wind Zones



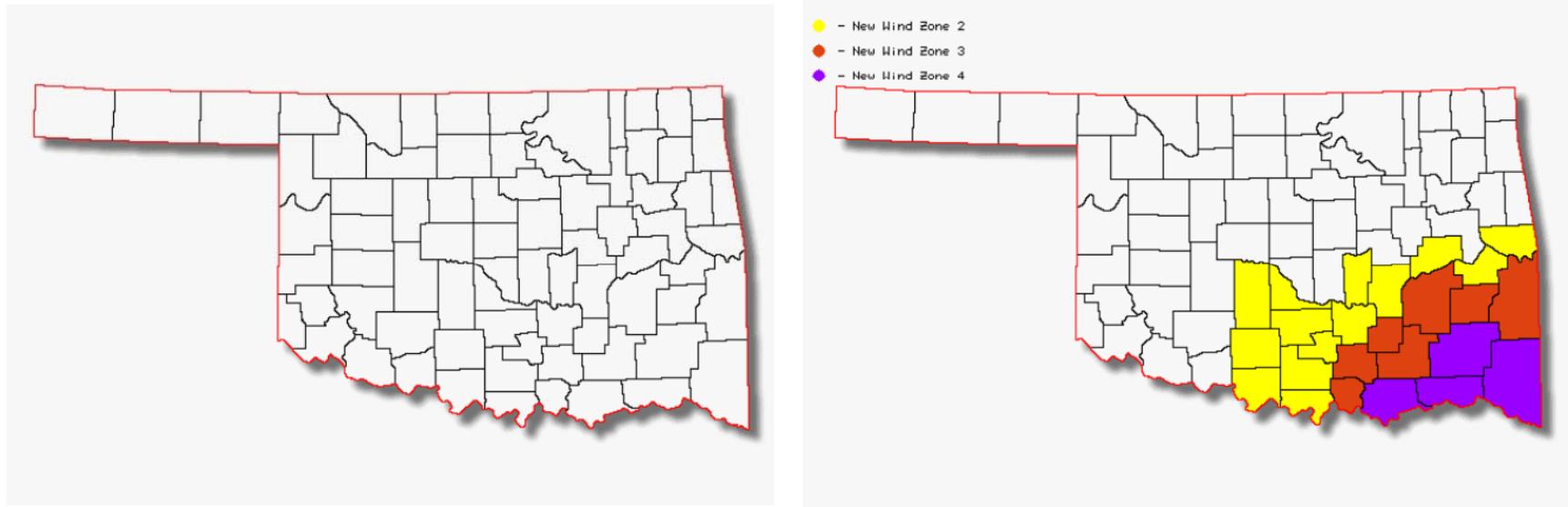
Decreased Protection Alternatives (cont.)

Shifting Wind Zones



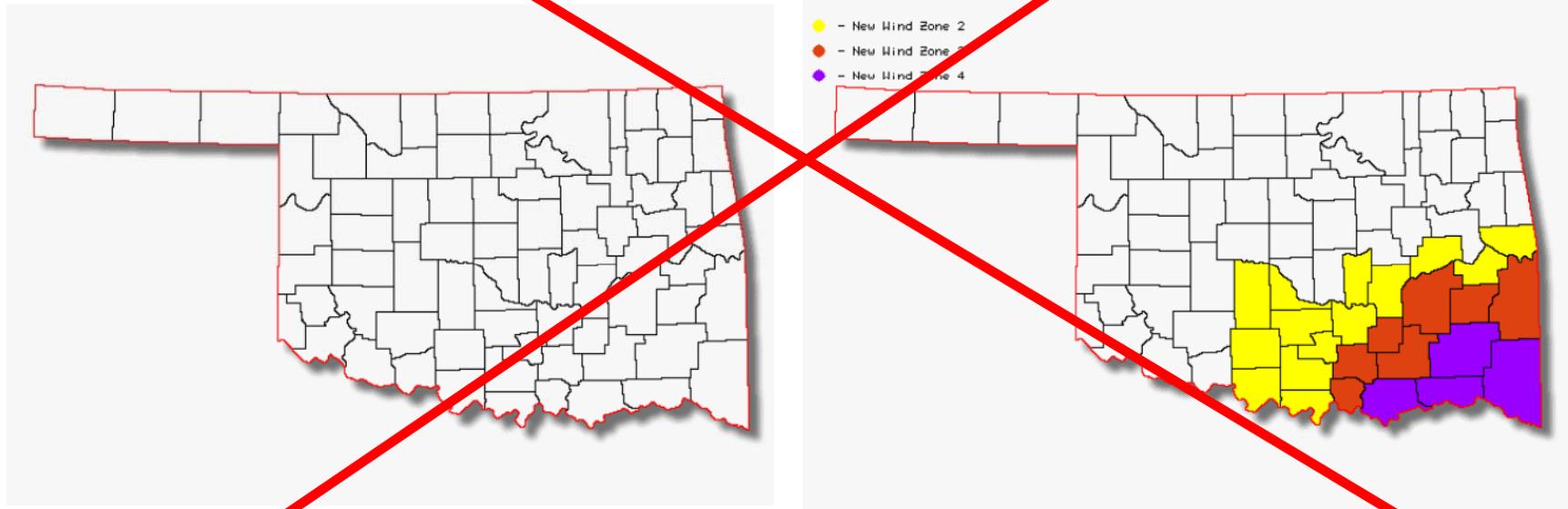
Decreased Protection Alternatives (cont.)

Shifting Wind Zones



Decreased Protection Alternatives (cont.)

Shifting Wind Zones



Decreased Protection Alternatives

1. Shift the wind zones

Move critical portions of zone 2 to zone 3

Move critical portions of zone 3 to new zone 4

(see examples)

2. Revise the pressure tables (no value less than existing 3280 values)

3. No change at all

4. “Alabama Compromise”

Alabama Compromise

- Leave WZ1, 2, & 3 wind pressures as they are presently
 - Rename wind speeds to 3-sec gust values
- Add WZ4 to the pressure tables
 - Use existing WZ3 values for any WZ4 pressures that would be less than existing WZ3
- Use shifted wind zones on the maps

Advantages of Alabama Compromise

- No reduced protection
- Simplified transition for all portions of the industry
 - Fewer changes for the designer
 - Fewer changes for the plant
 - Fewer changes for the retailer
 - Fewer changes for the installer
 - Fewer changes for the consumer

Alabama Compromise Advantages (cont.)

- No need to study impact on WZ1
 - Less cost impact
 - Avoid the difficulties faced in 1994
- More accurate cost impact analysis
- Incorporates elements of ASCE 7-05
 - WZ4 protection
 - Pressures more conservative than straight ASCE 7-05