



# **1999-2013 ATCLLC Historical and Potential Future Access Study**

Last Updated 8-6-2004

# Methodology & Key Assumptions:

- The values represent thermal capability only and do not address voltage stability or dynamic stability issues associated with increased transfer capability.
- The values are calculated for reliability purposes only and do not reflect commercially available ATC.
- Imports from the West were modeled as imports from MAPP.
- Imports from the South were modeled as imports from a combination of ECAR, ComEd and Southern Illinois.
- Historical TASG models were used for the 1999-2004 plots.
- The 2005-2013 plots were generated from the 2005 ATC 2004 10-Year Transmission Assessment model with ATC loads updated for each successive year and projects identified in the ATC 2004 10-Year Transmission Assessment.
- Only limiting elements with a 3% or greater distribution factor were utilized for the boundary lines.
- Limits common to both import directions were assumed to have a linear relationship.
- All Operating guides are assumed to be available.

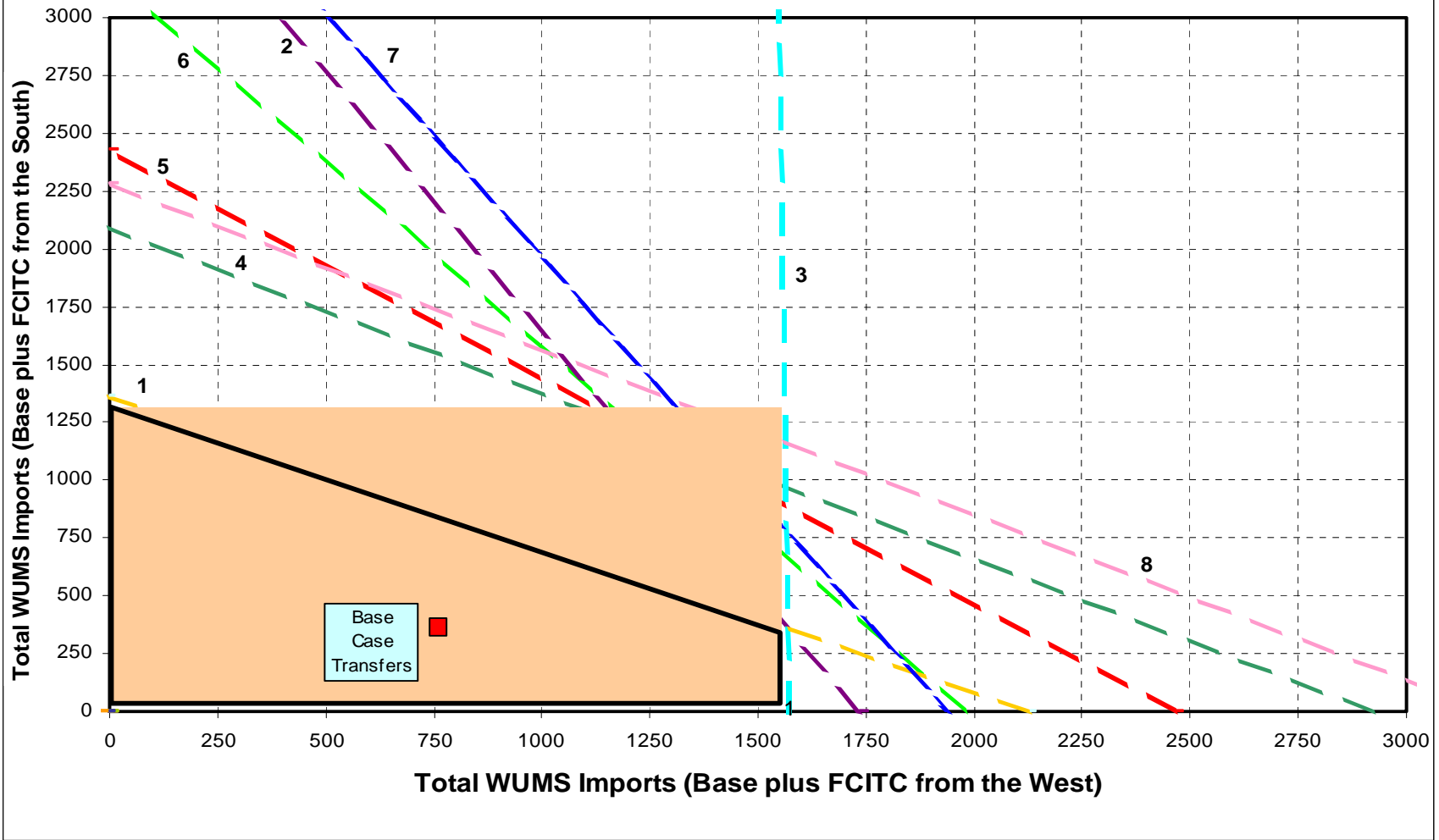
# Major Projects Included In Plots

- 2005 2<sup>nd</sup> Wempletown-Paddock 345 kV
- 2006 Werner West 345/138 kV Tr
- 2006 Gardner Park-Stone Lake 345kV
- 2008 Cranberry-Conover-Plains 138 kV
- 2008 Arrowhead-Stone Lake 345 kV
- 2009 Morgan-Werner West 345 kV
- 2009 Weston to tap of Morgan-Werner West 345 kV
- 2009 Rockdale-Concord 345 kV
- 2010 Oak Creek-Brookdale-Granville 345 kV
- 2010 Oak Creek-Bluemound conversion to 345 kV
- 2010 Concord-Bark River-Lannon 345 kV
- 2011 Rockdale-West Middleton 345 kV

# Interpreting the Plots

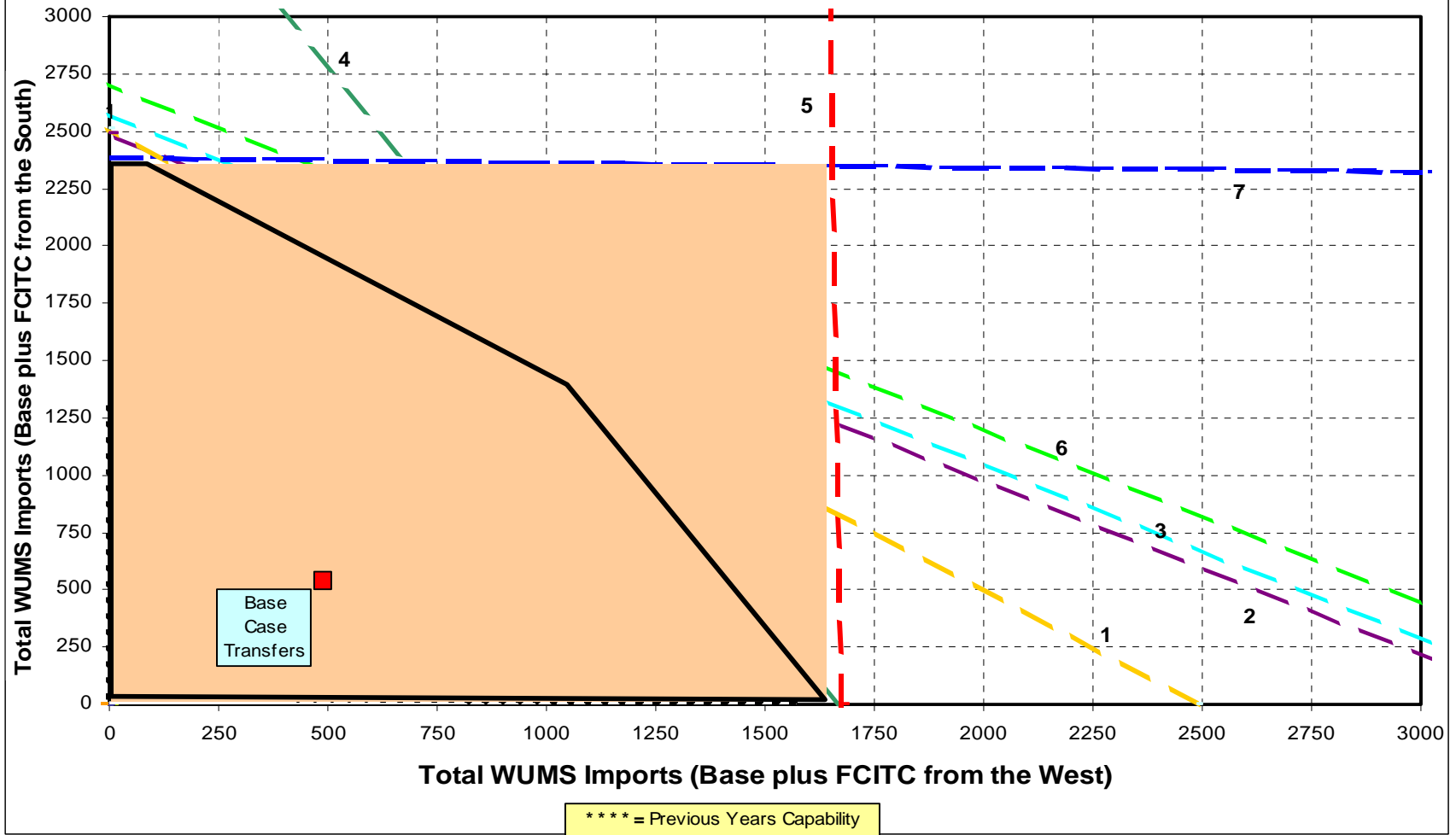
- The Y-axis represents ATC imports from the South.
- The X-axis represents ATC imports from the West.
- The Shaded region represents the variety of achievable ATC total import possibilities.
- The colored lines represent the transmission limits

### WUMS Simultaneous Import Capabilities for 1999 Summer



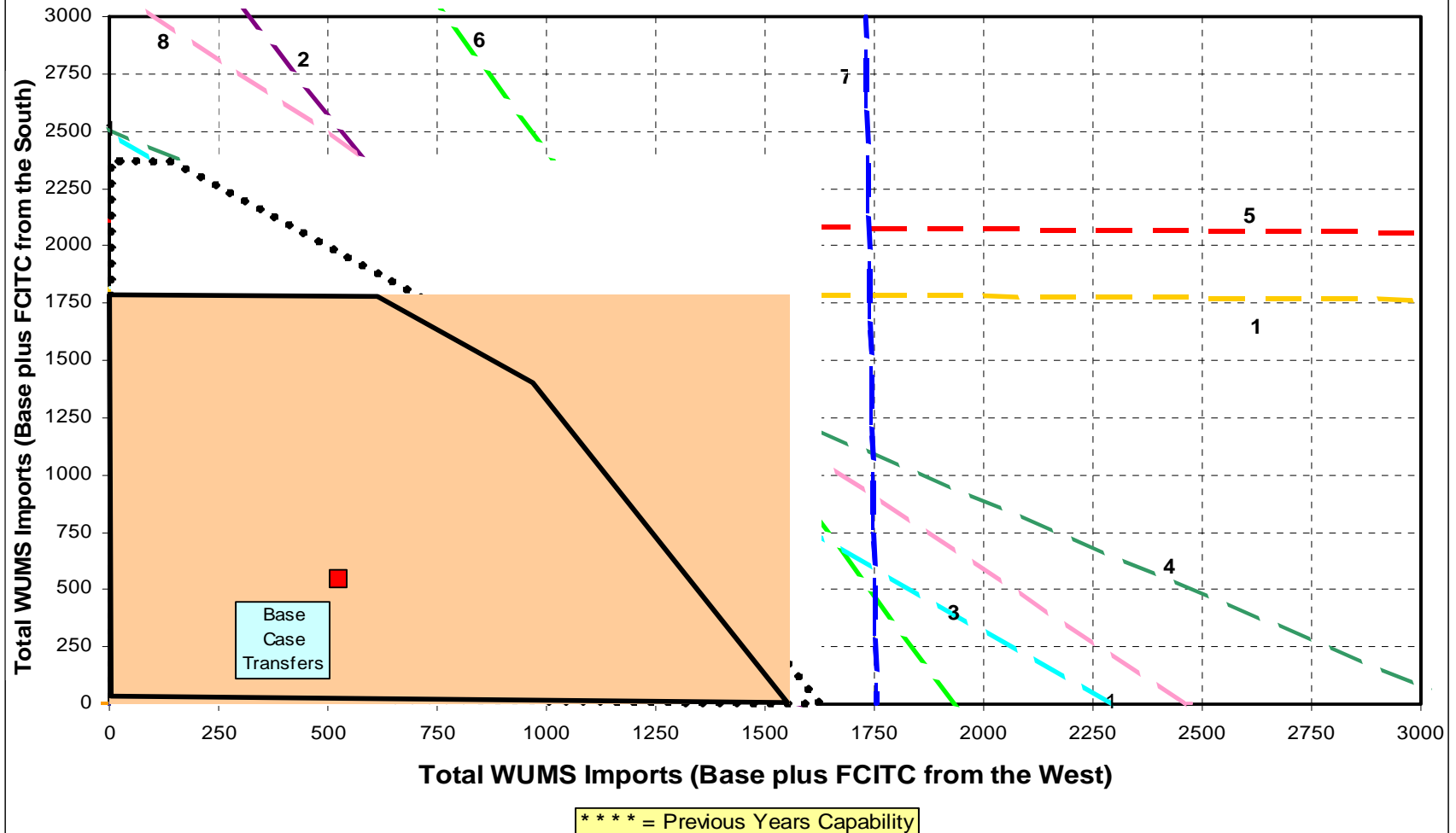
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|---|--|--|---|
| <ul style="list-style-type: none"> <li><b>1</b> Lockport-Lisle 345 kV Red</li> <li><b>2</b> Eau Claire - Arpin 345kV Flow Limit</li> <li><b>3</b> Rocky Run-Whiting Ave 115 kV</li> <li><b>4</b> Oak Creek-Racine 345 kV</li> <li><b>5</b> Wempletow n-Paddock 345 kV</li> <li><b>6</b> Electric Jct-Lombard 345 kV Blue</li> </ul> | <ul style="list-style-type: none"> <li>for no outage</li> <li>for no outage</li> <li>for outage of Rocky Run-N Appleton 345kV</li> <li>for outage of Wempletow n - Paddock 345kV</li> <li>for Arpin Area Op Guide Implementation</li> <li>for outage of Lisle Lockport Blue 345kV &amp; Op Guides</li> </ul> | <ul style="list-style-type: none"> <li><b>7</b> Nelson Dew ey 161/138 kV Tr</li> <li><b>8</b> Pleasant Prairie-Racine 345kV</li> </ul> | <ul style="list-style-type: none"> <li>for Arpin Area Op Guide Implementation</li> <li>for outage of Wempletow n - Paddock 345kV</li> </ul> |
|---|--|--|---|

### WUMS Simultaneous Import Capabilities for 2000 Summer



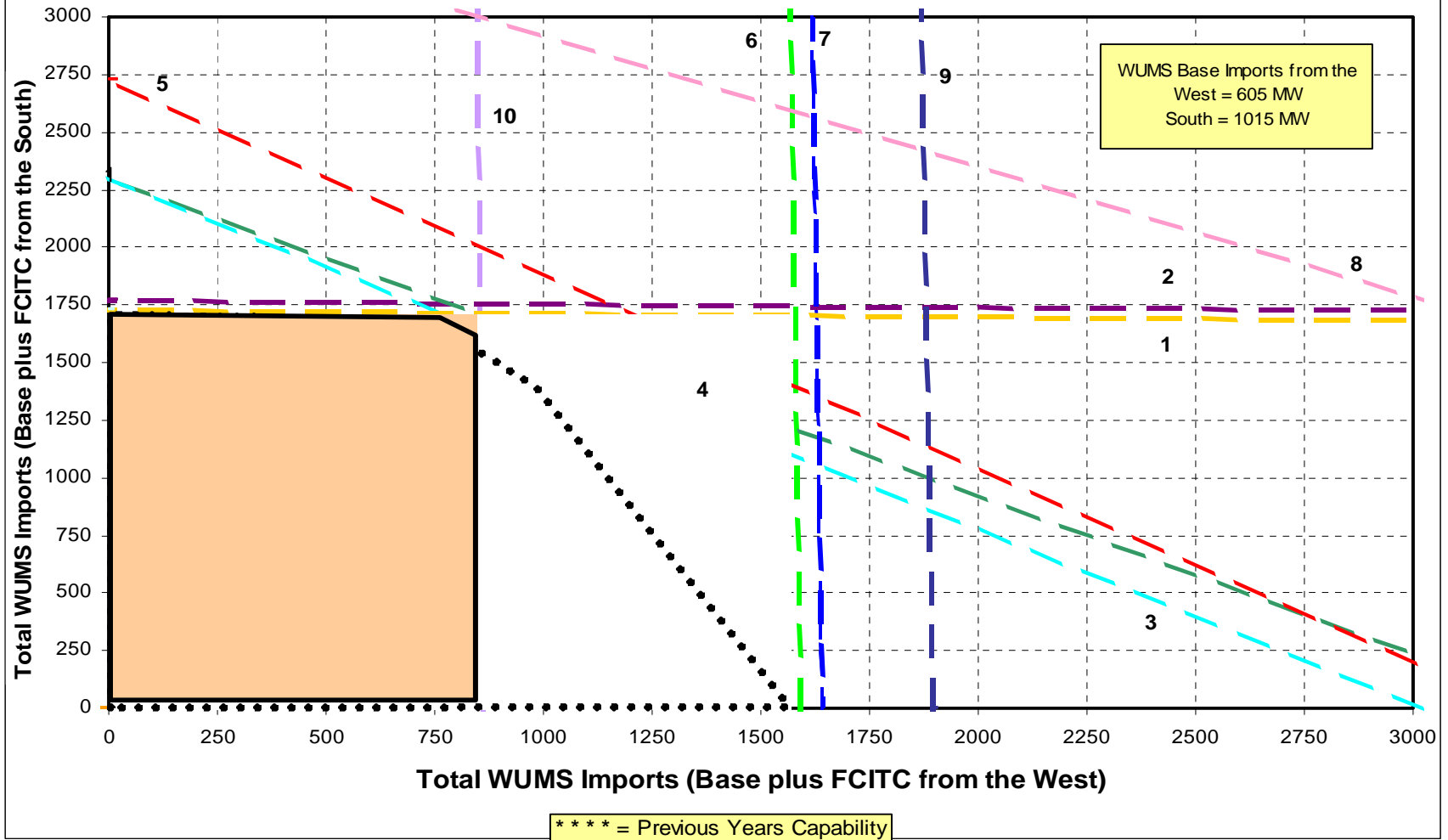
- 1** Wempletow n - Paddock 345kV for Arpin Area Op Guide Implementation
- 2** Pleasant Prairie - Racine 345kV for outage of Wempletow n-Paddock 345kV
- 3** Janesville-Russell 138 kV for outage of Paddock-Rockdale 345kV
- 4** Eau Claire - Arpin 345kV Flow Limit for outage of N/A
- 5** Rocky Run Whiting Ave 115 kV for outage of N Appleton-Rocky Run 345kV
- 6** Paris-St Martin 138 kV for outage of Pleasant Prairie - Racine 345kV & Guide
- 7** Itasca-Tonne 138 kV Blue for outage of Des Plains-Itasca 345kV & DP Tr

### WUMS Simultaneous Import Capabilities for 2001 Summer



- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li><b>1</b> Elwood-Goodings Gr. 345 kV Red</li> <li><b>2</b> Wien - T Corners 115kV</li> <li><b>3</b> N Appleton-Lost Dauphin 138 kV</li> <li><b>4</b> Cassville-Nelson Dewey 161kV</li> <li><b>5</b> Golf Mills-Niles 138 kV Blue</li> <li><b>6</b> Eau Claire - Arpin 345kV Flow Limit</li> </ul> | <ul style="list-style-type: none"> <li>for outage of Dresden-Elect Jct 345kV Red &amp; Dresden T</li> <li>for Arpin Area Op Guide Implementation</li> <li>for outage of Kewaunee 345/138 kV Tr</li> <li>for outage of Wempletown - Paddock 345kV</li> <li>for outage of Golf Mills-Skokie 345kV Blue &amp; Skokie Tr</li> <li>for outage of N/A</li> </ul> | <ul style="list-style-type: none"> <li><b>7</b> Cherry Valley-Silver Lk 345 kV Re for outage of Wempletown - Paddock 345kV</li> <li><b>8</b> N Appleton 345/138 kV Tr #1 for outage of N Appleton 345/138 kV Tr #2</li> </ul> |
|---|--|---|

## WUMS Simultaneous Import Capabilities for 2002 Summer

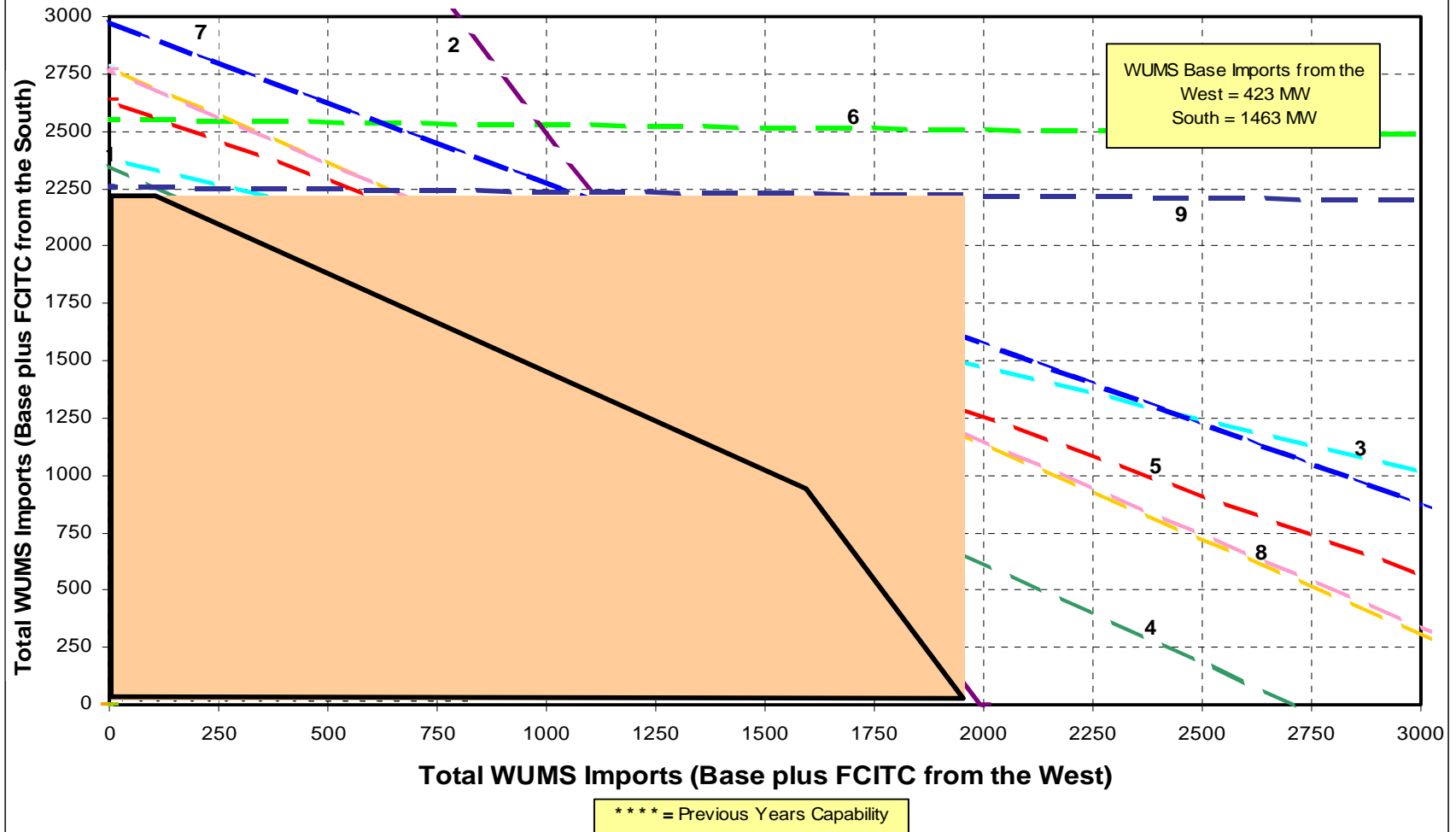


- 1** Golf Mills-Niles 138 kV Blue
- 2** Itasca-Tonne 138 kV Red
- 3** Paddock 345/138kV Tr
- 4** Lore-Turkey River 161 kV
- 5** Center-Fiebrantz 138 kV

for outage of Golf Mills-Skokie 345kV Blue & Skokie Tr  
for outage of Des Plains-Itasca 345kV Red & DesPl Tr  
for outage of Paddock-Rockdale 345kV  
for outage of Wempleto w - Paddock 345kV  
for Arpin Area Op Guide Implementation

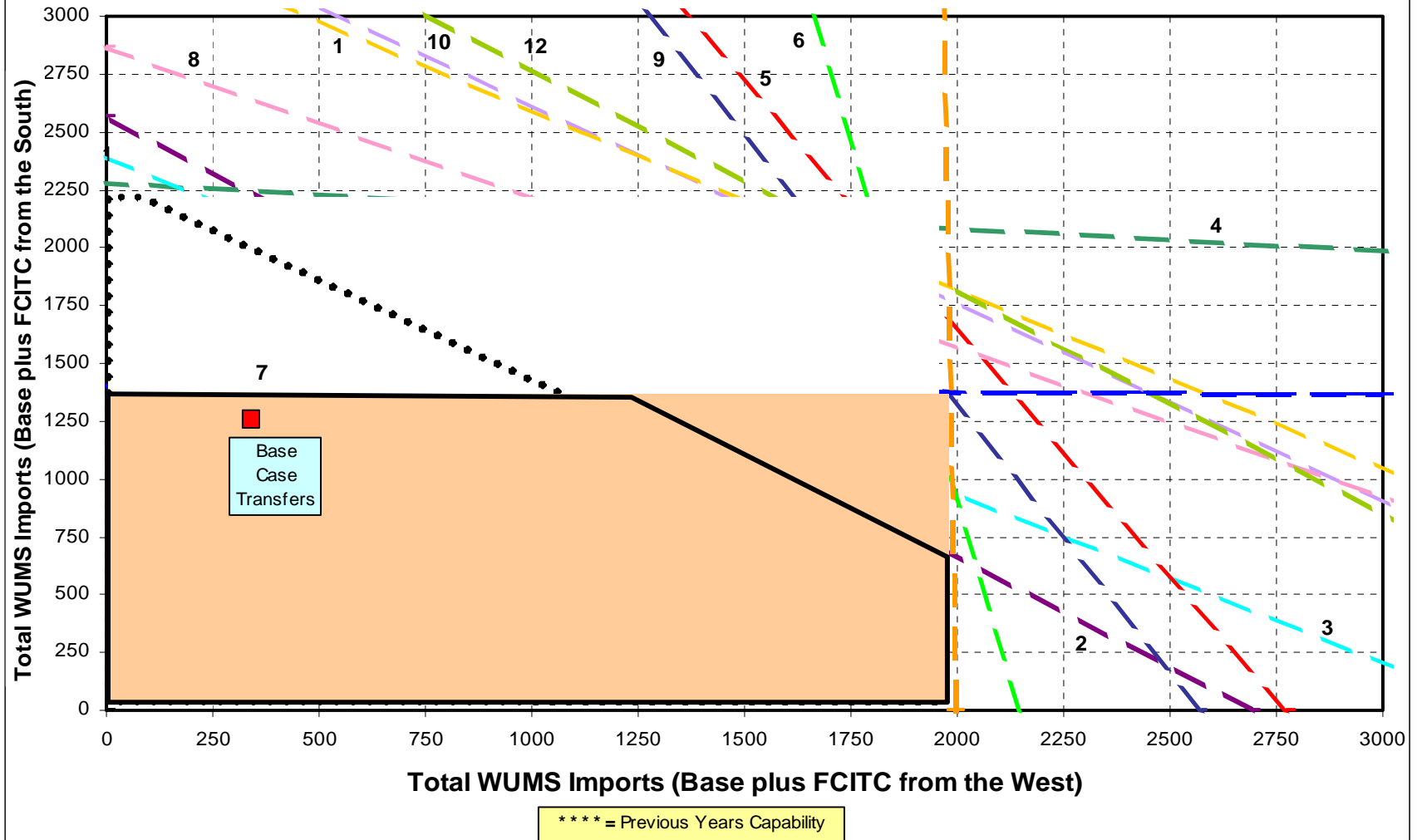
- 7** N Appleton 345/138 kV Tr #2      for outage of N Appleton 345/138 kV Tr #3
- 8** Arcadian - Pleasant Prairie 345kV      for outage of Pleasant Prairie - Racine 345kV
- 9** Eau Claire - Arpin 345kV Flow Limi      for outage of N/A
- 10** N Appleton-Lost Dauphin 138 kV      for outage of Kew aunee 345/138 kV Tr

### WUMS Simultaneous Import Capabilities for 2003 Summer



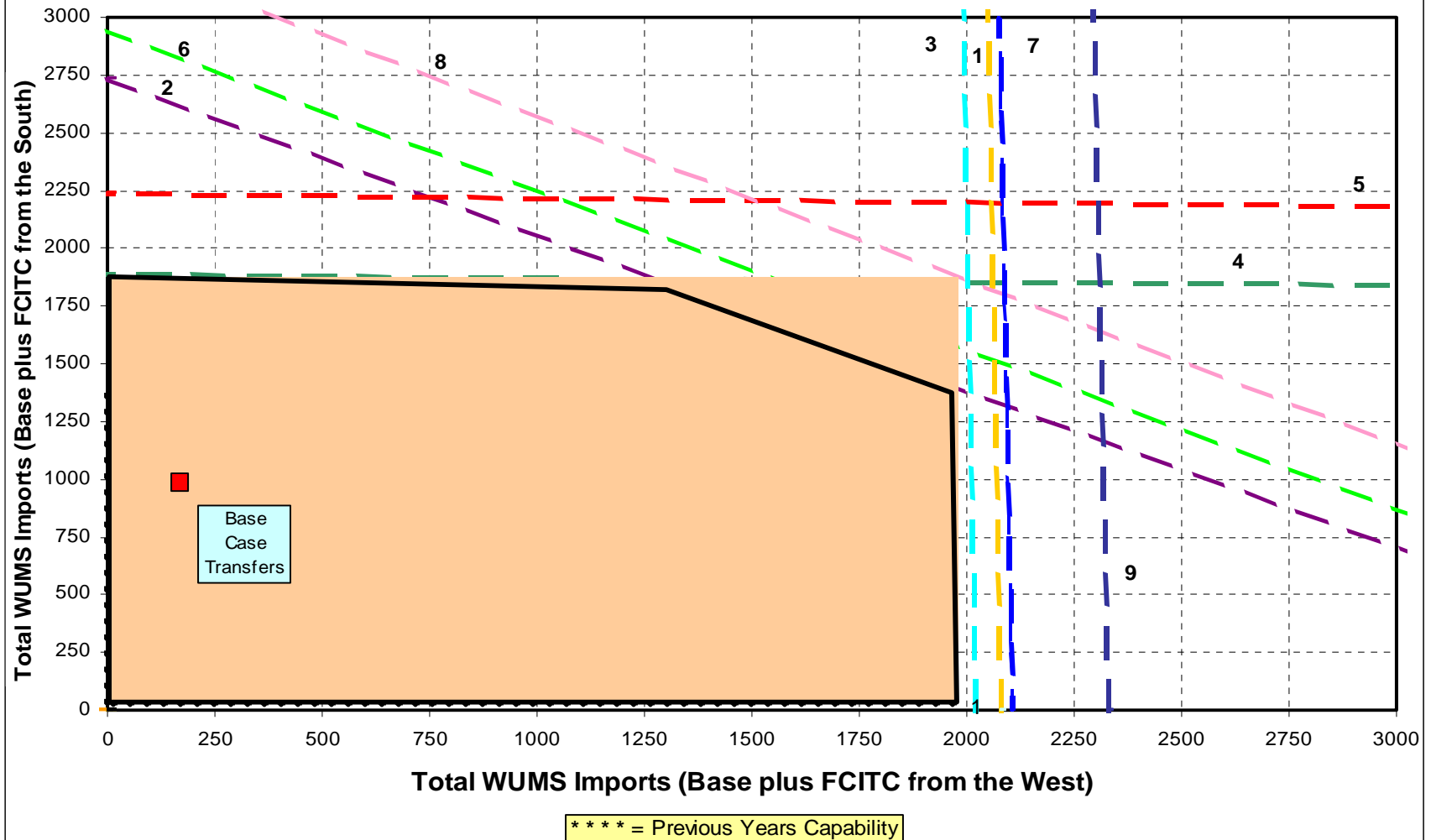
- |   |   |                                       |  |
|---|---|---------------------------------------|--|
| <b>1</b> Blackhaw k-ColleyRd 138 kV         | for outage of Paddock-Rockdale 345 kV                             | <b>7</b> Golf Mills-Niles 138 kV Blue | for outage of Golf Mills-Skokie 345 kV Blue  |
| <b>2</b> Eau Claire-Arpin 345 kV Flow Limit | for outage of N/A   | <b>8</b> Paddock 345/138 kV Tr.       | for outage of Paddock-Rockdale 345 kV        |
| <b>3</b> Center-Fiebrantz 138 kV            | for outage of Arcadian-Granville 345 kV                           | <b>9</b> Paris-St Martins 138 kV      | for outage of Pleasant Prairie-Racine 345 kV |
| <b>4</b> Lore-Turkey River-Cassville 161 kV | for outage of Wempletow n-Paddock 345 kV & Kaiser-Lancaster 69 kV |                                       |  |
| <b>5</b> Pleasant Prairie-Racine 345 kV     | for outage of Wempletow n-Paddock 345 kV & Kaiser-Lancaster 69 kV |                                       |  |
| <b>6</b> Salem 345/161 kV Tr                | for outage of Wempletow n-Paddock 345 kV & Kaiser-Lancaster 69 kV |                                       |  |

### WUMS Simultaneous Import Capabilities for 2004 Summer



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|--|---|---|--|
| <p><b>1</b> Zion-Pleasant Prairie 345 kV</p> <p><b>2</b> Lore - Turkey River - Cassville 161kV</p> <p><b>3</b> Pleasant Prairie - Racine 345kV</p> <p><b>4</b> Paris - St. Martin 138kV</p> <p><b>5</b> Wien - T Corners 115kV</p> <p><b>6</b> Hazelton - Dundee 161kV</p> | <p>for outage of Wempletow n - Paddock 345kV</p> <p>for outage of Wempletow n-Paddock 345kV</p> <p>for outage of Wempletow n-Paddock 345kV</p> <p>for outage of Pleasant Prairie - Racine 345kV</p> <p>for Arpin Area Op Guide Implementation</p> <p>for outage of Rock Creek - Quad Cities 345kV</p> | <p><b>7</b> Salem 345/161kV Tr</p> <p><b>8</b> Arcadian - Pleasant Prairie 345kV</p> <p><b>9</b> Eau Claire - Arpin 345kV Flow Limi</p> <p><b>10</b> Paddock 345/138kV Tr</p> <p><b>11</b> Hazelton - Dundee 161kV</p> <p><b>12</b> Cassville-Nelson Dew ey 161kV</p> | <p>for outage of Wempletow n - Paddock 345kV</p> <p>for outage of Pleasant Prairie - Racine 345kV</p> <p>for outage of N/A</p> <p>for outage of Paddock-Rockdale 345kV</p> <p>for outage of King-Eau Claire-Arpin 345kV</p> <p>for outage of Wempletow n - Paddock 345kV</p> |
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## WUMS Simultaneous Import Capabilities for 2005 Summer

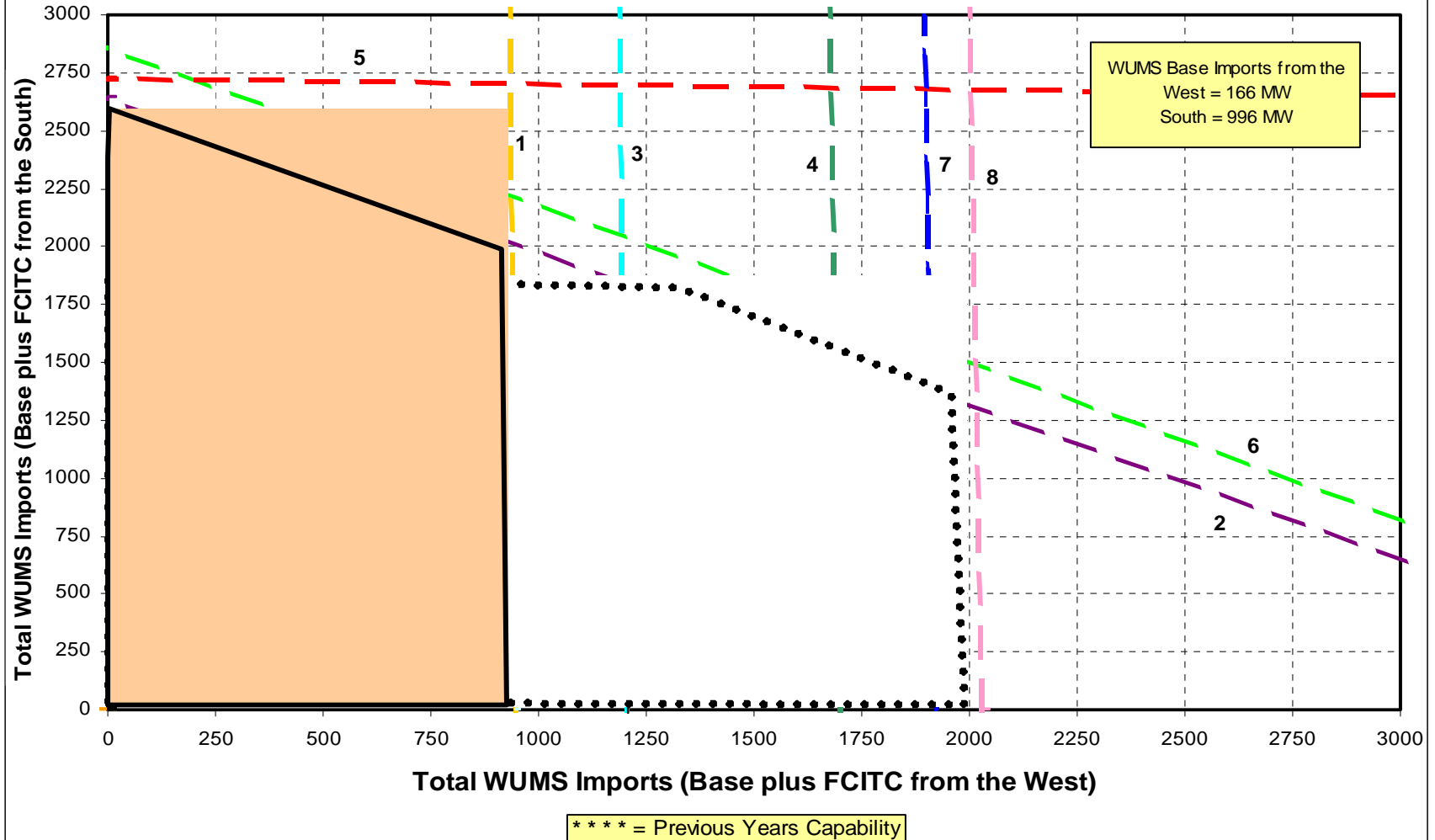


- 1 Hazelton - Dundee 161kV
- 2 Pleasant Prairie - Racine 345kV
- 3 Hazelton - Dundee 161kV
- 4 McGulpin-Riggsville 138 kV
- 5 McGulpin-Straits 138 kV #3
- 6 Pleasant Prairie - Racine 345kV

- for outage of Salem 345/161kV Tr.
- for outage of Pleasant Prairie-Arcadian 345 kV
- for outage of Rock Creek - Quad Cities 345kV
- for outage of Livingston-Emmet Co. 138 kV
- for outage of McGulpin-Straits 138 kV #1
- for outage of Zion-Arcadian 345 kV

- 7 Hazelton - Dundee 161kV for outage of King-Eau Claire-Arpin 345kV
- 8 Pleasant Prairie - Racine 345kV for outage of Wempletown n-Rockdale 345kV
- 9 Eau Claire - Arpin 345kV Flow Limi for outage of N/A

## WUMS Simultaneous Import Capabilities for 2006 Summer



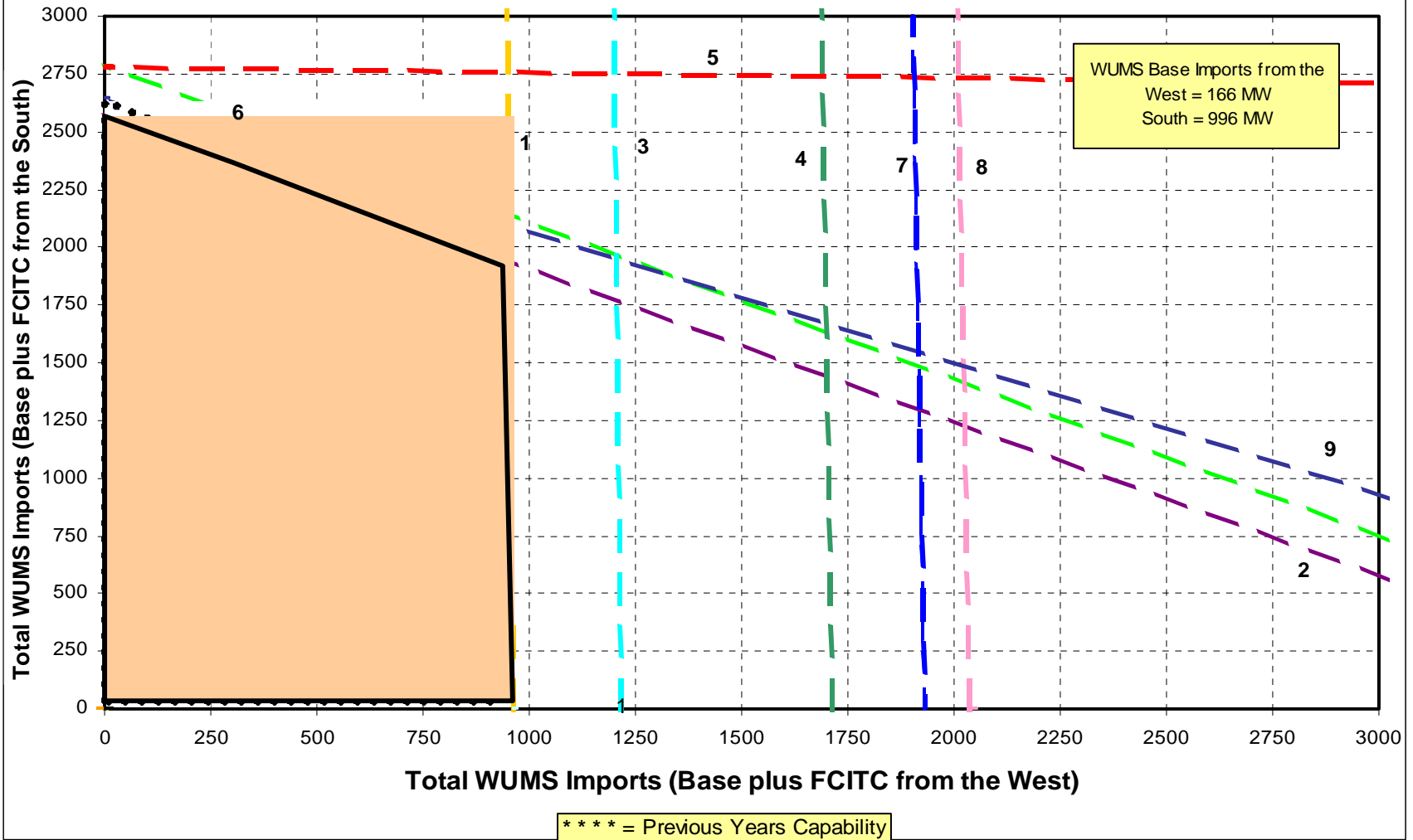
- 1** Barron-Wash Co 161kV
- 2** Pleasant Prairie - Racine 345kV
- 3** Wash Co-Stone Lake 161kV
- 4** Barron-Wash Co 161kV
- 5** McGulpin-Straits 138 kV #3
- 6** Pleasant Prairie - Racine 345kV

for outage of Eau Claire-Arpin 345kV & Op Guide  
 for outage of Pleasant Prairie-Arcadian 345 kV  
 for outage of Eau Claire-Arpin 345kV & Op Guide  
 for outage of King-Eau Claire-Arpin 345kV  
 for outage of McGulpin-Straits 138 kV #1  
 for outage of Zion-Arcadian 345 kV

- 7** Wash Co-Stone Lake 161kV
- 8** Hazelton - Dundee 161kV

for outage of King-Eau Claire-Arpin 345kV  
 for outage of Rock Creek - Quad Cities 345kV

## WUMS Simultaneous Import Capabilities for 2007 Summer



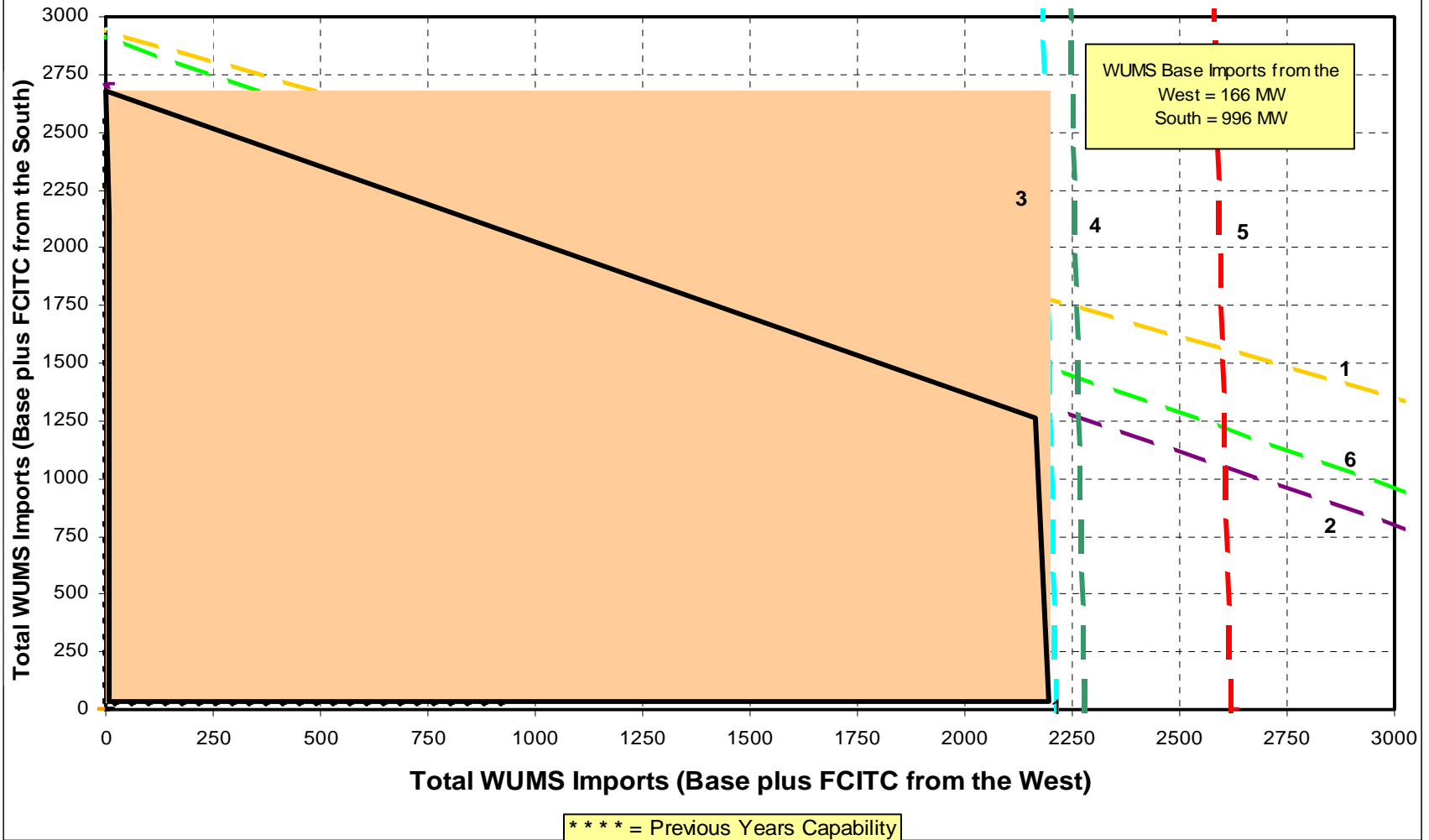
- **1** Barron-Wash Co 161kV
- **2** Pleasant Prairie - Racine 345kV
- **3** Wash Co-Stone Lake 161kV
- **4** Barron-Wash Co 161kV
- **5** McGulpin-Straits 138 kV #3
- **6** Pleasant Prairie - Racine 345kV

- for outage of Eau Claire-Arpin 345kV & Op Guide
- for outage of Pleasant Prairie-Arcadian 345 kV
- for outage of Eau Claire-Arpin 345kV & Op Guide
- for outage of King-Eau Claire-Arpin 345kV
- for outage of McGulpin-Straits 138 kV #1
- for outage of Zion-Arcadian 345 kV

- **7** Wash Co-Stone Lake 161kV
- **8** Hazelton - Dundee 161kV
- **9** Arcadian-Lannon 345kV #1

- for outage of King-Eau Claire-Arpin 345kV
- for outage of Rock Creek - Quad Cities 345kV
- for outage of Arcadian-Lannon 345kV #2

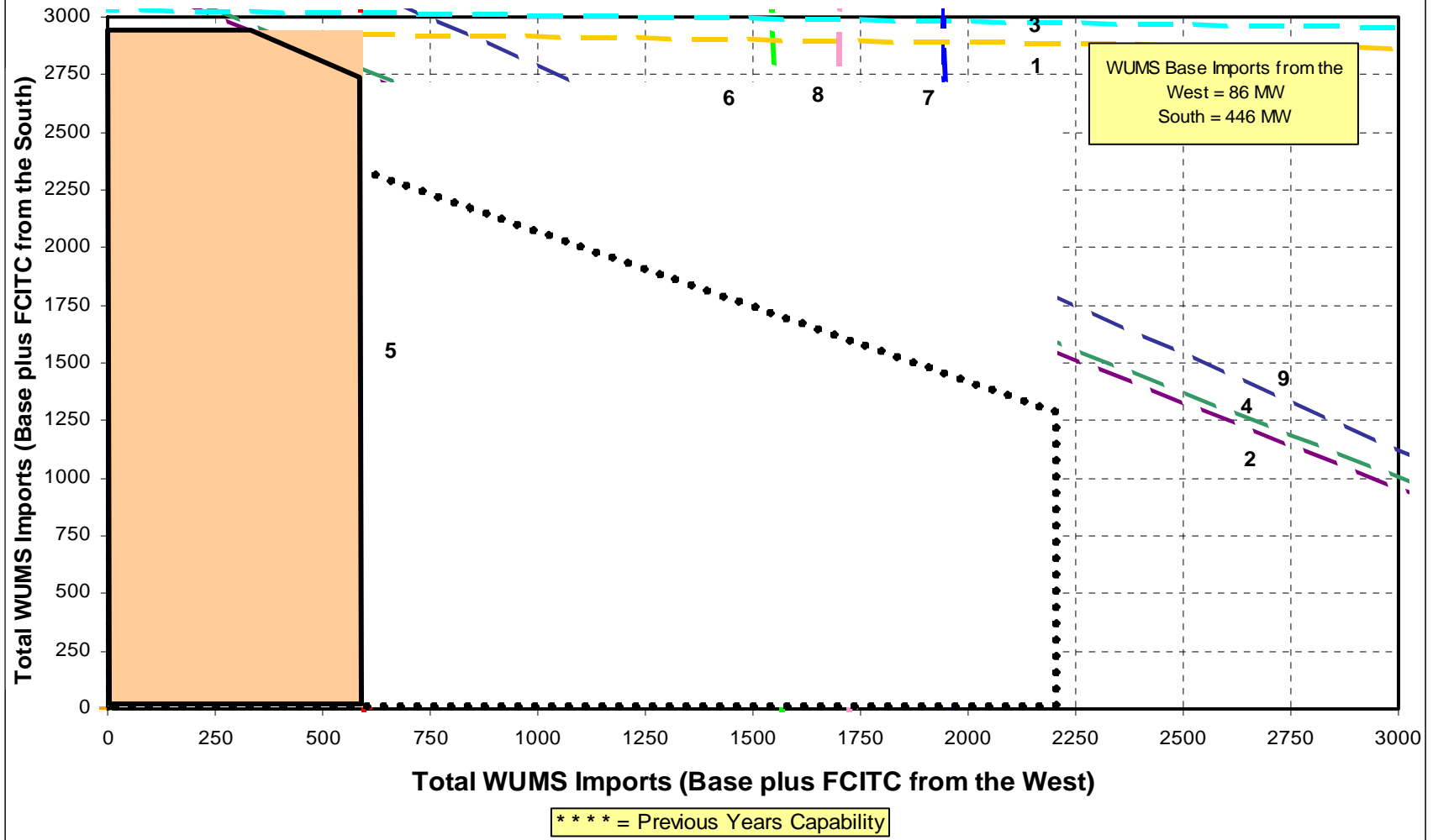
### WUMS Simultaneous Import Capabilities for 2008 Summer



- 1** Arcadian-Lannon 345kV #1
- 2** Pleasant Prairie - Racine 345kV
- 3** Hazelton - Dundee 161kV
- 4** Hazelton - Dundee 161kV
- 5** Turkey River-Cassville 161kV
- 6** Pleasant Prairie - Racine 345kV

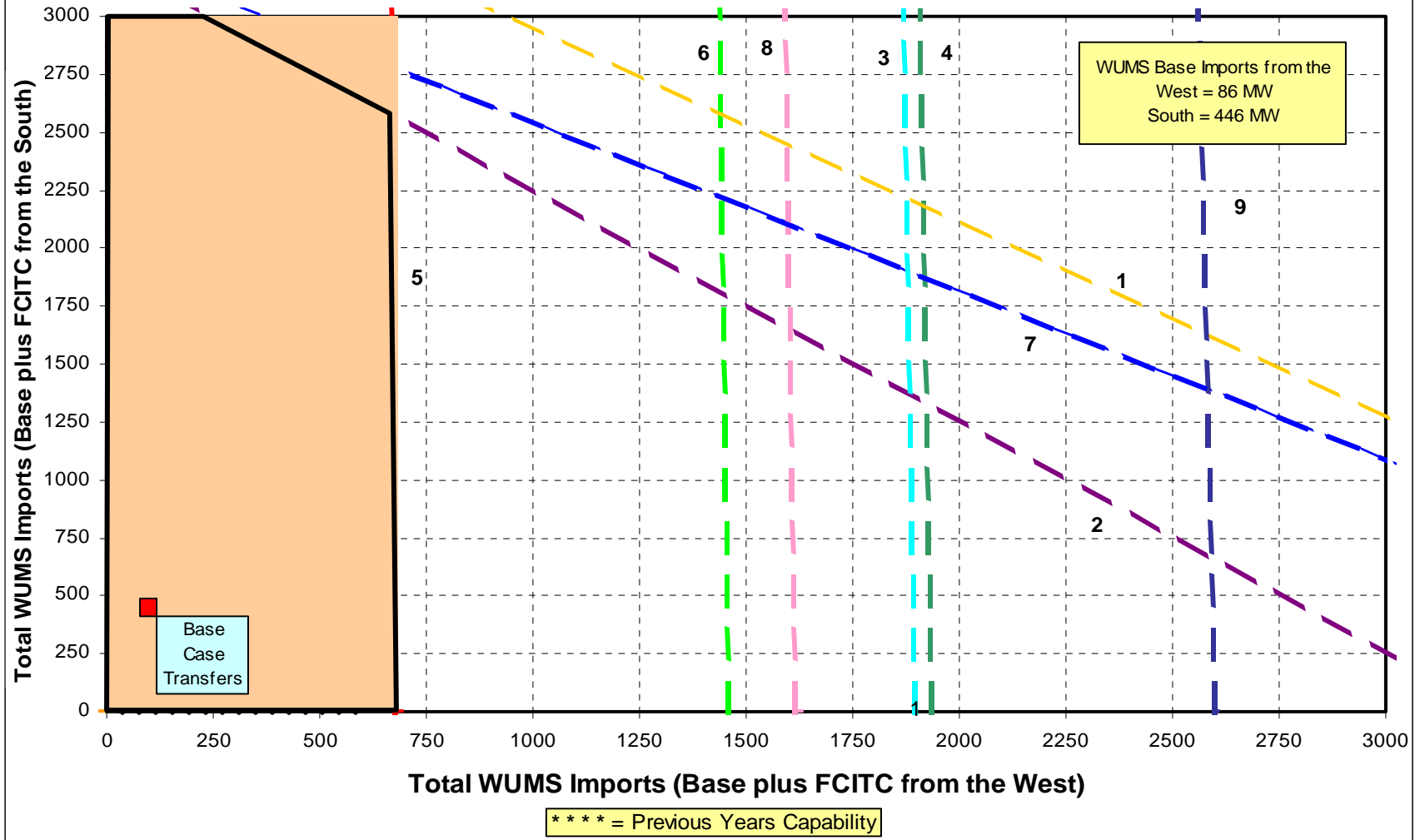
- for outage of Arcadian-Lannon 345kV #2
- for outage of Pleasant Prairie-Arcadian 345 kV
- for outage of Rock Creek - Quad Cities 345kV
- for outage of Salem 345/161kV Tr.
- for outage of GranGrae-Seneca-Genoa 161kV
- for outage of Zion-Arcadian 345 kV

## WUMS Simultaneous Import Capabilities for 2009 Summer



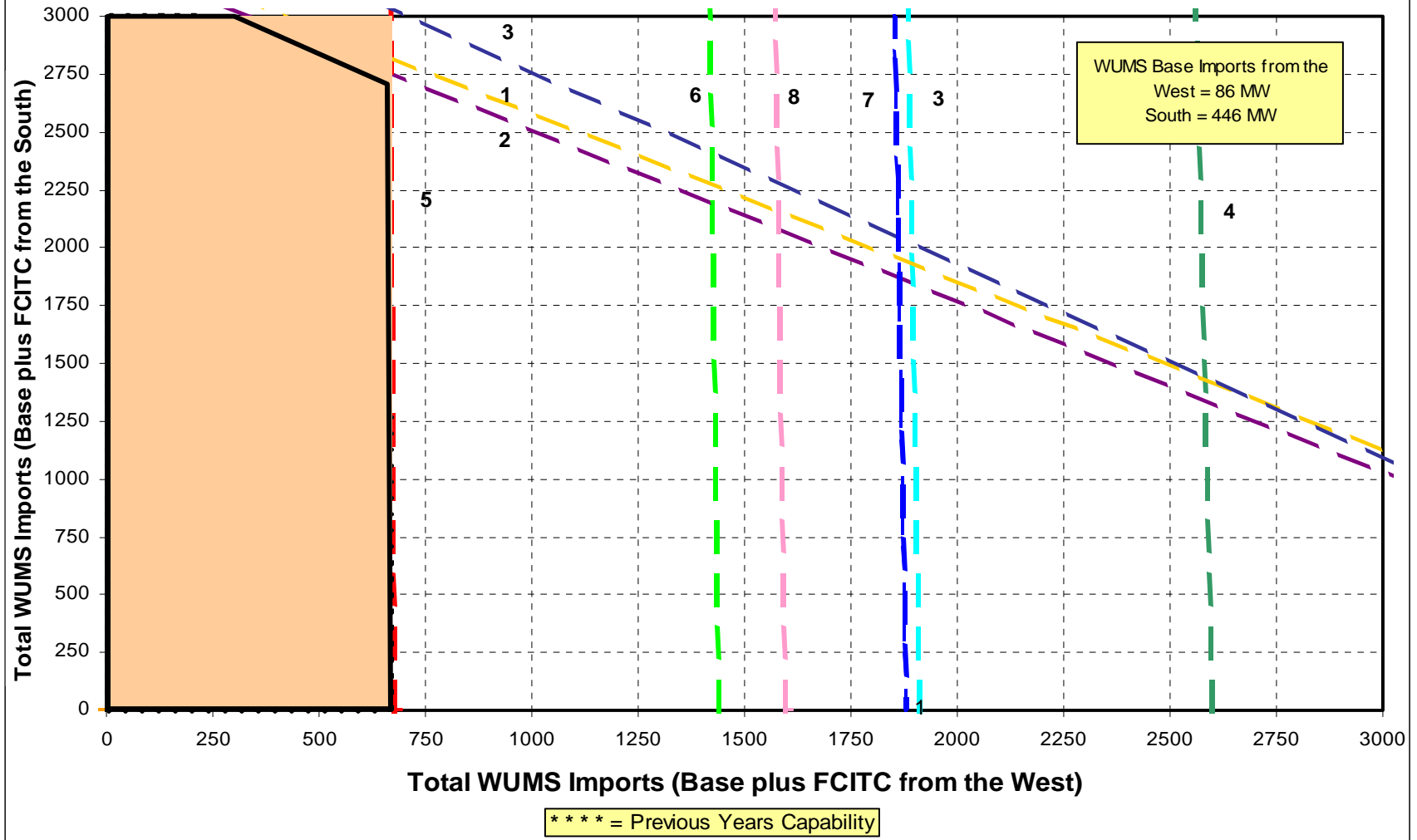
- |  |  |   |   |
|--|--|---|---|
| <ul style="list-style-type: none"> <li><b>1</b> Livingston-Emmit Co 138 kV</li> <li><b>2</b> Lockport-Lisle 345kV Red</li> <li><b>3</b> McGulpin-Straits 138 kV #3</li> <li><b>4</b> Des Plains-Lombard 345kV Red</li> <li><b>5</b> Eau Claire-Prescott-Wheaton 161kV</li> <li><b>6</b> Hazelton - Dundee 161kV</li> </ul> | <ul style="list-style-type: none"> <li>for outage of Riggsville-McGulpin 138kV</li> <li>for outage of Lockport-Lombard 345kV Red</li> <li>for outage of McGulpin-Straits 138 kV #1</li> <li>for outage of Lombard-Itasca 345kV Red &amp; Tr</li> <li>for outage of Gardner Park-Stone Lake 345 kV</li> <li>for outage of Quad Cities-Rock Creek 345kV</li> </ul> | <ul style="list-style-type: none"> <li><b>7</b> Hazelton - Dundee 161kV</li> <li><b>8</b> Hazelton - Dundee 161kV</li> <li><b>9</b> Paddock 345/138kV Tr</li> </ul> | <ul style="list-style-type: none"> <li>for outage of King-Eau Claire-Arpin 345kV + Gu</li> <li>for outage of Rock Creek-Salem 345kV</li> <li>for outage of Wempletown-Rockdale 345kV</li> </ul> |
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## WUMS Simultaneous Import Capabilities for 2010 Summer



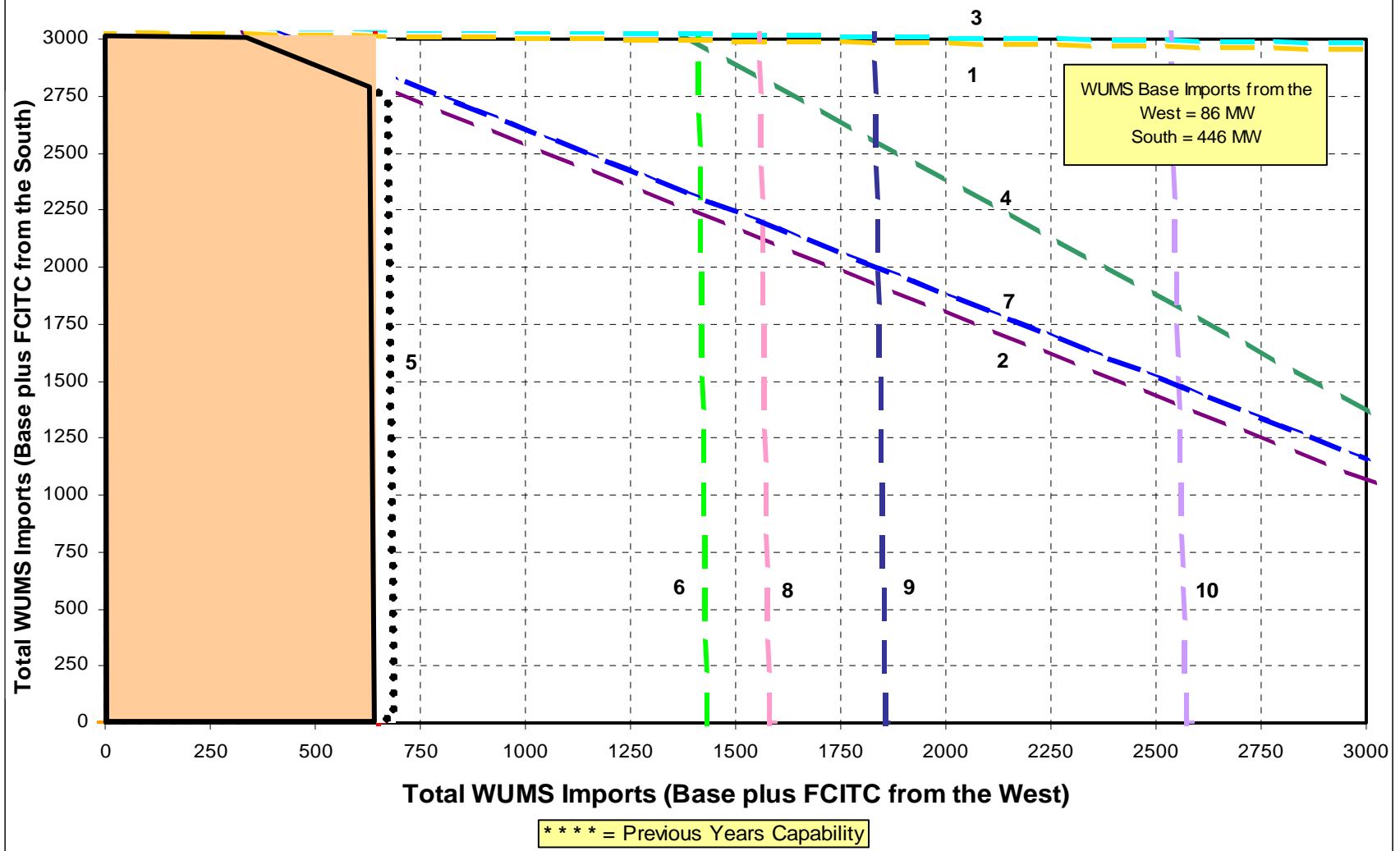
- |   |  |  |   |
|---|--|--|---|
| <p><b>1</b> Wempletow n-Rockdale 345kV</p> <p><b>2</b> Lockport-Lisle 345kV Red</p> <p><b>3</b> Hazelton - Dundee 161kV</p> <p><b>4</b> Hazelton - Dundee 161kV</p> <p><b>5</b> Eau Claire-Prescott-Wheaton 161kV</p> <p><b>6</b> Hazelton - Dundee 161kV</p> | <p>for outage of Wempletow n-Paddock 345kV</p> <p>for outage of Lockport-Lombard 345kV Red</p> <p>for outage of King-Eau Claire-Arpin 345kV +Guide</p> <p>for outage of Gran Grey-Seneca-Genoa 161kV</p> <p>for outage of Gardner Park-Stone Lake 345 kV</p> <p>for outage of Quad Cities-Rock Creek 345kV</p> | <p><b>7</b> Lombard-Des Plains 345kV Red</p> <p><b>8</b> Hazelton - Dundee 161kV</p> <p><b>9</b> Eau Claire-Arpin 345kV Flow Limit</p> | <p>for outage of Lombard-Itasca 345kV Red &amp; Tr</p> <p>for outage of Rock Creek-Salem 345kV</p> <p>for outage of N/A</p> |
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## WUMS Simultaneous Import Capabilities for 2011 Summer



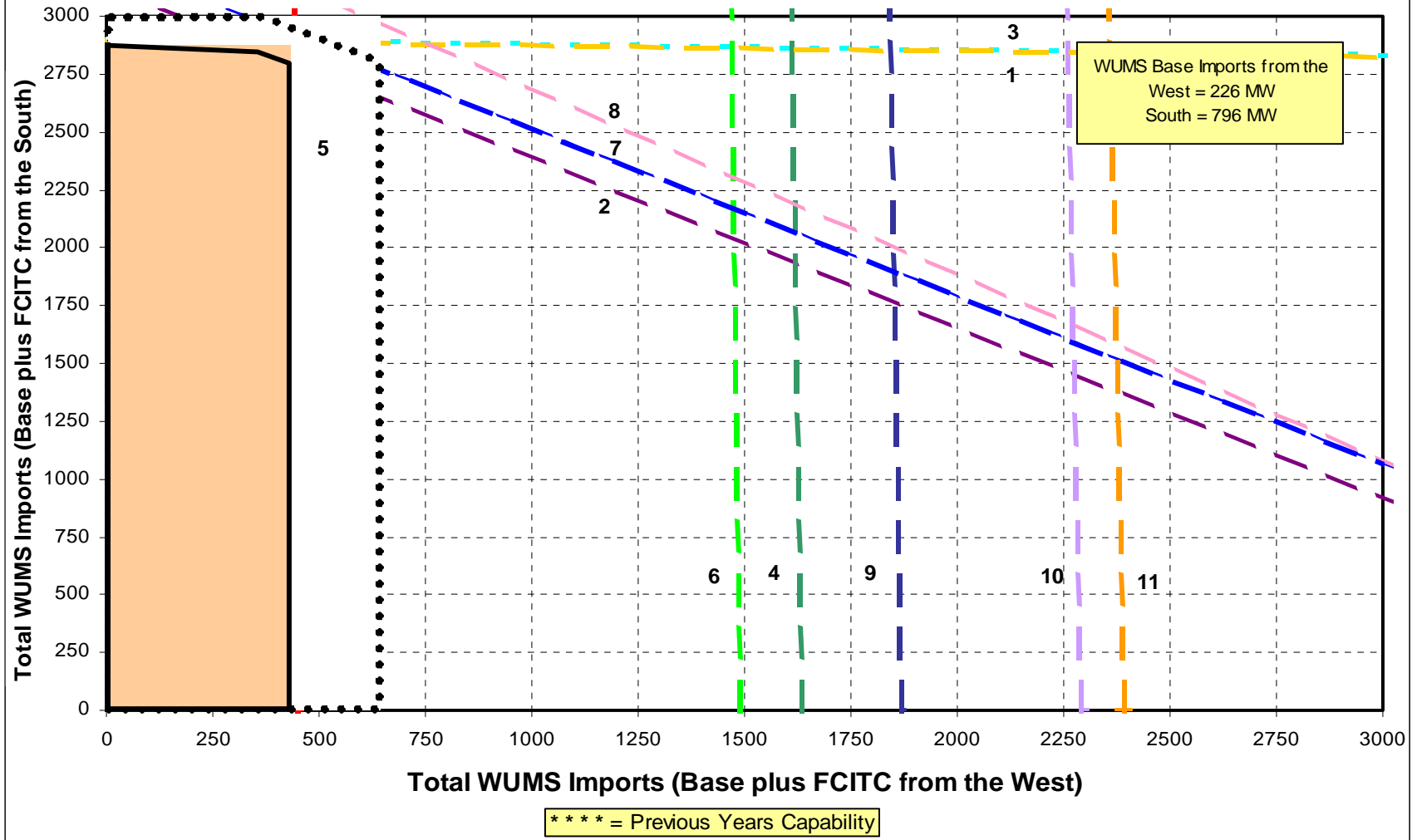
- |   |   |  |  |
|---|---|--|--|
| <p><b>1</b> Lombard-Des Plains 345kV Red</p> <p><b>2</b> Lockport-Lisle 345kV Red</p> <p><b>3</b> Hazelton - Dundee 161kV</p> <p><b>4</b> Eau Claire-Arpin 345kV Flow Limit</p> <p><b>5</b> Eau Claire-Prescott-Wheaton 161kV</p> <p><b>6</b> Hazelton - Dundee 161kV</p> | <p>for outage of Lombard-Itasca 345kV Red &amp; Tr</p> <p>for outage of Lockport-Lombard 345kV Red</p> <p>for outage of Gran Grey-Seneca-Genoa 161kV</p> <p>for outage of N/A</p> <p>for outage of Gardner Park-Stone Lake 345 kV</p> <p>for outage of Quad Cities-Rock Creek 345kV</p> | <p><b>7</b> Hazelton - Dundee 161kV</p> <p><b>8</b> Hazelton - Dundee 161kV</p> <p><b>9</b> Wempletow n-Rockdale 345kV</p> | <p>for outage of King-Eau Claire-Arpin 345kV + Gu</p> <p>for outage of Rock Creek-Salem 345kV</p> <p>for outage of Wempletow n-Paddock 345kV</p> |
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## WUMS Simultaneous Import Capabilities for 2012 Summer



- |   |   |   |  |
|---|---|---|--|
| <p><b>1</b> Livingston-Emmit Co 138 kV</p> <p><b>2</b> Lockport-Lisle 345kV Red</p> <p><b>3</b> McGulpin-Straits 138 kV #3</p> <p><b>4</b> Wempletow n-Rockdale 345kV</p> <p><b>5</b> Eau Claire-Prescott-Wheaton 161kV</p> <p><b>6</b> Hazelton - Dundee 161kV</p> | <p>for outage of Riggsville-McGulpin 138kV</p> <p>for outage of Lockport-Lombard 345kV Red</p> <p>for outage of McGulpin-Straits 138 kV #1</p> <p>for outage of Wempletow n-Paddock 345kV</p> <p>for outage of Gardner Park-Stone Lake 345 kV</p> <p>for outage of Quad Cities-Rock Creek 345kV</p> | <p><b>7</b> Lombard-Des Plains 345kV Red</p> <p><b>8</b> Hazelton - Dundee 161kV</p> <p><b>9</b> Hazelton - Dundee 161kV</p> <p><b>10</b> Eau Claire-Arpin 345kV Flow Limit</p> | <p>for outage of Lombard-Itasca 345kV Red &amp; Tr</p> <p>for outage of Rock Creek-Salem 345kV</p> <p>for outage of King-Eau Claire-Arpin 345kV +Gu</p> <p>for outage of N/A</p> |
|---|---|---|--|

### WUMS Simultaneous Import Capabilities for 2013 Summer



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|--|--|---|---|
| <b>1</b> Livingston-Emmit Co 138 kV        | for outage of Riggsville-McGulpin 138kV      | <b>7</b> Lombard-Des Plains 345kV Red       | for outage of Lombard-Itasca 345kV Red & Tr   |
| <b>2</b> Lockport-Lisle 345kV Red          | for outage of Lockport-Lombard 345kV Red     | <b>8</b> Electric Jct 345kV Bus Tie Red     | for outage of Wayne-Aurora 345kV Red          |
| <b>3</b> McGulpin-Straits 138 kV #3        | for outage of McGulpin-Straits 138 kV #1     | <b>9</b> Hazelton - Dundee 161kV            | for outage of King-Eau Claire-Arpin 345kV +Gu |
| <b>4</b> Hazelton - Dundee 161kV           | for outage of Rock Creek-Salem 345kV         | <b>10</b> Eau Claire-Arpin 345kV Flow Limit | for outage of N/A                             |
| <b>5</b> Eau Claire-Prescott-Wheaton 161kV | for outage of Gardner Park-Stone Lake 345 kV | <b>11</b> Arrow head 230kV Phase Shifter    | for outage of King-Eau Claire-Arpin 345kV +Gu |
| <b>6</b> Hazelton - Dundee 161kV           | for outage of Quad Cities-Rock Creek 345kV   |   |   |

\*\*\*\* = Previous Years Capability