

- State Hwy
- County Hwy
- County Road
- Lakes
- In-channel Flow Paths
- Total Watershed
- HUC 12
- County
- Cites

Figure 1: Location Map

Scale: AS SHOWN	Drawn by: KZS	Checked by:	Project No: 8177-003	Date: 9/30/2015	Sheet:
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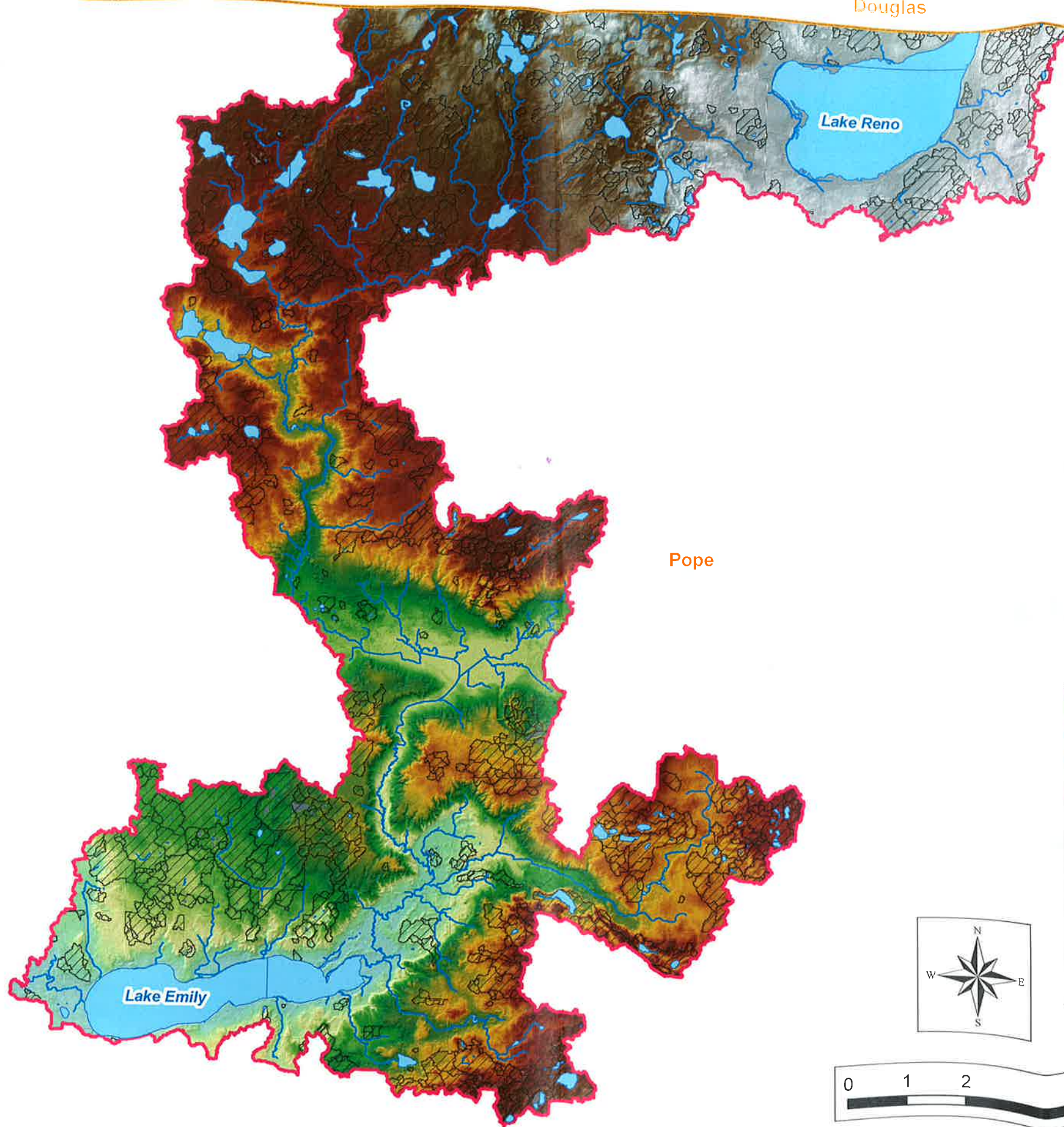
Houston Engineering Inc. Maple Grove
 P: 763.493.4522
 F: 763.493.5572






Grant

Douglas



Stevens

Pope



-  Lakes
-  County
-  Total Watershed
-  In-channel Flow Paths
-  Non-Contrib Drainage Area 10yr24hr

Conditioned DEM

-  High
-  Low

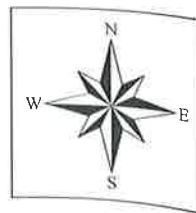



Figure 3: Conditioned DEM

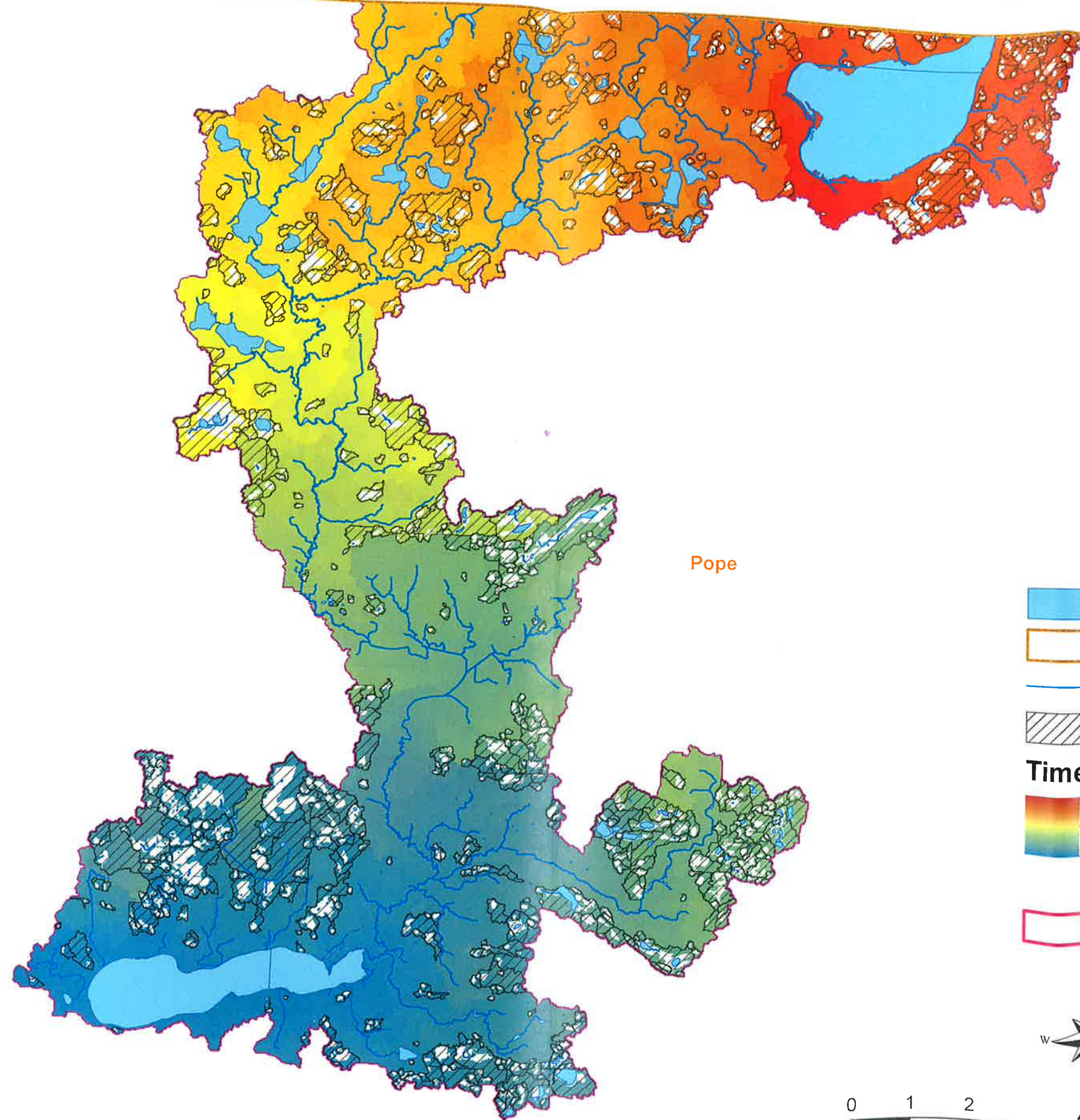
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				P: 763.493.4522 F: 763.493.5572	





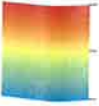

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-  Lakes
-  County
-  In-channel Flow Paths
-  Non-Contrib Drainage Area 10yr24hr
- Time Travel**
-  High
Low
-  Total Watershed

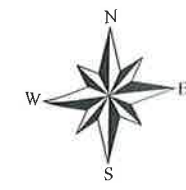



Figure 4: Downstream Travel Time in Hours to Lake Emily

Scale: AS SHOWN	Drawn by: KZS	Checked by:	Project No: 8177-003	Date: 9/30/2015	Sheet:
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 **Houston Engineering Inc.**

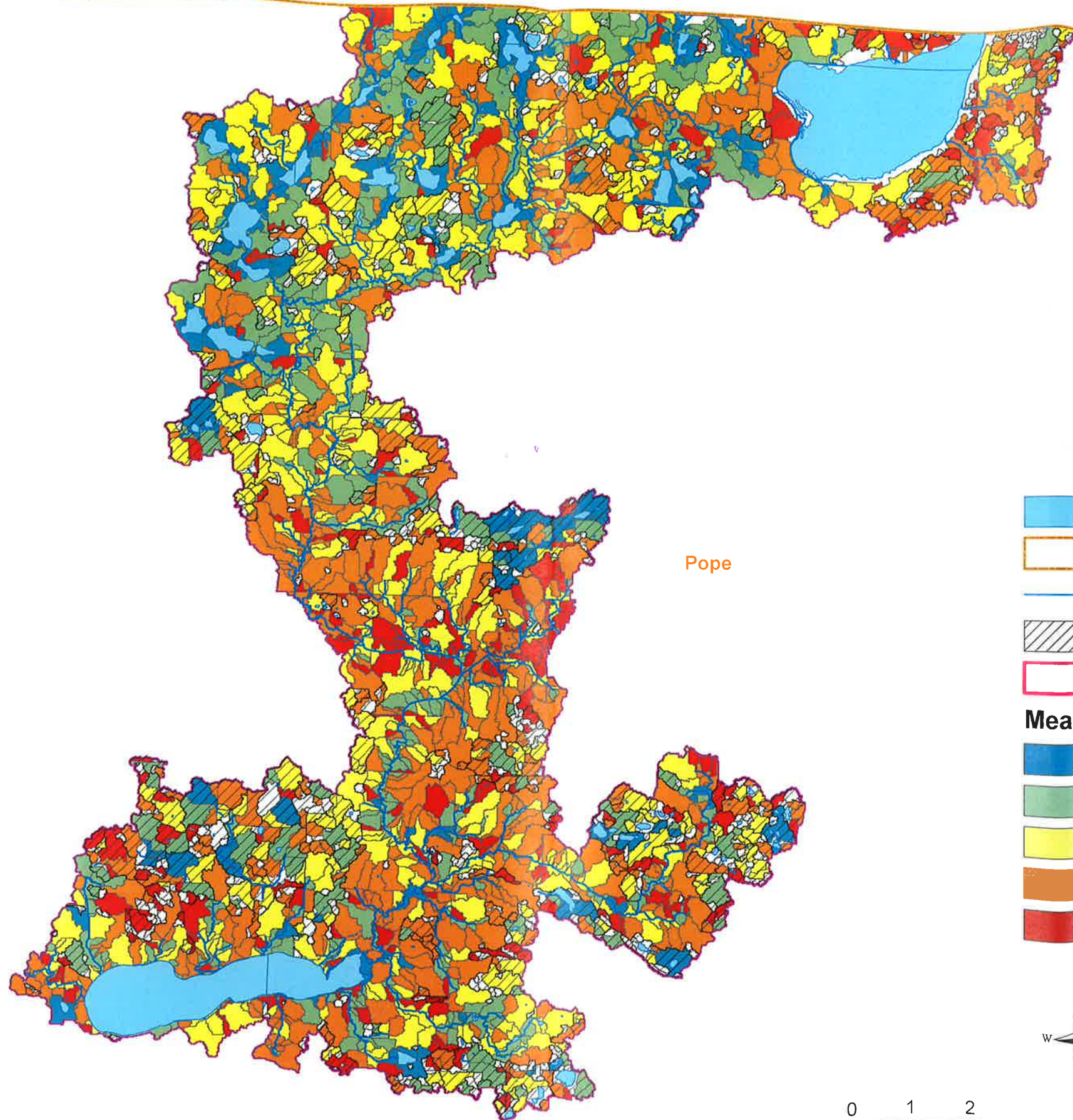
Maple Grove
P: 763.493.4522
F: 763.493.5572











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-  Lakes
-  County
-  In-channel Flow Paths
-  Non-Contrib Drainage Area 10yr24hr
-  Total Watershed
- Mean SPI**
-  Low
-  Low/Moderate
-  Moderate
-  High/Moderate
-  High

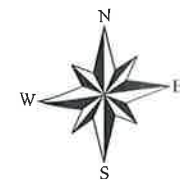


Figure 5: Mean SPI Ranks by Catchments

Scale AS SHOWN	Drawn by KZS	Checked by	Project No. 8177-003	Date 9/30/2015	Sheet
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			P: 763.493.4522		
			F: 763.493.5572		

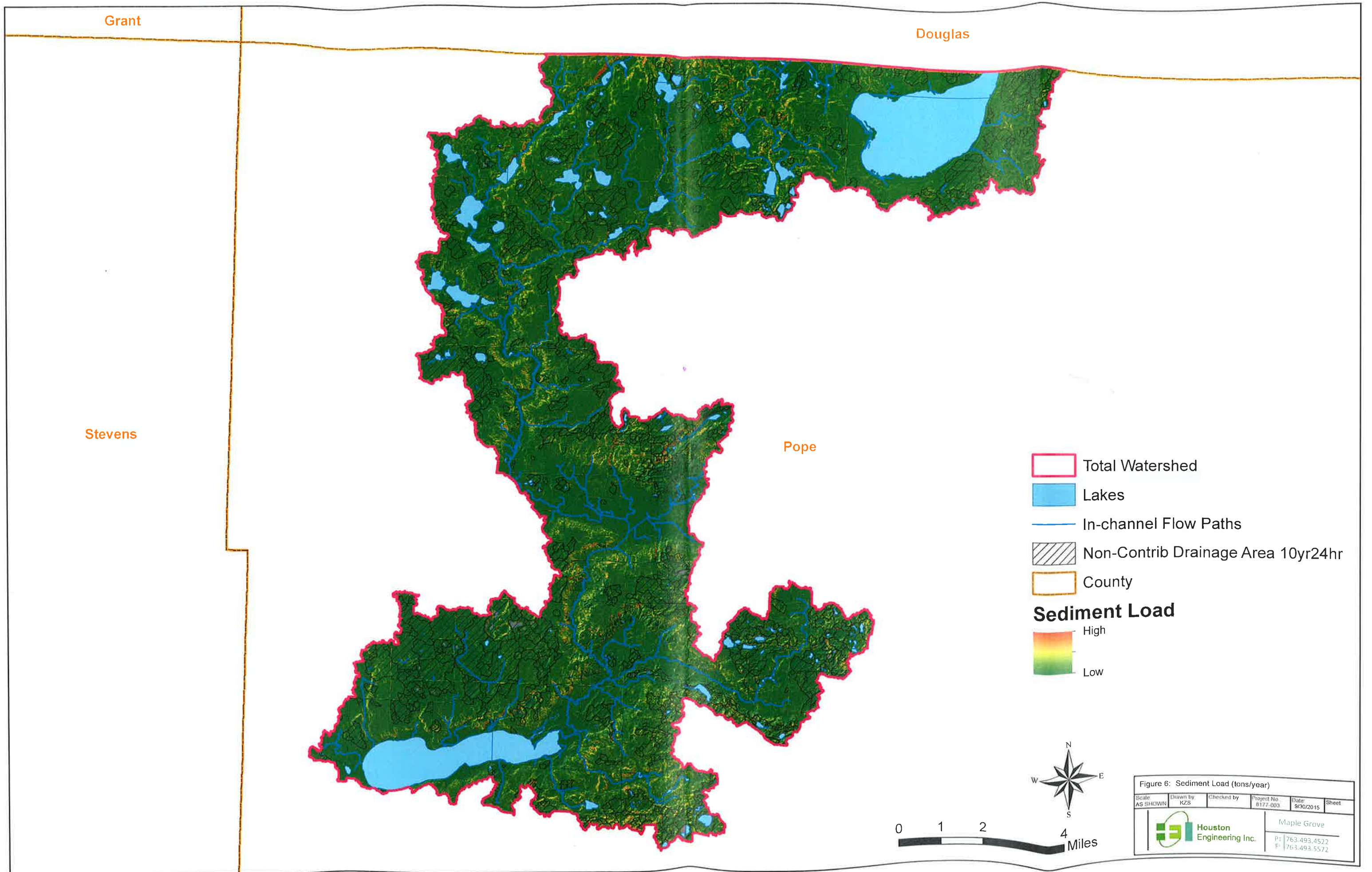


Figure 6: Sediment Load (tons/year)

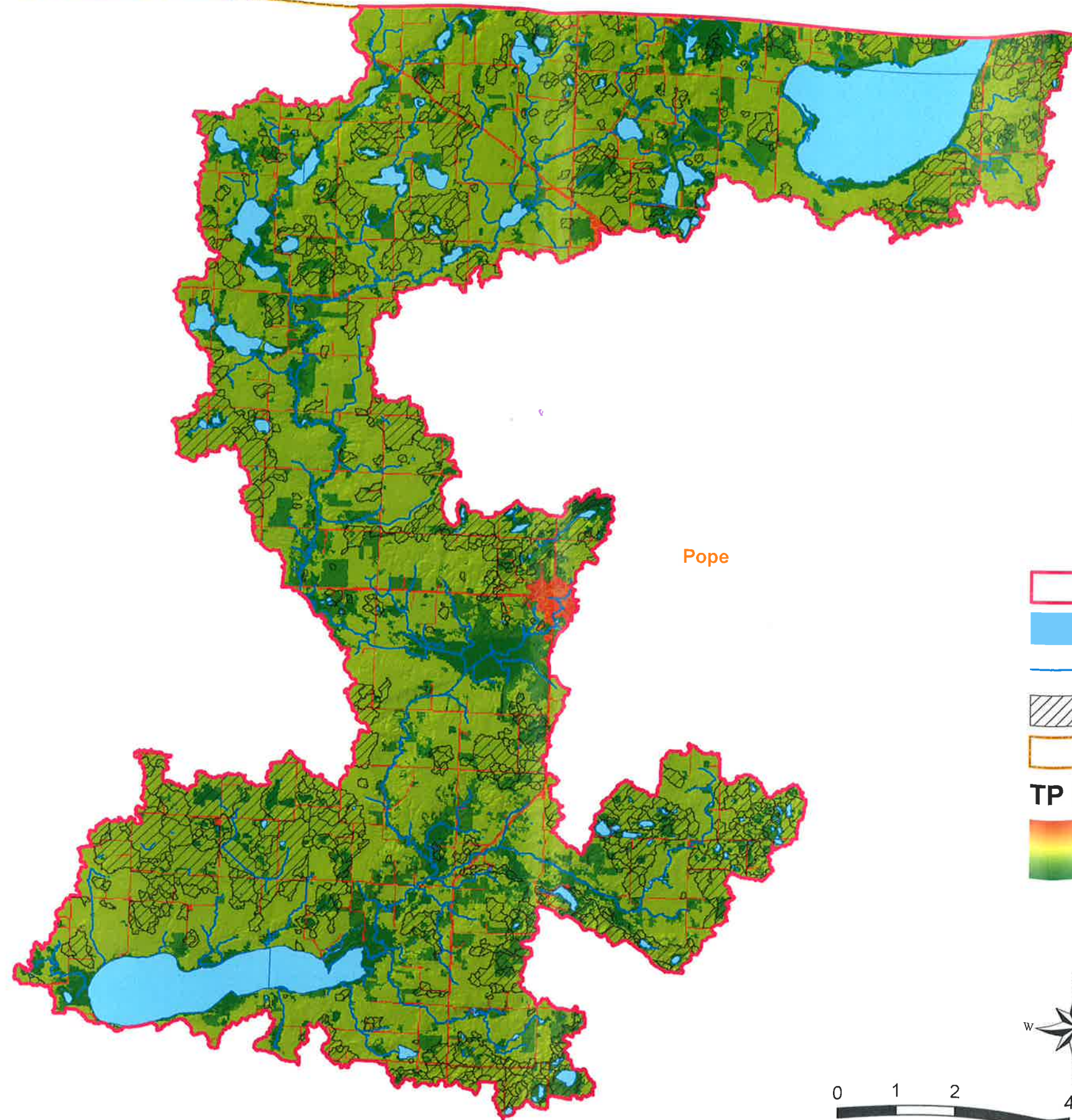
Scale AS SHOWN	Drawn by KZS	Checked by	Project No. 8177-003	Date 9/30/2015	Sheet
			Maple Grove P: 763.493.4522 F: 763.493.5572		







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-  Total Watershed
-  Lakes
-  In-channel Flow Paths
-  Non-Contrib Drainage Area 10yr24hr
-  County
- TP Load (lbs/scre/year)**
-  High
Low

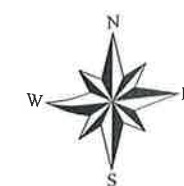



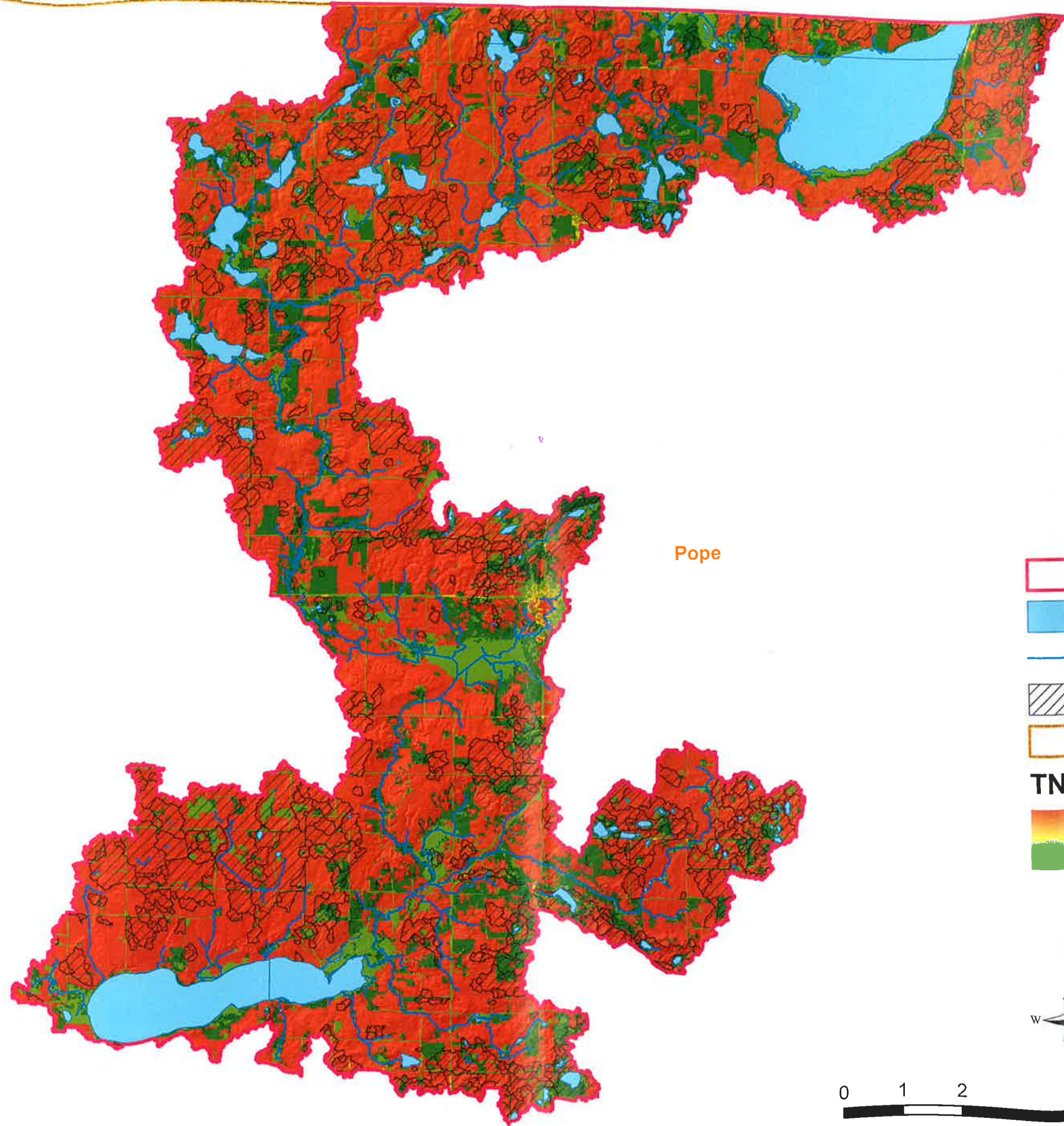
Figure 7: TP Load Leaving the Landscape					
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 Houston Engineering Inc.			Maple Grove		
			P: 763.493.4522 F: 763.493.5572		


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-  Total Watershed
-  Lakes
-  In-channel Flow Paths
-  Non-Contrib Drainage Area 10yr24hr
-  County
- TN Load (lbs/acre/year)**
-  High
Low

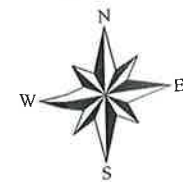


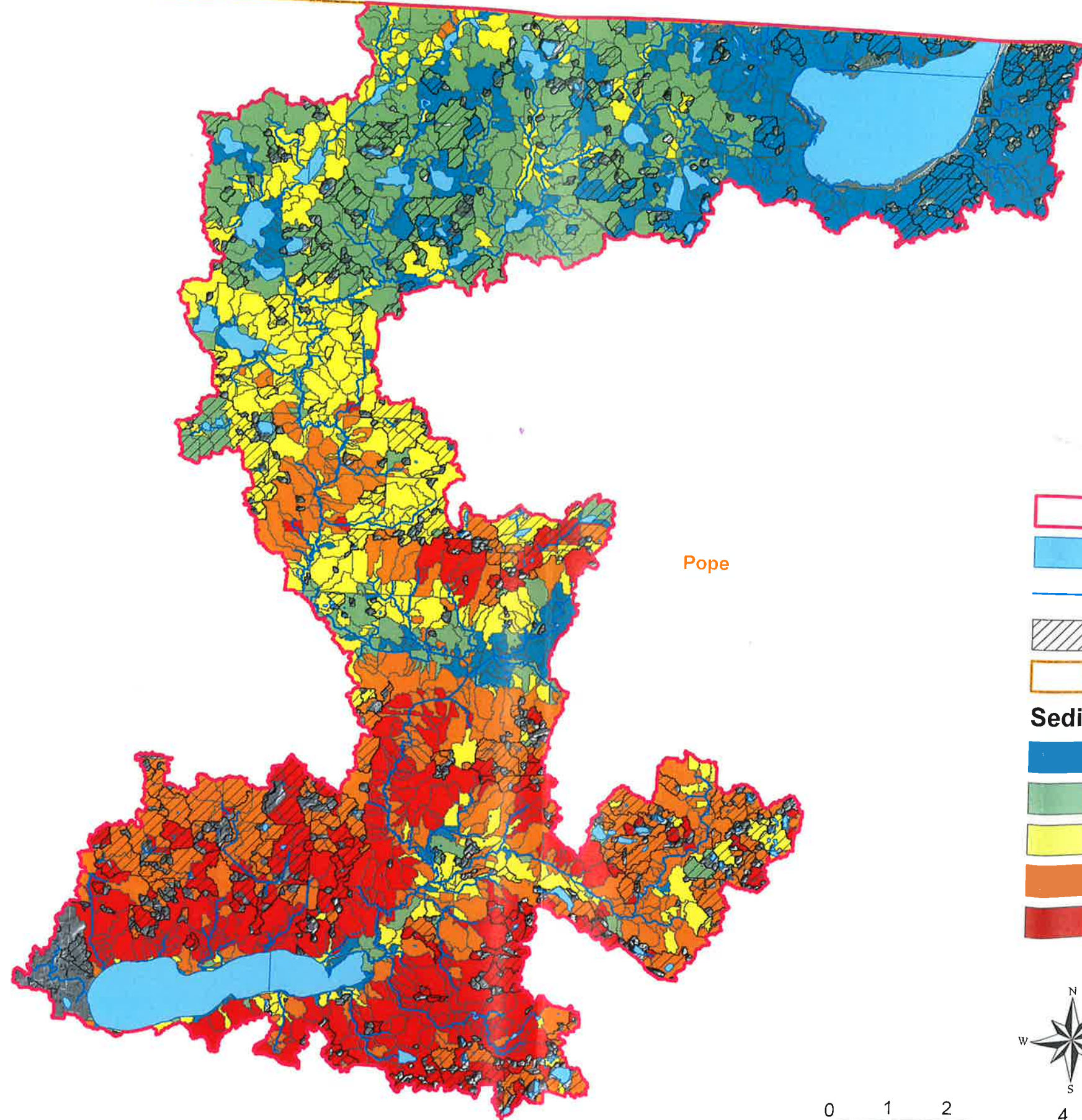
Figure 8: TN Load Leaving the Landscape					
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				Maple Grove	
				P: 763.493.4522	
				F: 763.493.5572	











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-  Total Watershed
-  Lakes
-  In-channel Flow Paths
-  Non-Contrib Drainage Area 10yr24hr
-  County
- Sediment Mass (tons/acre)**
-  Low
-  Low/Moderate
-  Moderate
-  High/Moderate
-  High

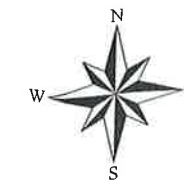



Figure 9: Sediment Load (tons/year) Delivered
Sediment Load to Lake Emily

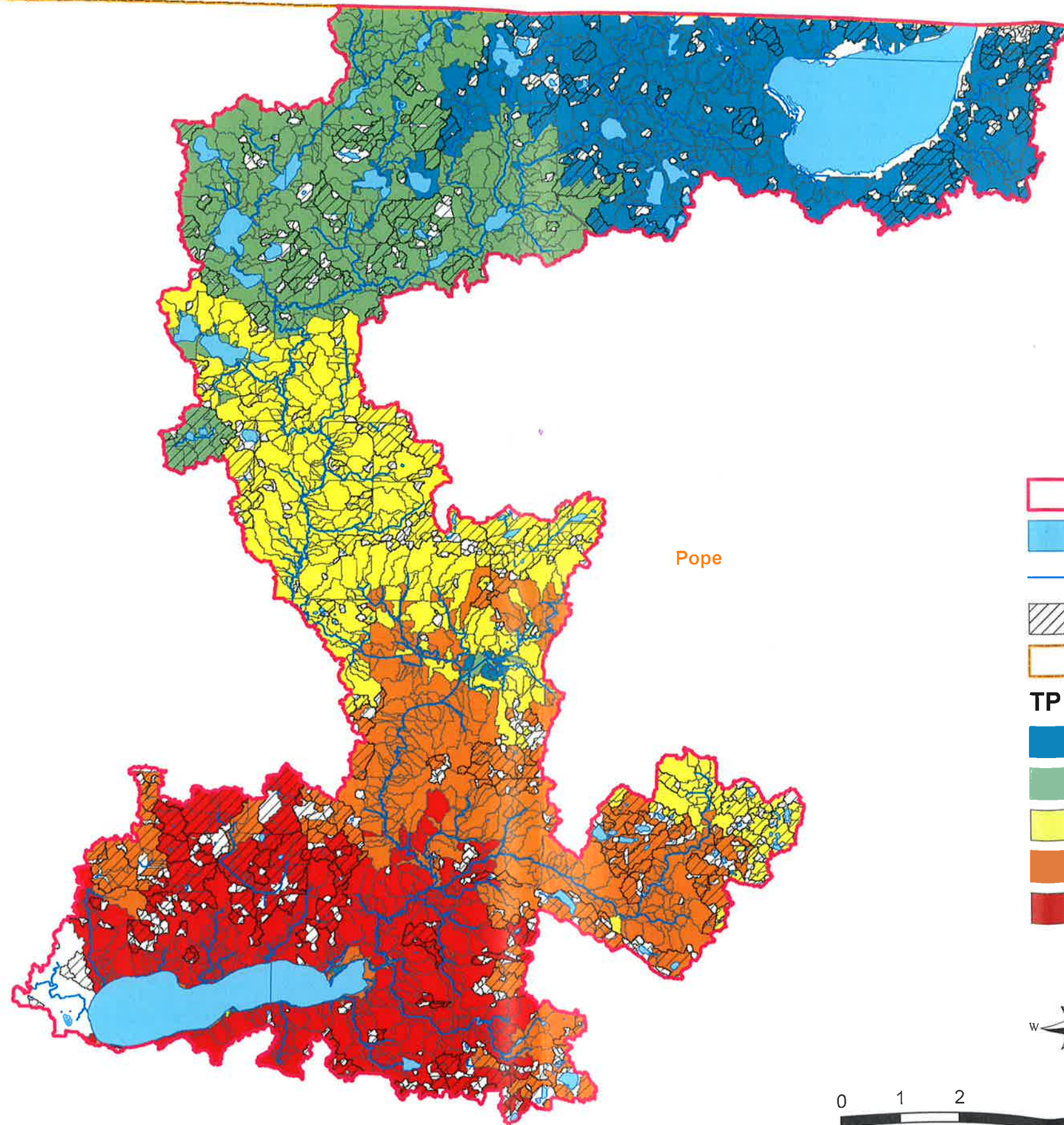
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				P: 763.493.4522 F: 763.493.5572	











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-  Total Watershed
-  Lakes
-  In-channel Flow Paths
-  Non-Contrib Drainage Area 10yr24hr
-  County
- TP Load (lbs/acre/year)**
-  Low
-  Low/Moderate
-  Moderate
-  High/Moderate
-  High

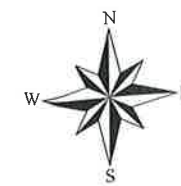

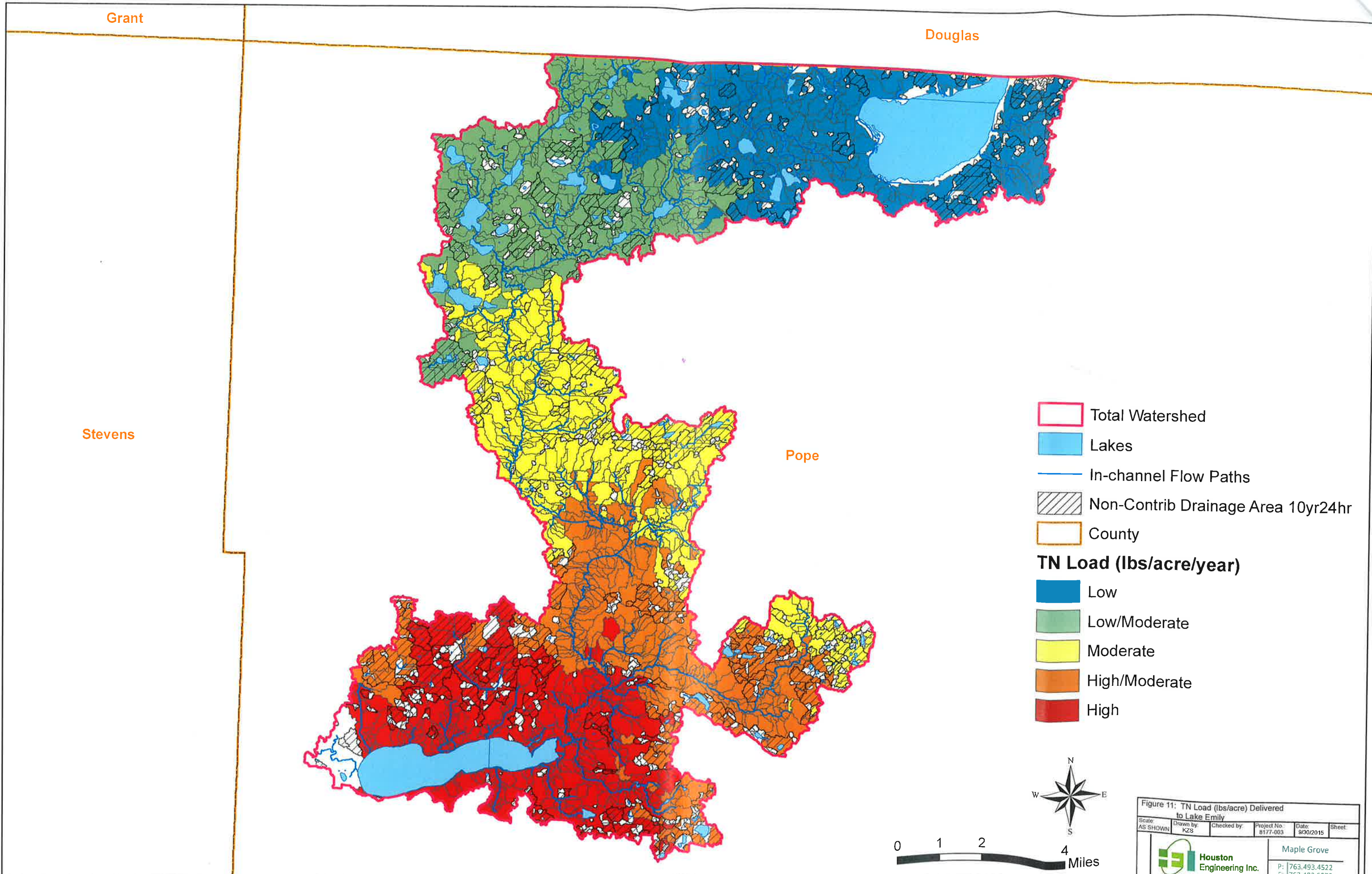


Figure 10: TP Load (lbs/acre) Delivered to Lake Emily					
Scale: AS SHOWN	Drawn by: KZs	Checked by:	Project No.: B177-003	Date: 9/30/2015	Sheet:
				Maple Grove	
				P: 763.493.4522 F: 763.493.5572	



- Total Watershed
 - Lakes
 - In-channel Flow Paths
 - Non-Contrib Drainage Area 10yr24hr
 - County
- TN Load (lbs/acre/year)**
- Low
 - Low/Moderate
 - Moderate
 - High/Moderate
 - High

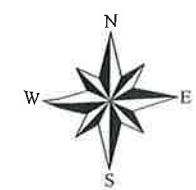


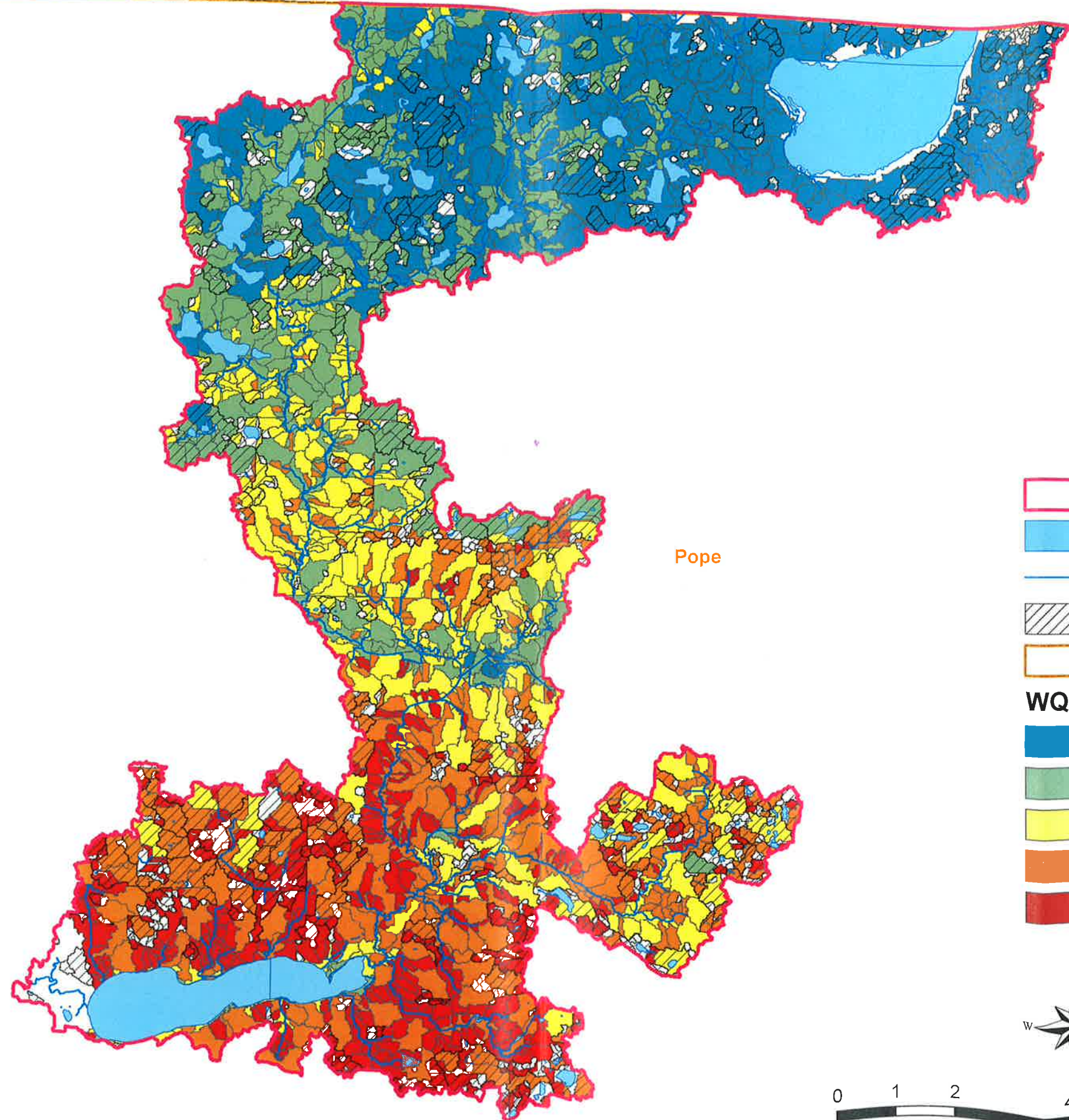
Figure 11: TN Load (lbs/acre) Delivered to Lake Emily					
Scale: AS SHOWN	Drawn by: KZS	Checked by:	Project No.: 8177-003	Date: 9/30/2015	Sheet:
Houston Engineering Inc.				Maple Grove	
				P: 763.493.4522 F: 763.493.5572	











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-  Total Watershed
-  Lakes
-  In-channel Flow Paths
-  Non-Contrib Drainage Area 10yr24hr
-  County
- WQI Load**
-  Low
-  Low/Moderate
-  Moderate
-  High/Moderate
-  High

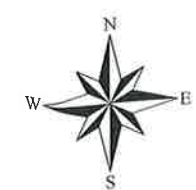

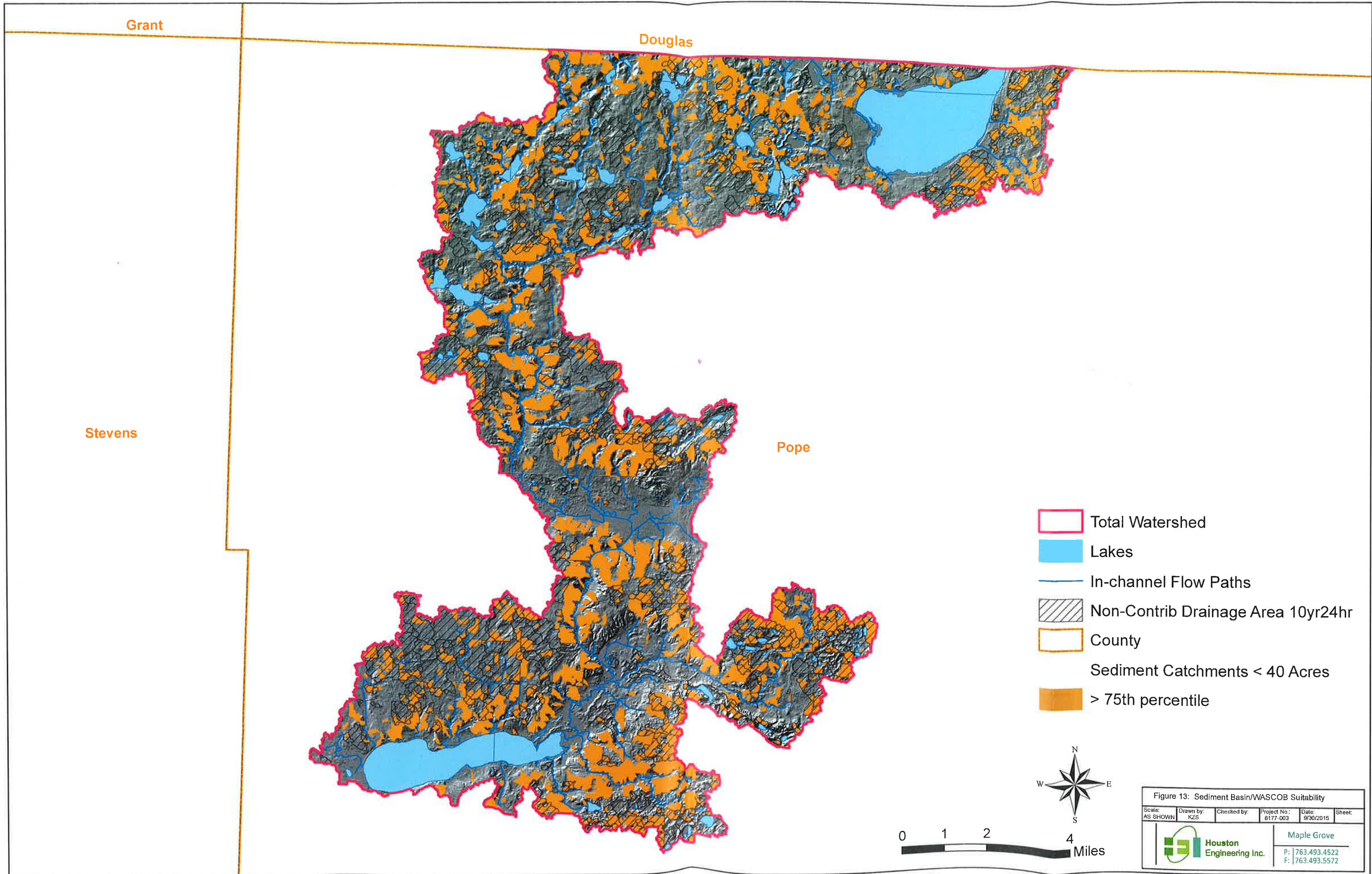









Figure 12: WQI Load Delivered to Lake Emily

Scale AS SHOWN	Drawn by KZS	Checked by	Project No. 8177-003	Date 9/30/2015	Sheet:
 Houston Engineering Inc.			Maple Grove P: 763.493.4522 F: 763.493.5572		



-  Total Watershed
-  Lakes
-  In-channel Flow Paths
-  Non-Contrib Drainage Area 10yr24hr
-  County
-  Sediment Catchments < 40 Acres
-  > 75th percentile

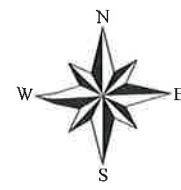



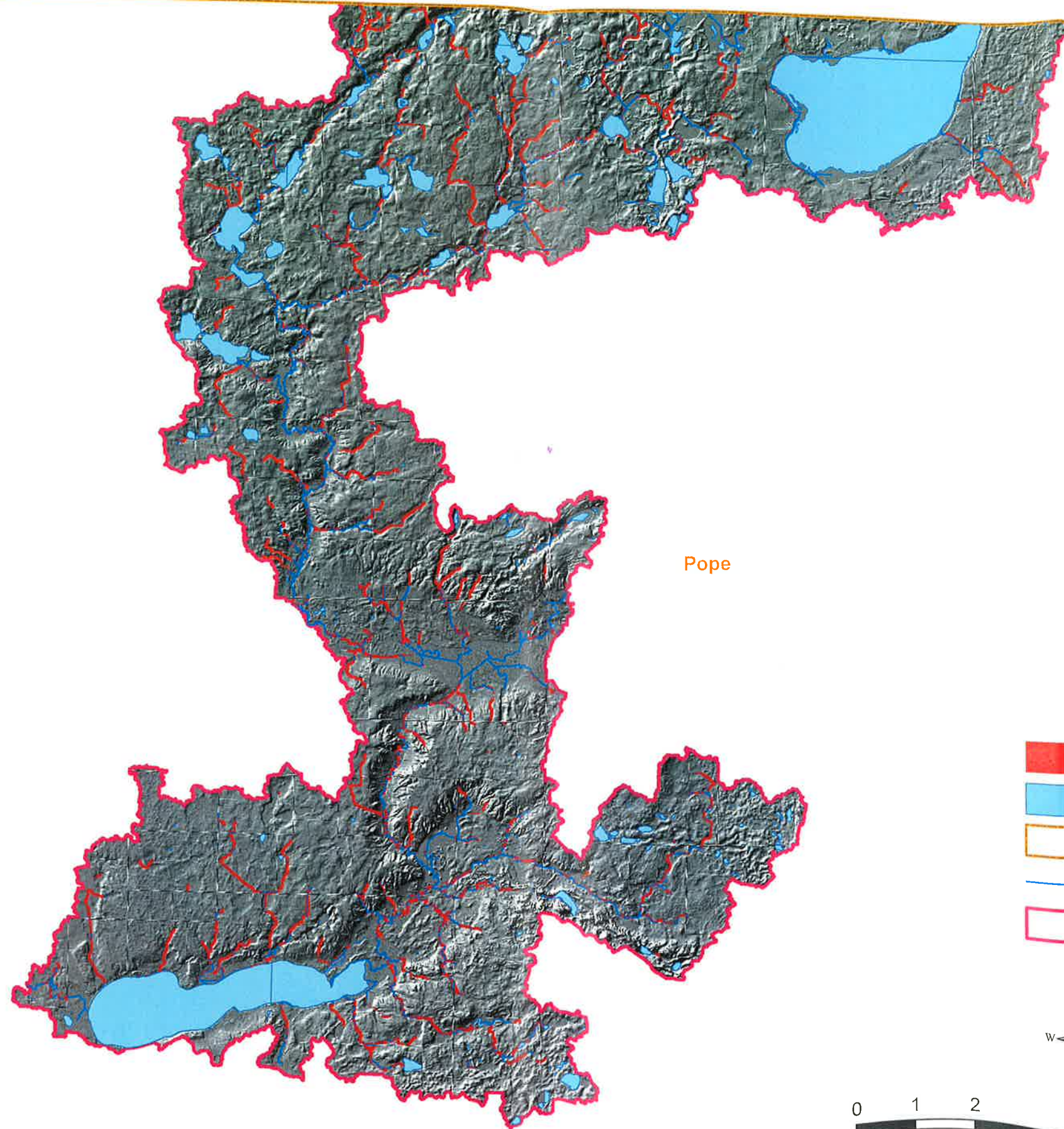
Figure 13: Sediment Basin/WASCOB Suitability					
Scale: AS SHOWN	Drawn by: KZS	Checked by:	Project No.: 8177-003	Date: 9/30/2015	Sheet:
				Maple Grove	
				P: 763.493.4522 F: 763.493.5572	

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- Filter Strips
- Lakes
- County
- In-channel Flow Paths
- Total Watershed

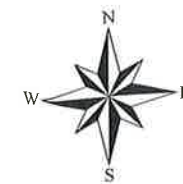


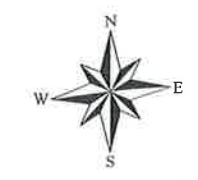
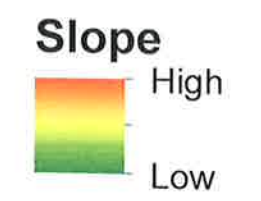
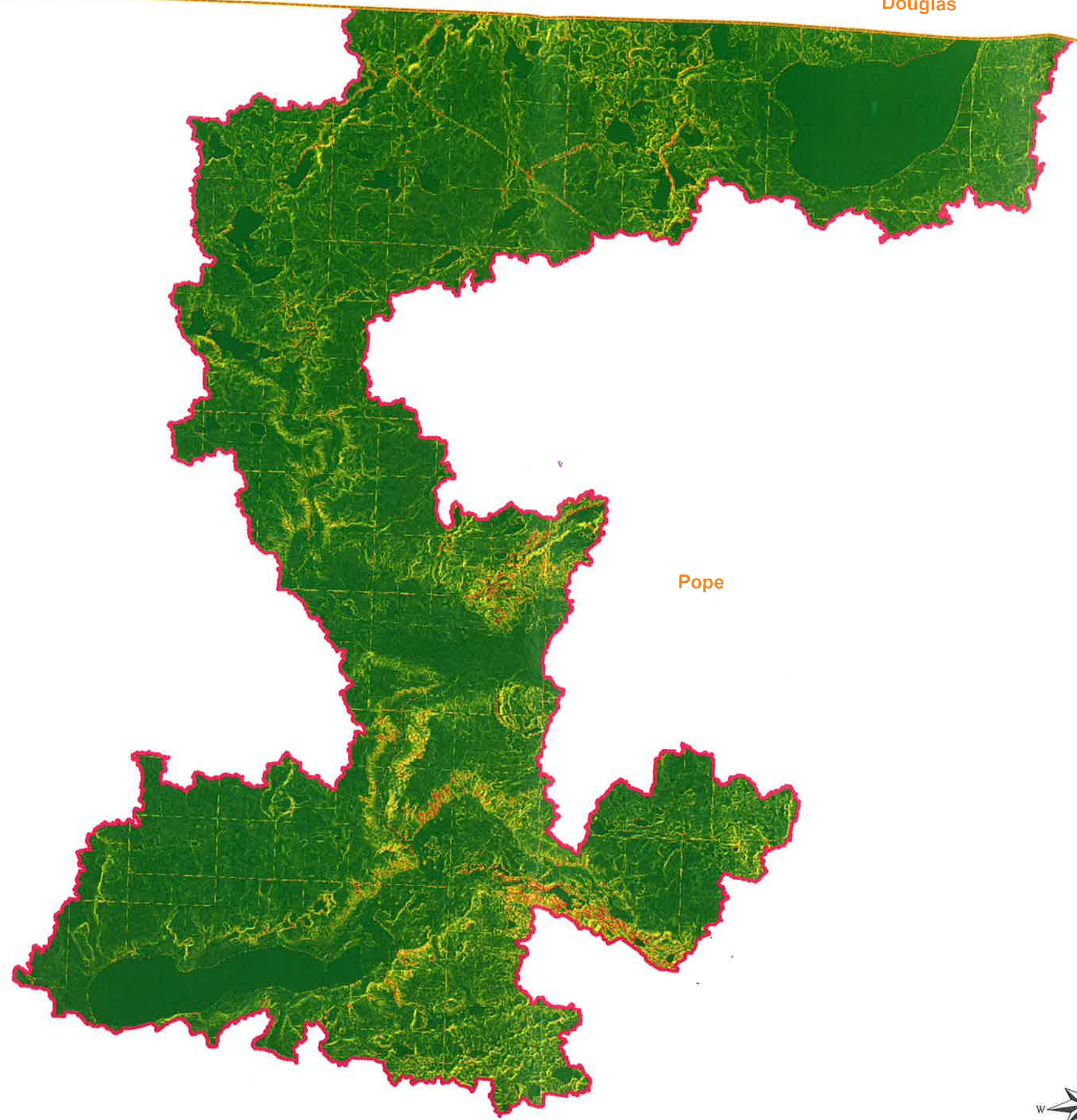
Figure 14: Filter Strip Suitability					
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 Houston Engineering Inc.			Maple Grove		
			P: 763.493.4522 F: 763.493.5572		

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Pope



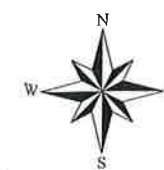
Slope					
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Houston Engineering Inc.				Maple Grove P: 763.493.4522 F: 763.493.5572	

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Pope



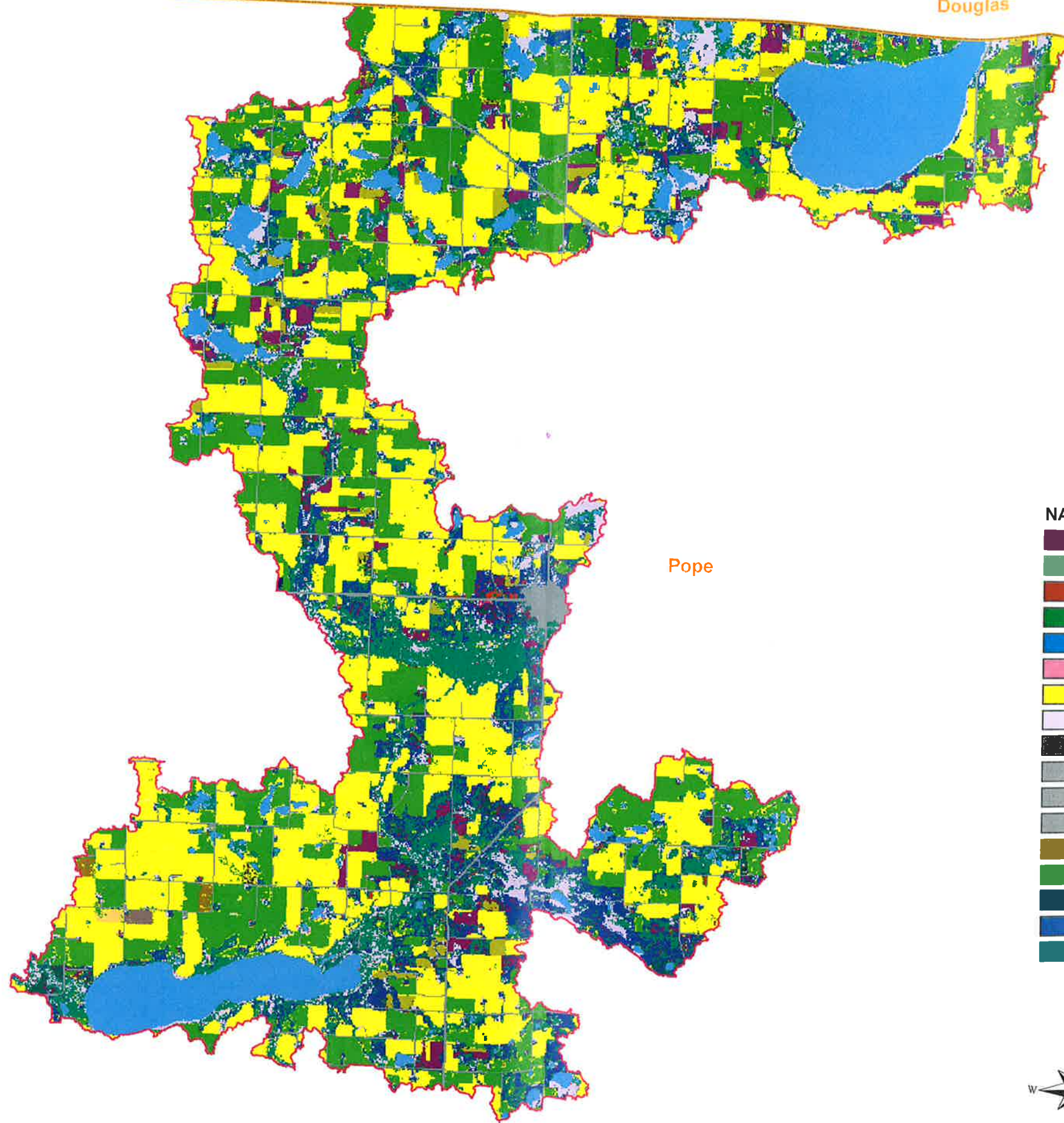
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				Maple Grove	
				P: 763.493.4522 F: 763.493.5572	

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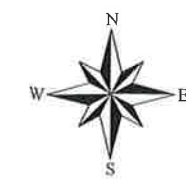
Stevens

Pope



NASS 2013

- Alfalfa
- Barley
- Barren
- Buckwheat
- Canola
- Clover/Wildflowers
- Corn
- Deciduous Forest
- Developed/High Intensity
- Developed/Low Intensity
- Developed/Med Intensity
- Developed/Open Space
- Dry Beans
- Evergreen Forest
- Fallow/Idle Cropland
- Grassland/Pasture
- Herbaceous Wetlands
- Millet
- Oats
- Open Water
- Other Crops
- Other Hay/Non Alfalfa
- Peas
- Potatoes
- Rye
- Shrubland
- Sod/Grass Seed
- Sorghum
- Soybeans
- Spring Wheat
- Sugarbeets
- Sunflower
- Sweet Corn
- Winter Wheat
- Woody Wetlands



Nass 2013					
Scale: AS SHOWN	Drawn by: KZS	Checked by:	Project No.: 8177-003	Date: 9/22/2015	Sheet:
Houston Engineering Inc.				Maple Grove P: 763.493.4522 F: 763.493.5572	

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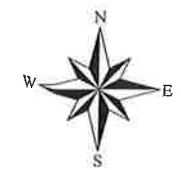
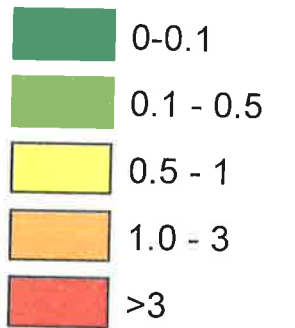
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Pope



LS Factor



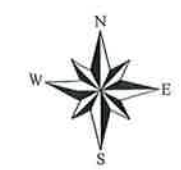
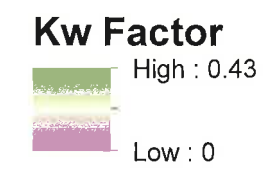
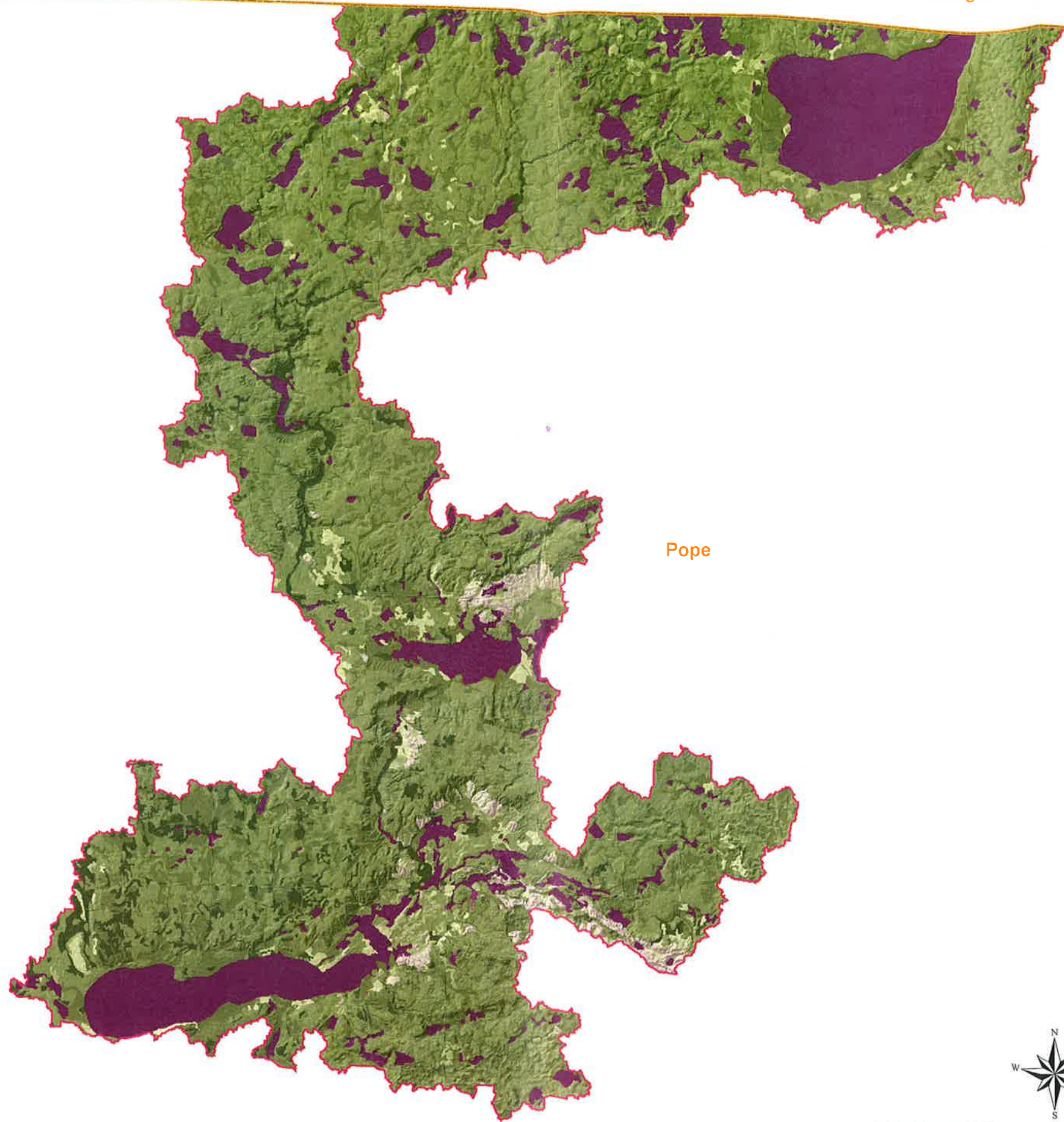
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Stevens

Pope



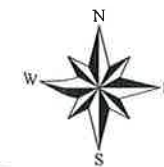
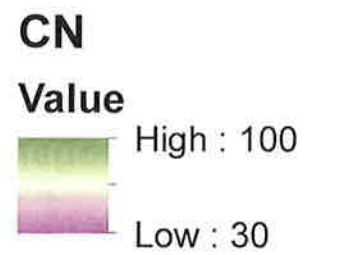
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Pope



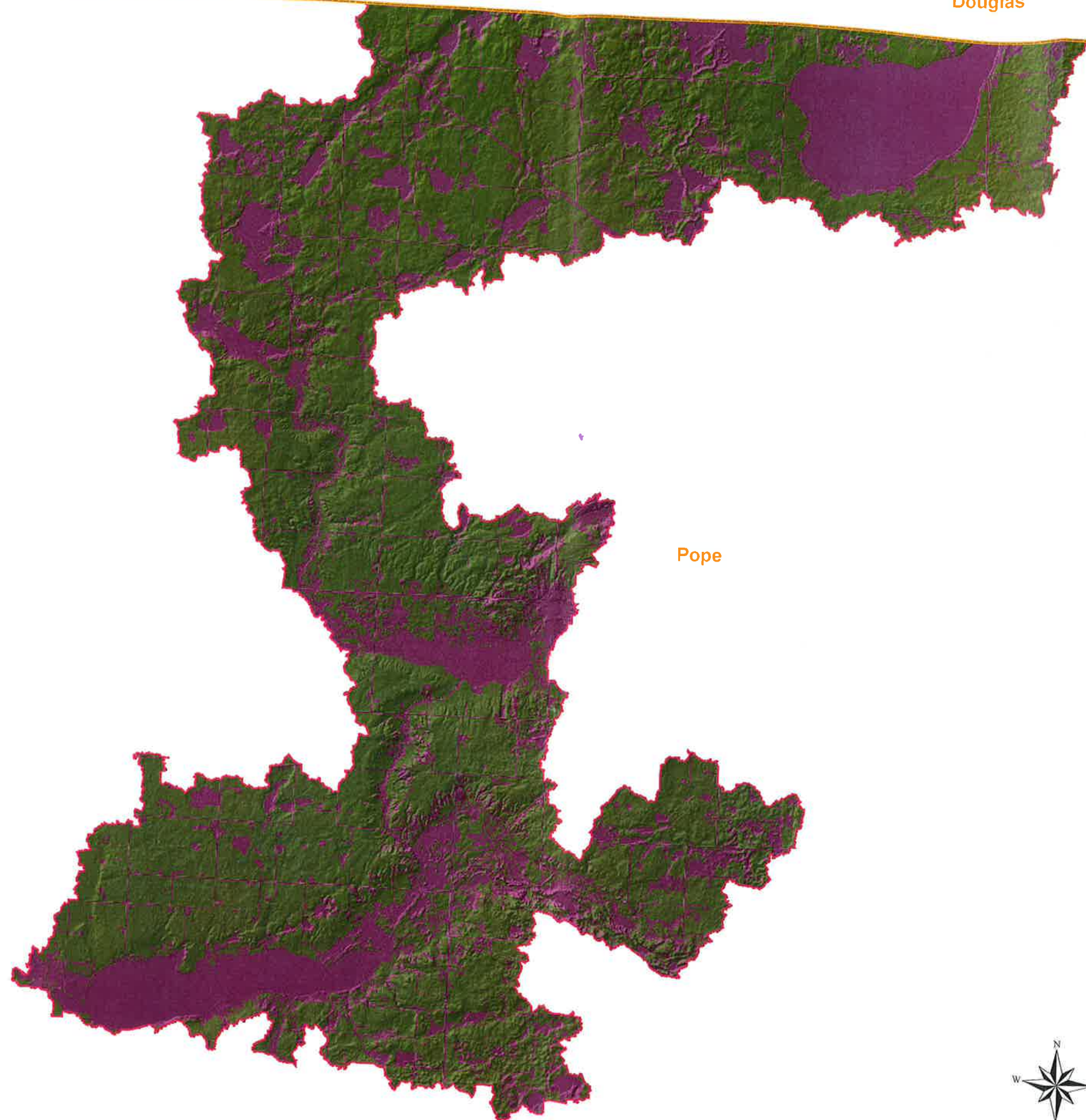
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Houston Engineering Inc.				Maple Grove	
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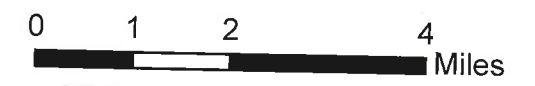
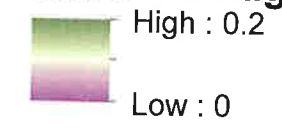
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Pope



Cover Management Factor



Cover Management Factor					
Scale: AS SHOWN	Drawn by: KZS	Checked by:	Project No.: 8177-003	Date: 9/22/2015	Sheet:
Houston Engineering Inc.				Maple Grove	
				P: 763.493.4522 F: 763.493.5572	