



Bureau of Abandoned Mine Reclamation

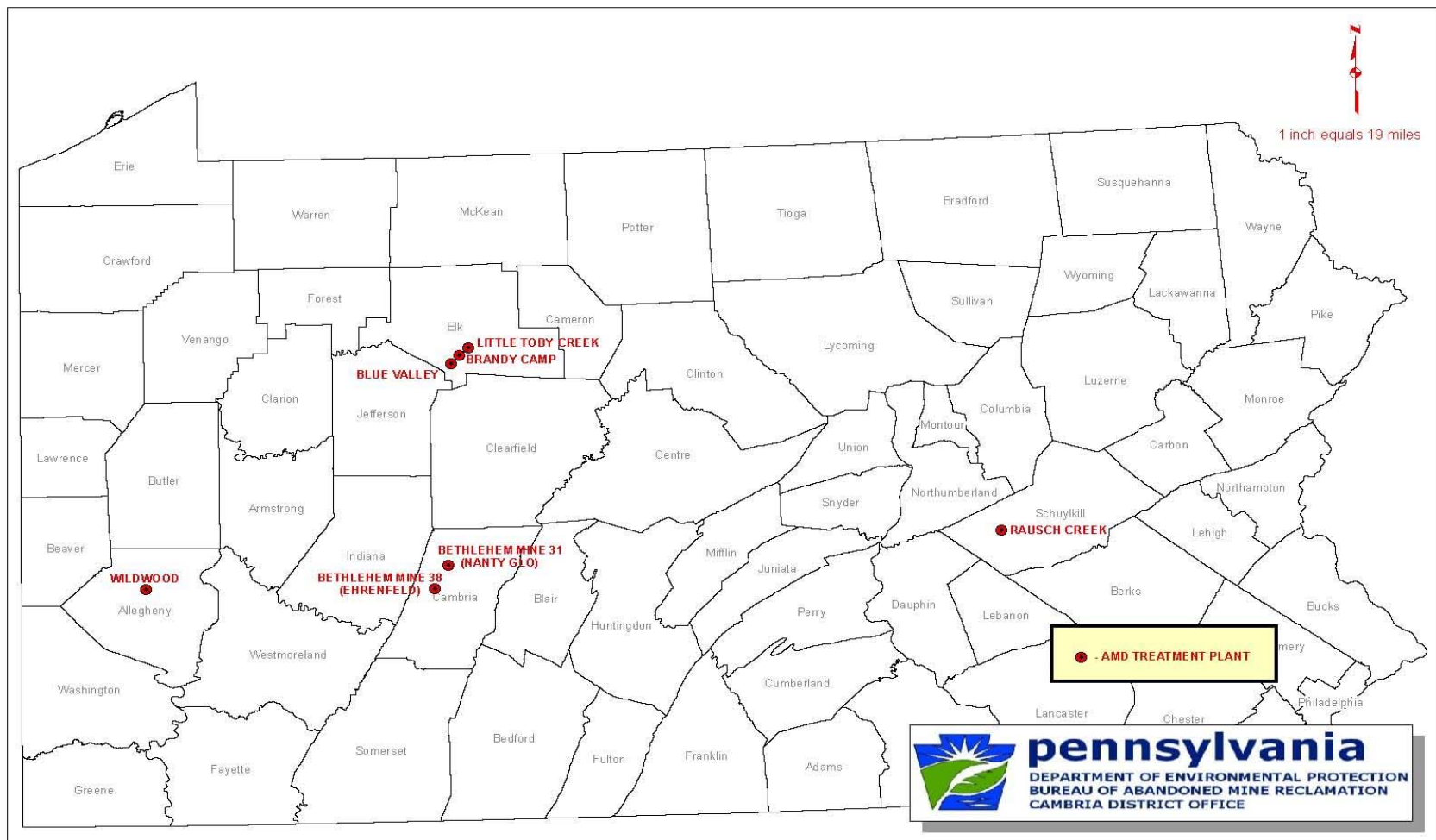
# Economic Analysis of the Use of Mine Water from Abandoned Mines for the Development of Marcellus Shale Gas Wells in Pennsylvania

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July 24, 2012

# Location of some Selected AMD Treatment Facilities in Pennsylvania



# Treatment Costs for Selected AMD Treatment Facilities in Pennsylvania

Treatment Plant	County	Operator	Flow Treated (MGD)	2009 Treatment Cost (\$/1,000 gal)	2010 Treatment Cost (\$/1,000 gal)	2011 Treatment Cost (\$/1,000 gal)	Source
Wildwood	Allegheny	PA DEP	0.9	\$ 0.11	\$ 0.14	\$ 0.06	1
Brandy Camp	Elk	PA DEP	1.4	\$ 0.65	\$ 0.68	\$ 0.76	1
Blue Valley	Elk	Toby Creek Watershed Assoc.	0.4	\$ 0.76			2
Toby Creek	Elk	PA DEP	0.7	\$ 0.57	\$ 0.76	\$ 0.76	1
Rausch Creek	Schuylkill	PA DEP	10.8	\$ 0.07	\$ 0.22	\$ 0.10	1
Bethlehem Mine 31	Cambria	Pristine Resources	3.0	\$ 0.45			3
Bethlehem Mine 38	Cambria	Pristine Resources	10.0	\$ 0.41			3
<b>Weighted Average</b>			<b>3.9</b>	<b>\$ 0.29</b>			

1 - Bob Oshaben, PA DEP, BAMR, Personal Communication, June 1, 2012

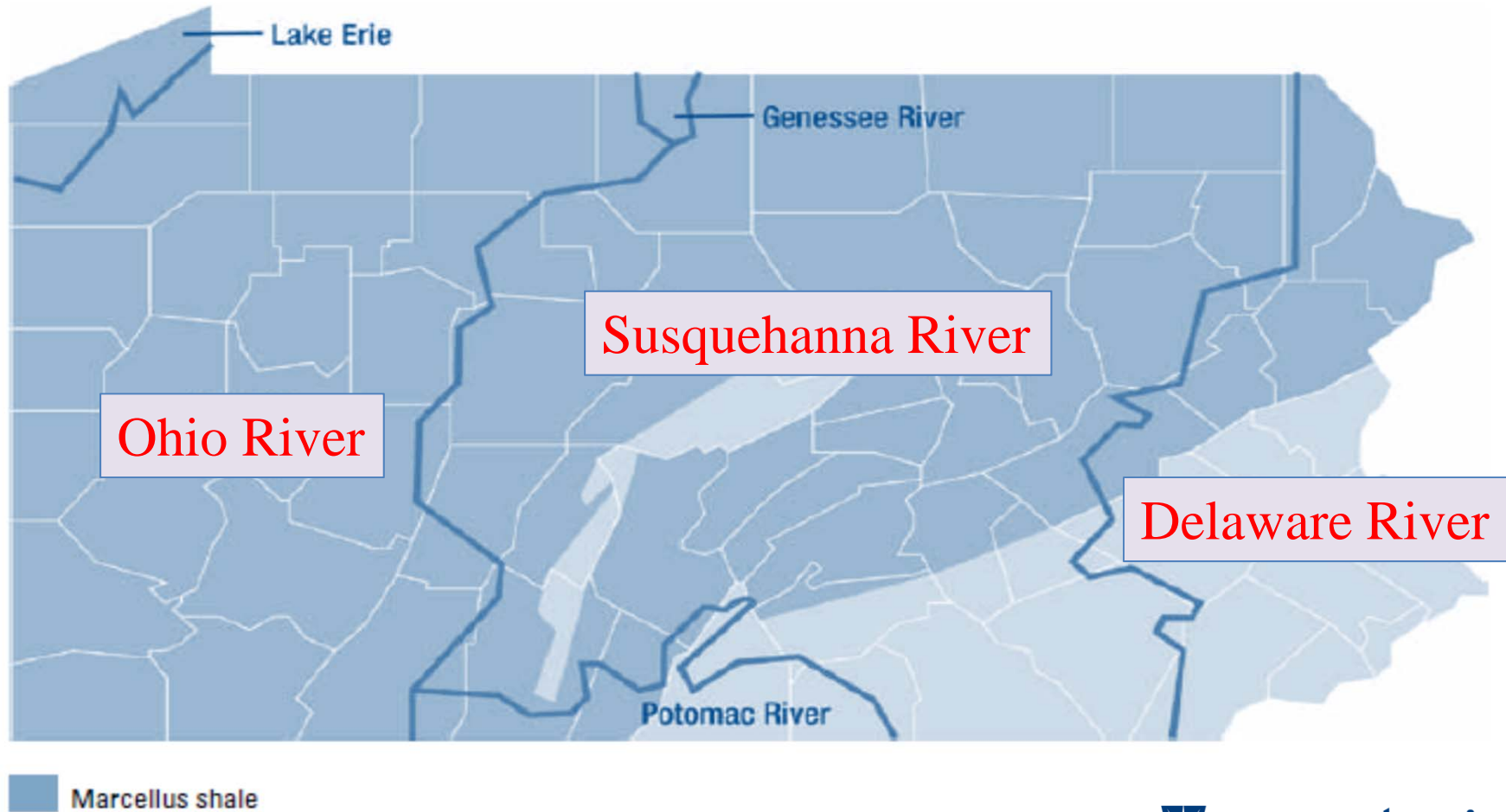
2 - Bill Sabatose, President, Toby Creek Watershed Assoc., Personal Communication, Oct. 29, 2010

3 - Larry Neff, Operations Manager, Pristine Resources, Personal Communication, Sept. 2, 2010

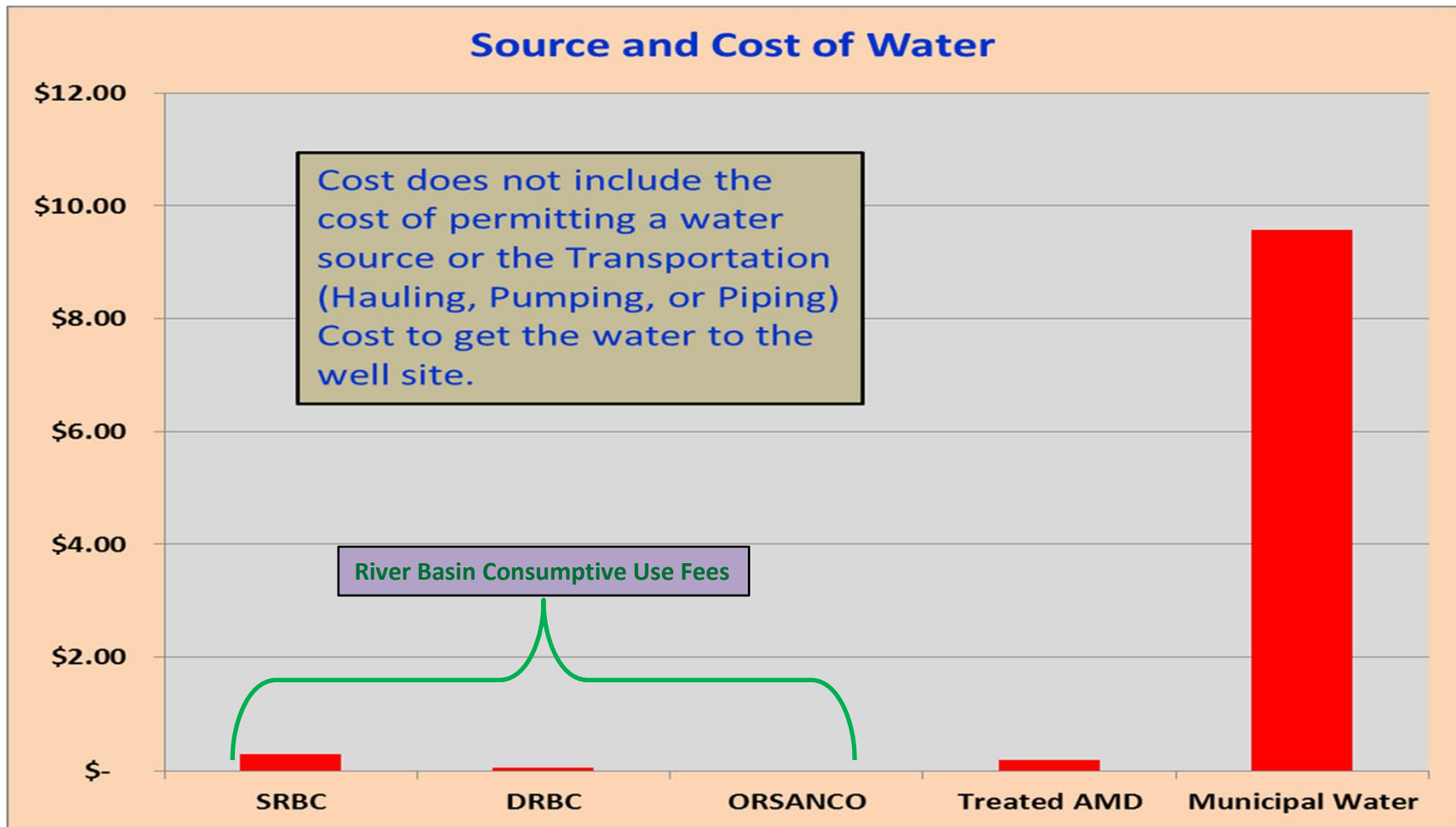
# Costs of Municipal Water for Various Geographic Areas of Pennsylvania

<b>Gas Company</b>	<b>County</b>	<b>Supplier</b>	<b>Cost (\$/1,000 gal)</b>
<b>East Resources</b>	<b>Tioga</b>	<b>Erwin NY Municipal Authority</b>	<b>\$ 14.50</b>
<b>Range Resources</b>	<b>Washington</b>	<b>PA American Water</b>	<b>\$ 10.50</b>
<b>Burnett Oil Co.</b>	<b>Fayette</b>	<b>PA American Water</b>	<b>\$ 7.89</b>
<b>Burnett Oil Co.</b>	<b>Westmoreland</b>	<b>Highridge Water Authority</b>	<b>\$ 8.00</b>
<b>EOG Resources</b>	<b>Elk</b>	<b>Ridgway Water Authority</b>	<b>\$ 7.00</b>
<b>Average</b>			<b>\$ 9.57</b>

# River Basins in Pennsylvania



# Cost Summary



# Economics

- Based on the cost of purchasing water from a municipal water supplier, the use of AMD could dramatically reduce costs for gas well developers in Pennsylvania
- At an average cost of \$9.57 per 1,000 gallons for municipal water, and an average of 5.6 million gallons of water required per well, the cost to purchase water for each well would be approaching \$60,000 without taking into consideration the trucking or piping costs

# Economics

- Assuming treated AMD can be used for hydraulic fracturing without additional treatment, and at a cost of only \$0.10 – \$0.75 per 1,000 gallons treated, using the treated AMD could reduce the cost to only a few thousand dollars per well
- The cost of using treated AMD is also competitive when comparing it to the consumptive use fees charged by the SRBC and the DRBC





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# Questions?

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