



The Dan River Coal Ash Release: Water Quality Conditions

Environmental Review Commission
February 17, 2014

Water Quality Sampling Results

- Sampling commenced on Monday, Feb 3, and continues through the present
- Sampling coordinated with EPA/USFWS/VA DEQ
- First results published Thursday, Feb 6

Field Parameters

- Temperature, pH, Dissolved Oxygen, Conductivity
 - All within normal ranges
- No fish kills noted
- No noted impacts to public water supplies

Other Constituents

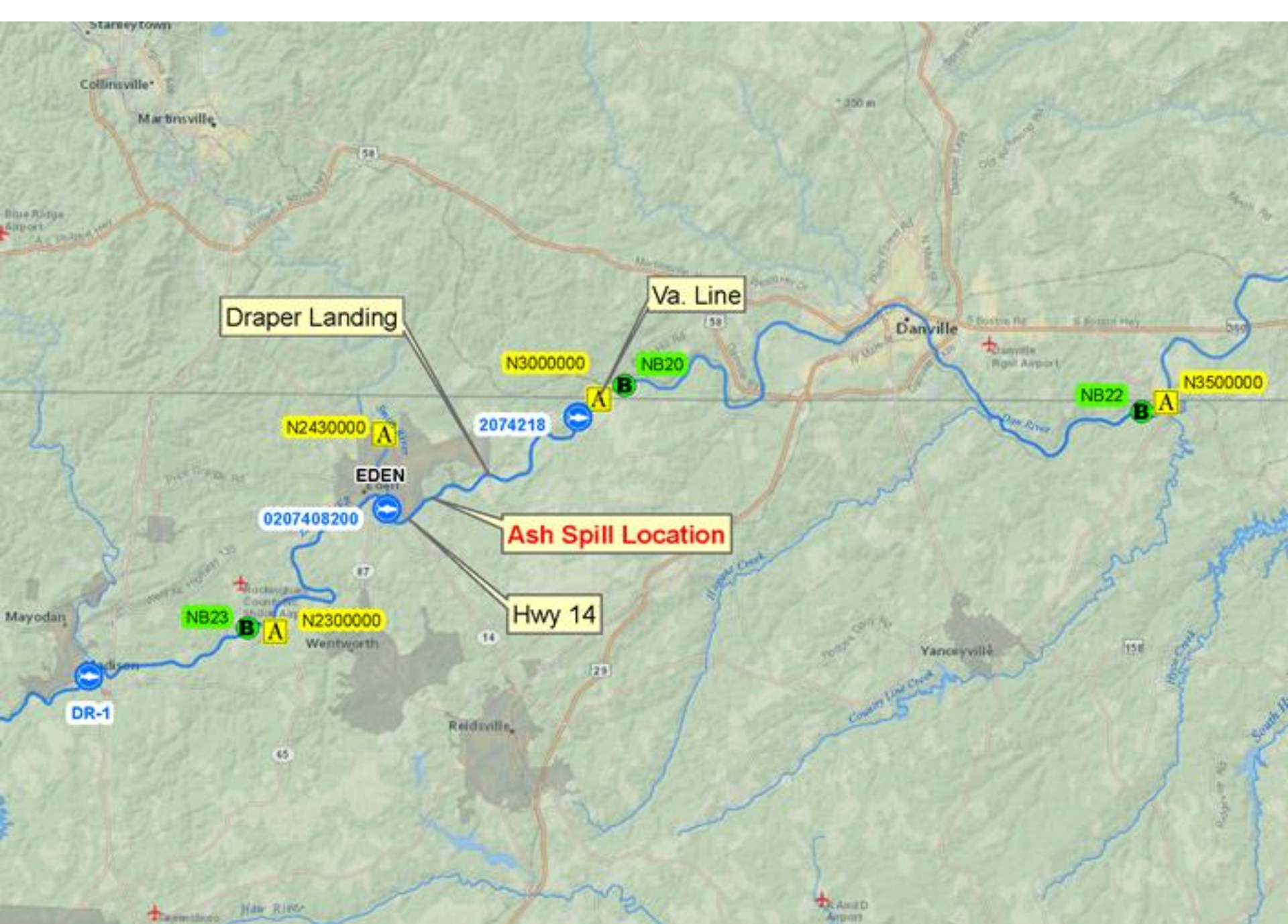
- Sulfates
- Nutrients (Nitrogen and Phosphorus)
- Total Suspended Solids
- Heavy Metals

Heavy Metals

- Potassium
- Cadmium
- Chromium
- Copper
- Nickel
- Lead
- Zinc
- Vanadium
- Silver
- Aluminum
- Beryllium
- Calcium
- Cobalt
- Iron
- Antimony
- Tin
- Thallium
- Titanium
- Lithium
- Magnesium
- Manganese
- Sodium
- Arsenic
- Selenium
- Mercury
- Molybdenum
- Barium
- Boron

Detailed Sampling Results

- Most parameters within surface water quality standards
- Exceedances noted for:
 - Copper
 - Iron
 - Aluminum
 - Arsenic



Data from Ash Release at Duke Energy Dan River Station

Preliminary Results

Parameter	Lab PQL	Sampling Dates and Locations						Water Quality Standard
		2/3/2014 Downstream Draper Landing	2/3/2014 Downstream Virginia Line	2/3/2014 Upstream Hwy 14	2/4/2014 Downstream Draper Landing	2/4/2014 Downstream Virginia Line	2/4/2014 Upstream Hwy 14	
		Sample ID AC04606	Sample ID AC04607	Sample ID AC04608	Sample ID AC04664	Sample ID AC04665	Sample ID AC04666	
Residue: Suspended	6.2 mg/L	855	329	15	164	256	28	N
Sulfate	1.0 mg/L	5.1	5.6	4.9	4.7	5.3	5.1	No Data
TKN as N	0.2 mg/L	0.74	.58	0.24	0.31	0.41	0.24	N/A
NO2 plus NO3 as N	0.02 mg/L	0.40	.44	0.38	0.39	0.40	0.34	N/A
P: Total P	0.02 mg/L	0.26	.14	0.03	0.10	0.14	0.05	N/A
K-Potassium	0.10 mg/L	4.7	2.8	1.5	1.9	2.5	1.6	No Data
Cd-Cadmium	0.5 µg/L	0.69	0.50U	0.50U	0.50U	0.50U	0.50U	2 µg/L
Cr -Chromium	10 µg/L	15	10U	10U	10U	10U	10U	50 µg/L
Cu-Copper	2.0 µg/L	46	19	2.0U	13	16	3.3	7 µg/L
Ni-Nickel	2.0 µg/L	21	8.9	2.0U	7.5	8.4	2.1	88 µg/L
Pb_Lead	2.0 µg/L	23	7.9	2.0U	4.5	6.5	2.0U	25 µg/L
Zn-Zinc	10 µg/L	44	29	13	16	20	13	50 µg/L
As-Arsenic	2.0 µg/L	40	13	2.0U	6.3	10	2.0U	10 µg/L*
Se-Selenium	5.0 µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5 µg/L
Hg-Mercury (high level)	0.2 µg/L	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U	0.012 µg/L
Ag -Silver	1.0 µg/L	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	0.06 µg/L
Al-Aluminum	50 µg/L	16000	5800	770	3000	4900	1100	87 µg/L*
Ba-Barium	10 µg/L	530	210	29	100	170	34	200 mg/L
Be-Beryllium	5.0 µg/L	5.0U	5.0U	5.0U	50U	50U	50U	6.5 µg/L
Co-Cobalt	50 µg/L	50U	50U	50U	50U	50U	50U	4 µg/L
Fe-Iron	50 µg/L	7800	3500	1200	2400	3400	1700	1 mg/L
Mg-Magnesium	0.10 mg/L	4.6	3.7	3.0	2.9	3.4	3.0	N/A
Mn-Manganese	10 µg/L	120	65	36	48	63	41	N/A
V -Vanadium	25 µg/L	67	25	25U	25U	25U	25U	No Data
Na - Sodium	0.10 mg/L	6.4	7.1	4.4	5.5	7.0	4.9	N/A
Ca - Calcium	0.10 mg/L	12	10	8.7	7.8	9.1	8.5	N/A
Li-Lithium	25 µg/L	25U	25U	25U	25U	25U	25U	No Data
Mo-Molybdenum	10 µg/L	10U	10U	10U	10U	10U	10U	2 mg/L
Sb - Antimony	10 µg/L	10U	10U	10U	10U	10U	10U	640 µg/L*
Sn-Tin	10 µg/L	10U	10U	10U	10U	10U	10U	800 µg/L
Tl-Thallium	2.0 µg/L	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	0.47 µg/L*
Ti-Titanium	10 µg/L	980	370 J2	39	200	310	54	No Data
B-Boron	50 µg/L	210	170	230	140	140	200	750 mg/L*
Sr-Strontium	10 µg/L	260	130	52	84	110	52	40 mg/L

U = Indicates that the analyte was analyzed for but not detected above the reported practical quantitation limit.

N = 15A NCAC 02B .0211(3)(c) - Floating solids, settleable solids, or sludge deposits: only such amounts attributable to sewage, industrial wastes or other wastes as shall not make the water unsafe or unsuitable for aquatic life and wildlife or impair the waters for any designated uses;

N/A = Not Applicable

* Arsenic: 50 µg/L for protecting Aquatic Life.

* Aluminum: pH and hardness dependent; National Recommended Water Quality Criteria.

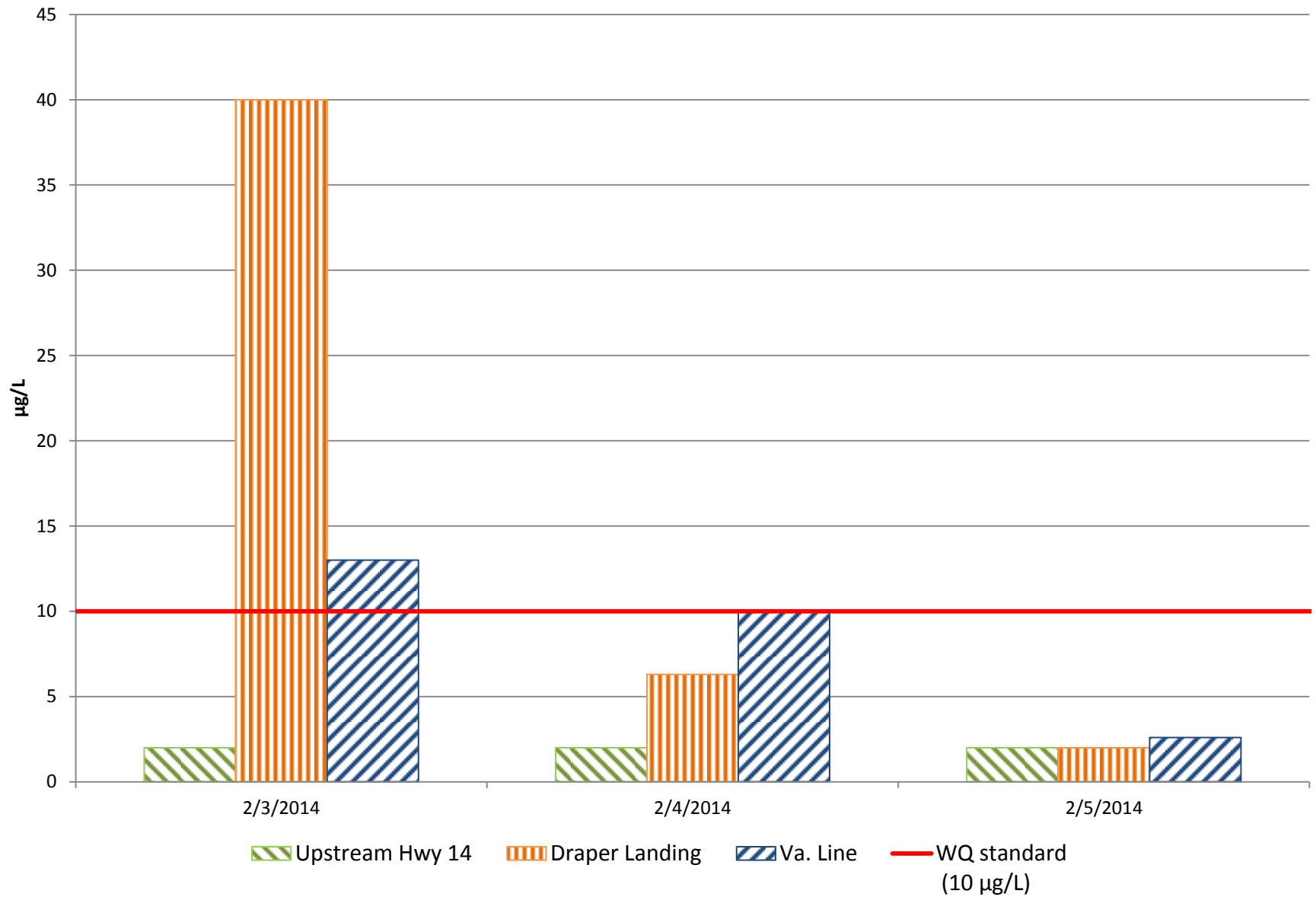
* Boron: National Recommended Water Quality Criteria for irrigation.

* Antimony: National Recommended Water Quality Criteria.

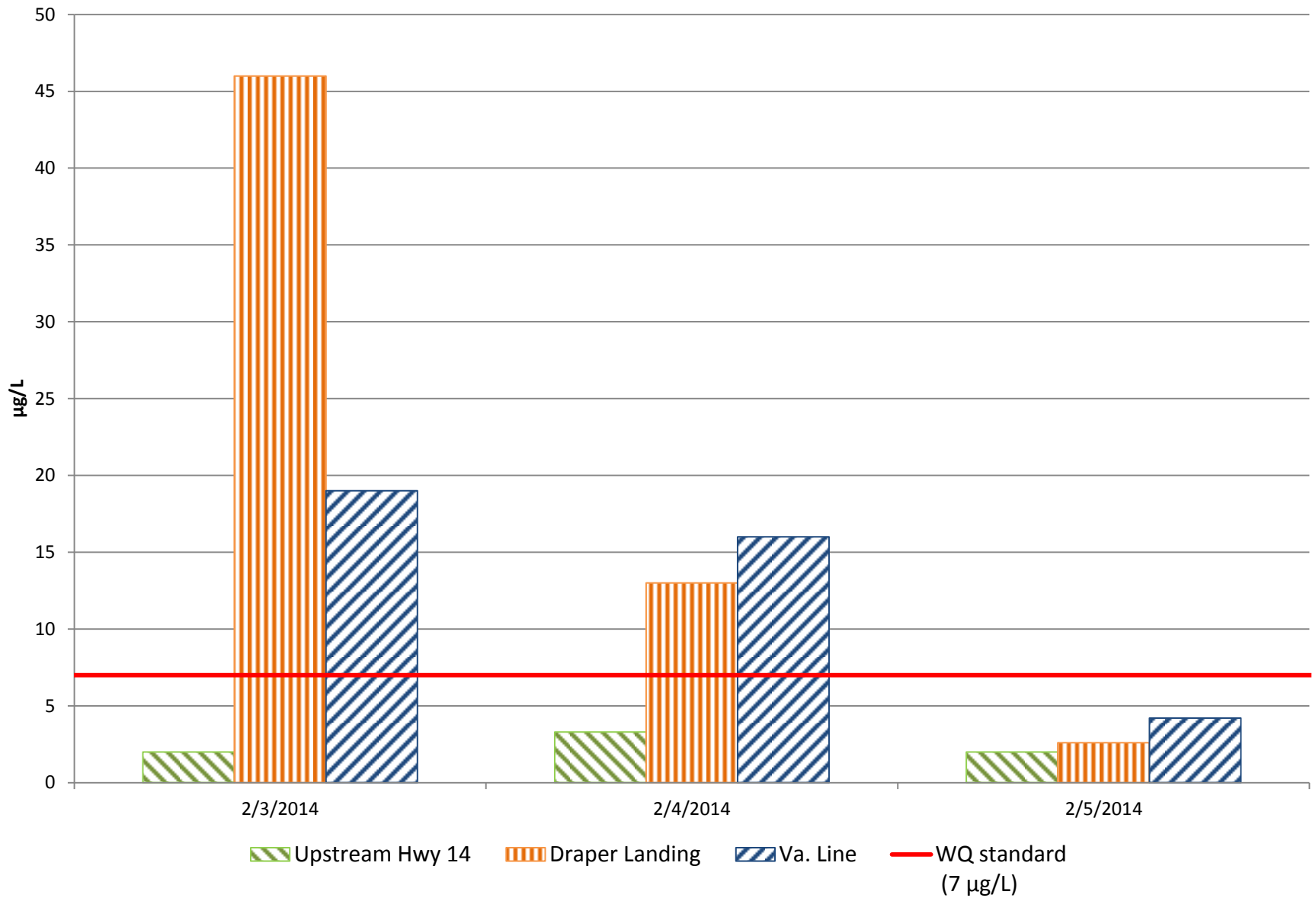
* Thallium: National Recommended Water Quality Criteria.

PQL = Practical Quantitation Limit

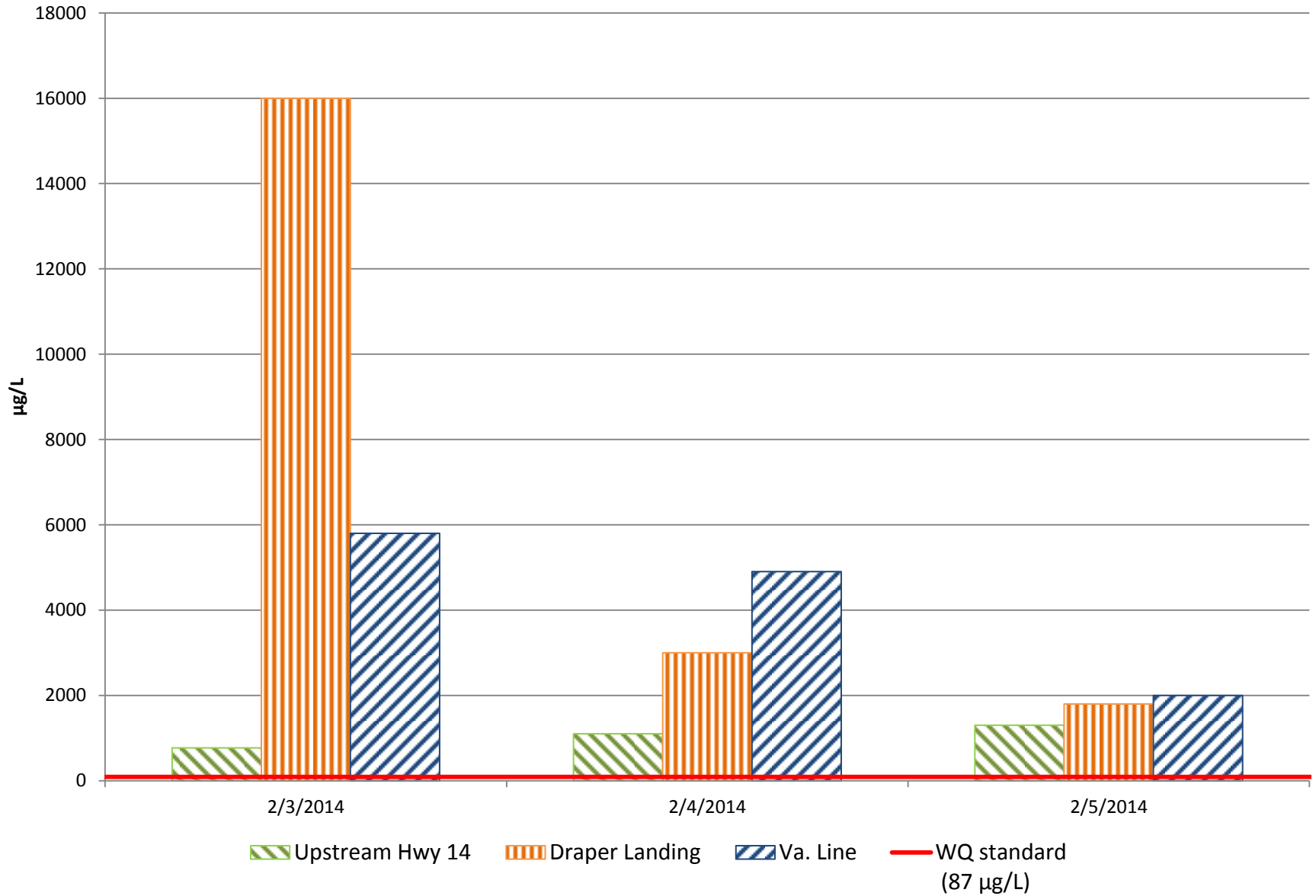
As - Arsenic



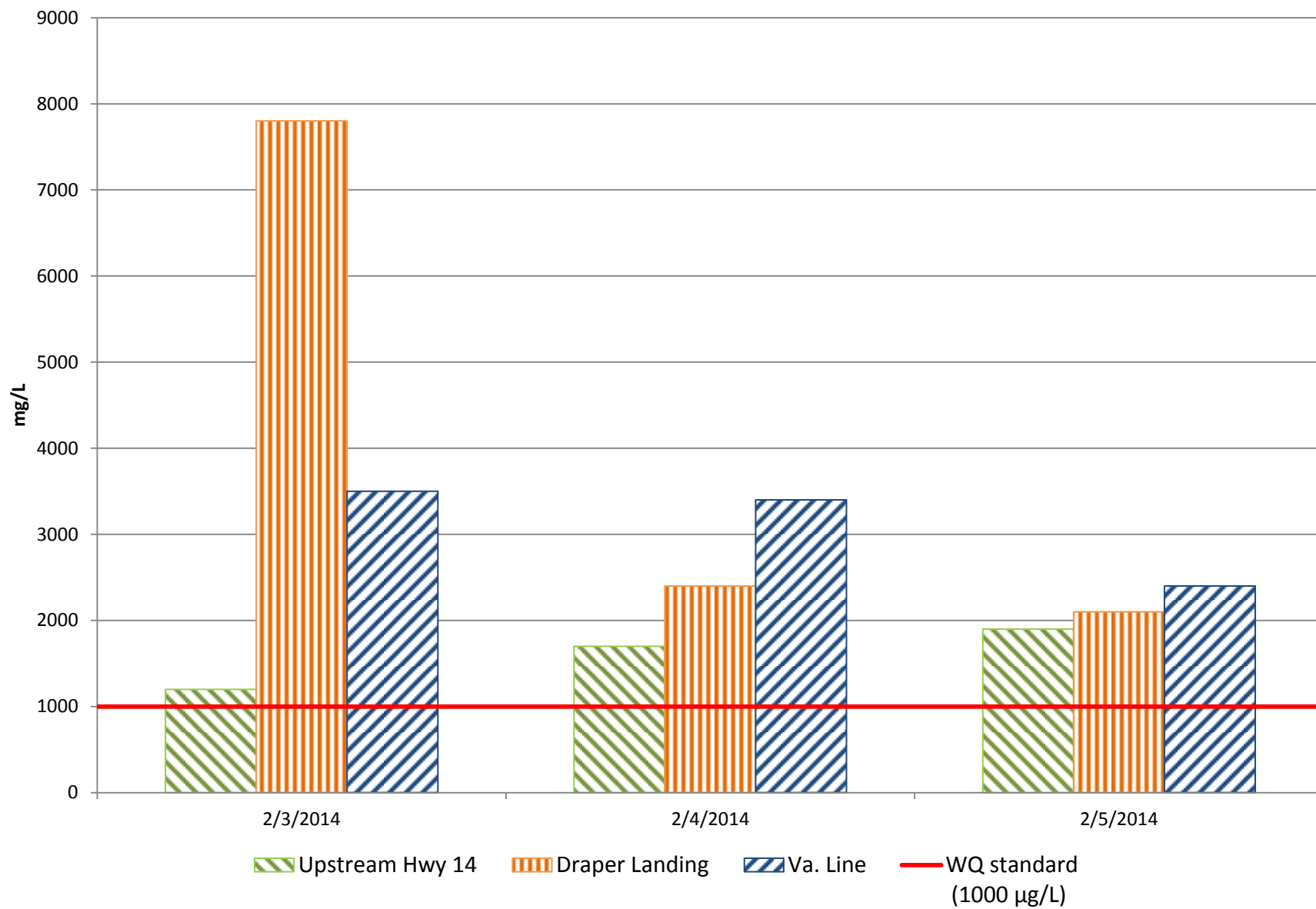
Cu - Copper



Al - Aluminum



Fe - Iron



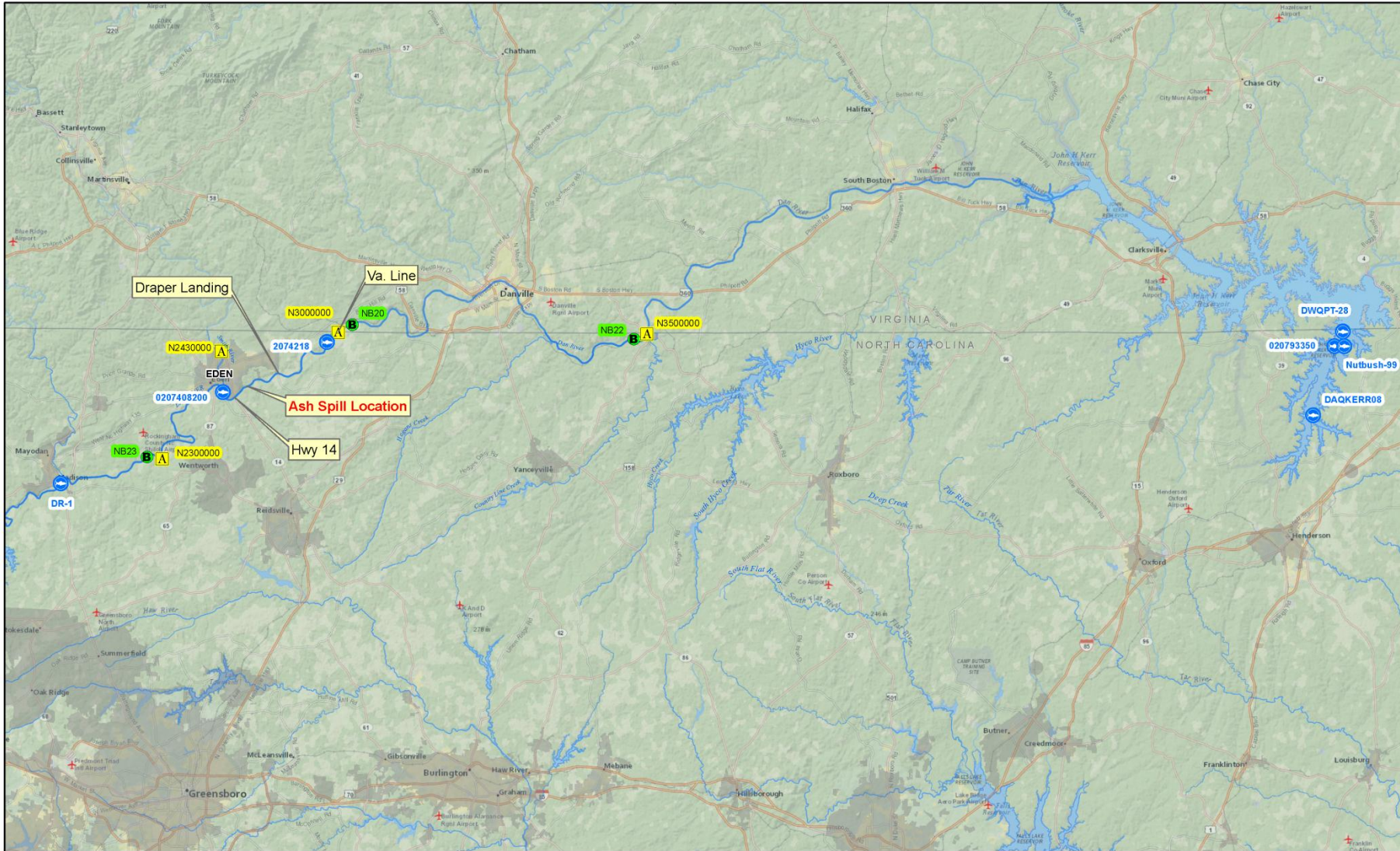
Sedimentation Impacts

- Deposition of coal ash on river bottom remains the primary environmental concern
- Heavy metals & other constituents of coal ash remain in sediments and can be re-suspended in water column
- Heavy deposits have been located along bank next to discharge point
 - 300 cubic yards of material in one mound
- DENR will need to determine extent of deposition throughout river basin for clean up

Long Term Monitoring & Assessment

- Coordination with EPA / VA DEQ / USFWS
- Surface water quality sampling & analysis
- Determine ash distribution
- Sediment sampling & analysis
 - Sediment sampling commenced on Friday, Feb 7
- Monitor any effects on aquatic life
 - Fish tissue / Benthic (bug) sampling
- Coordination w/VA DEQ for sampling of headwaters of Kerr Lake
- Protection of drinking water supplies
 - Danville to VA Beach (Lake Gaston)

Duke Power Eden Coal Ash Spill and DWR Monitoring Locations for Dan River, NC



- Fish Tissue Station
- Ambient Station
- Benthos Station

0 2.5 5 10 15 20 Miles



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