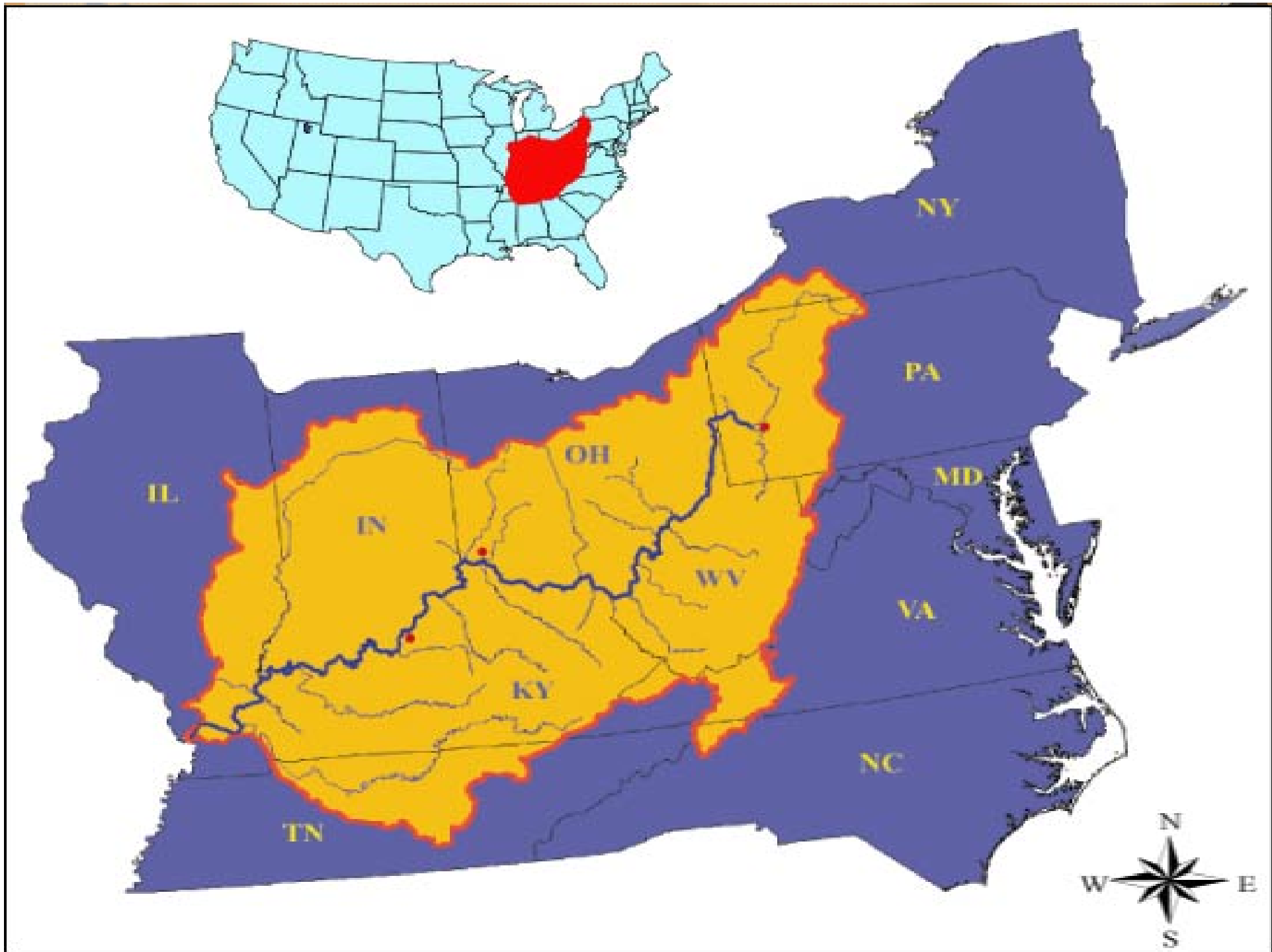




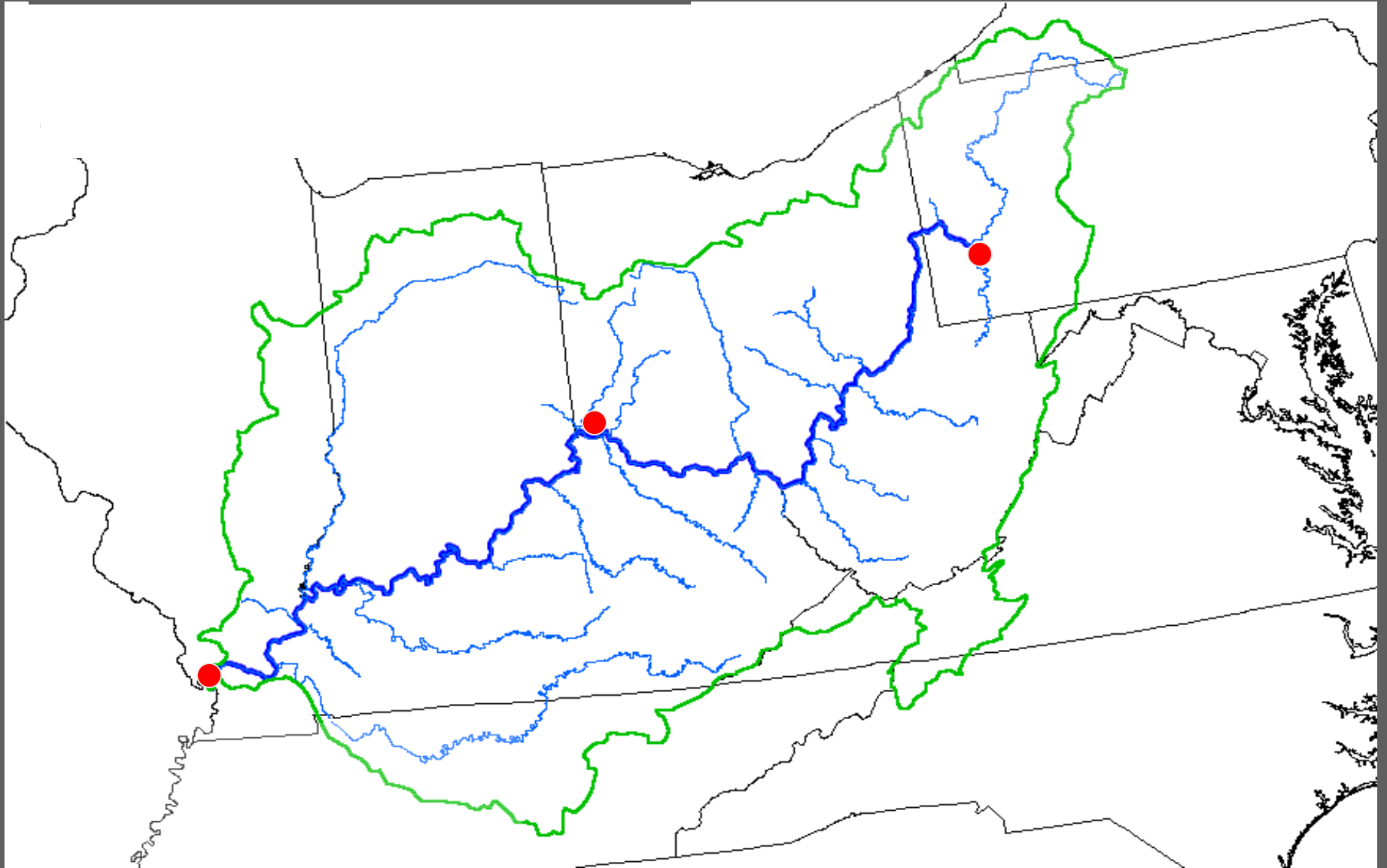
Monitoring Crude Oil Spill Components with the ORSANCO Organics Detection System

**Jerry G. Schulte
Ohio River Valley Water Sanitation
Commission**





Ohio River Basin

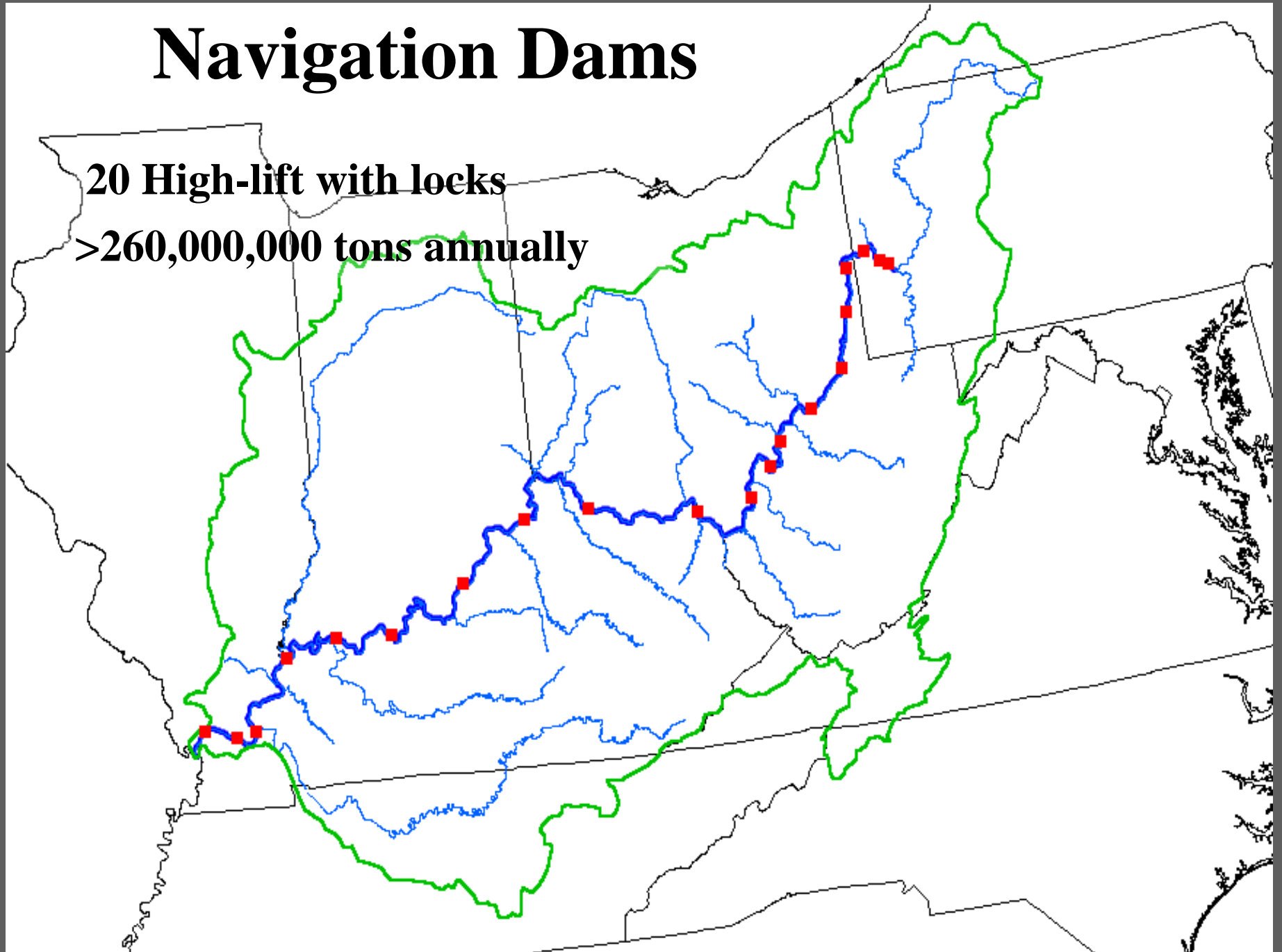


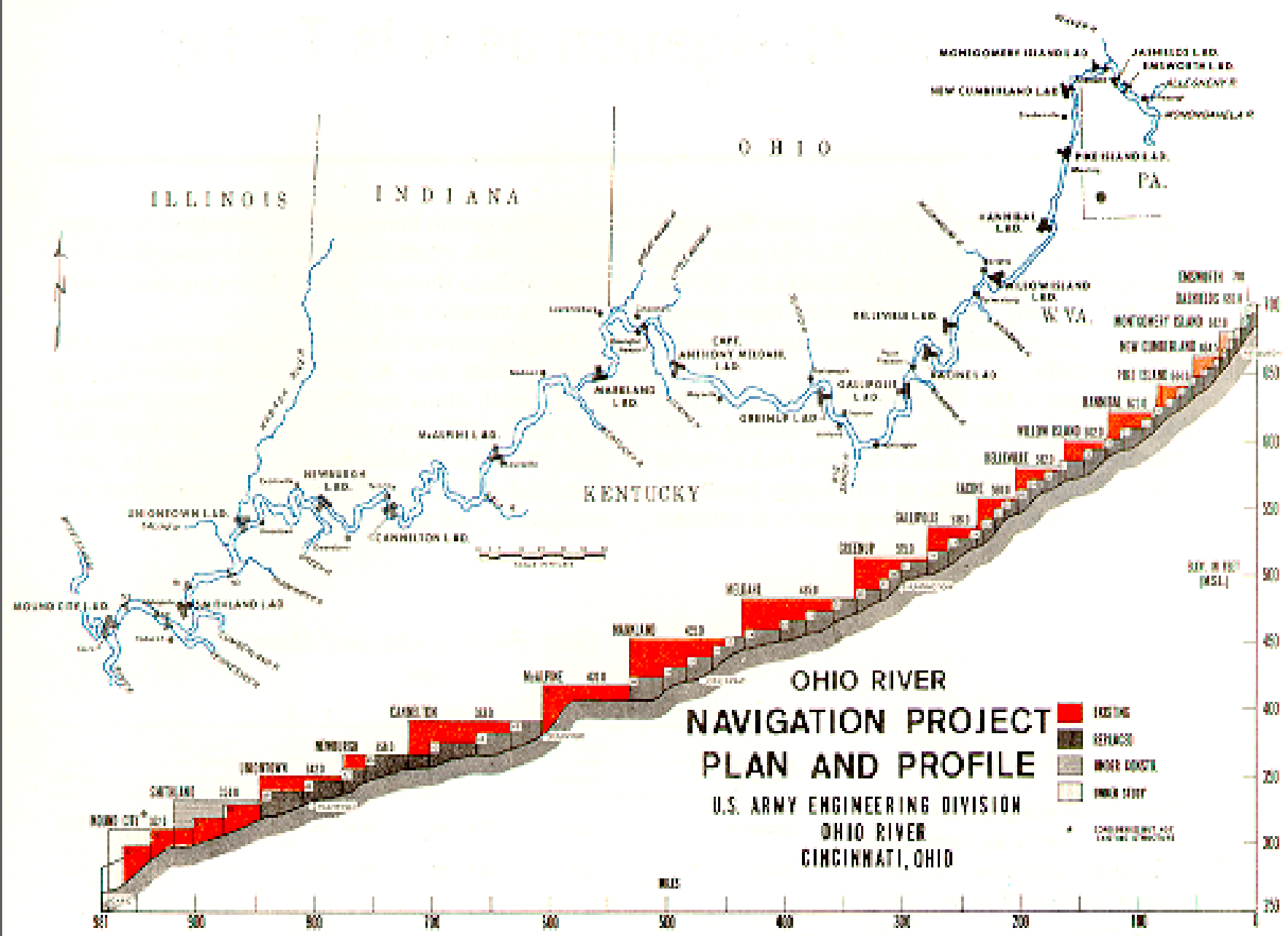


Navigation Dams

20 High-lift with locks

>260,000,000 tons annually









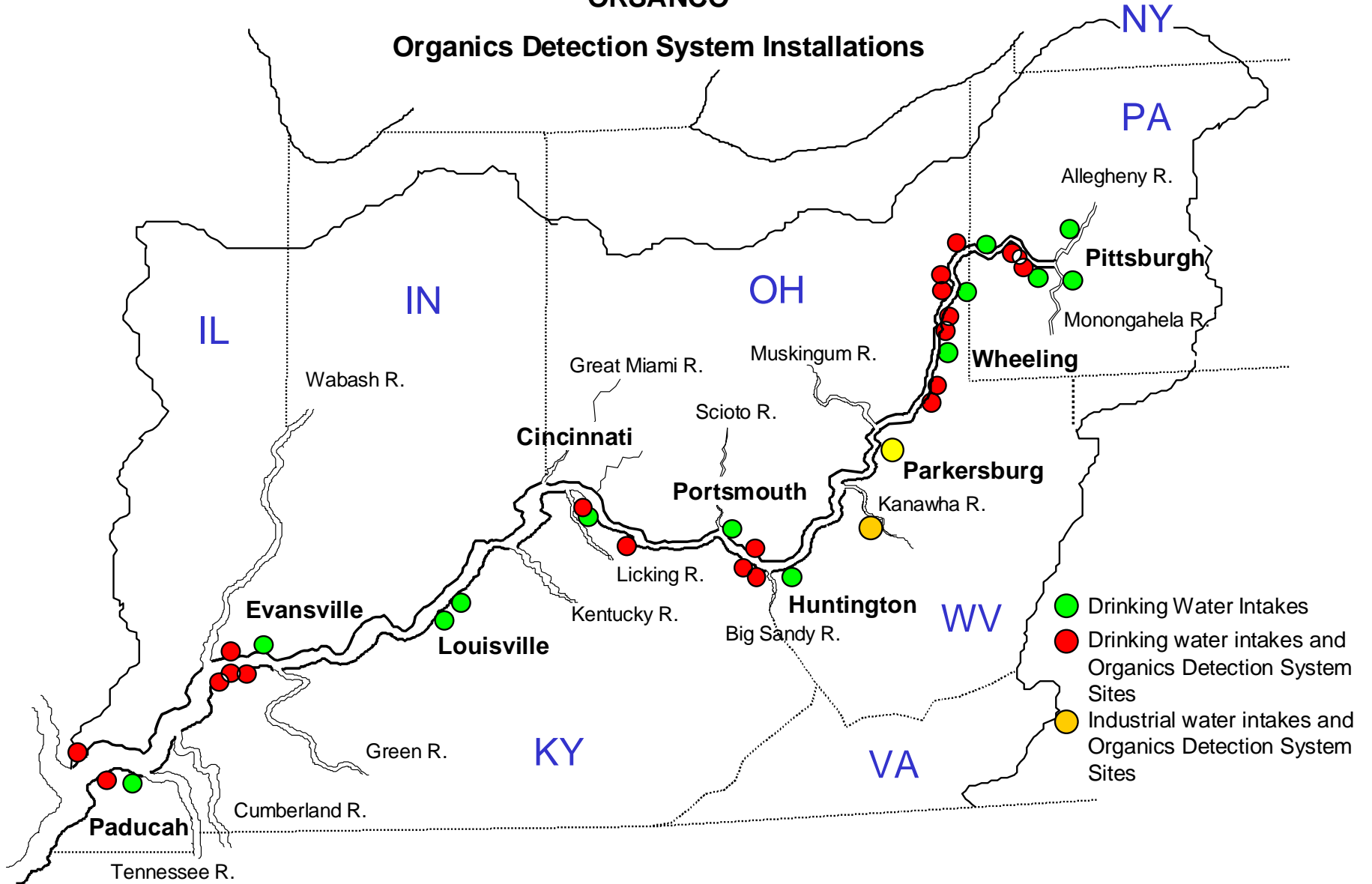
Ohio River – Industrialized River

- ⇒ >600 permitted discharges
- ⇒ 1350 combined sewage overflows
- ⇒ Hundreds of tank farms, pipelines and chemical barges

- ⇒ 33 drinking water intakes
- ⇒ Provide drinking water to >5,000,000
- ⇒ 144 industrial intakes

ORSANCO

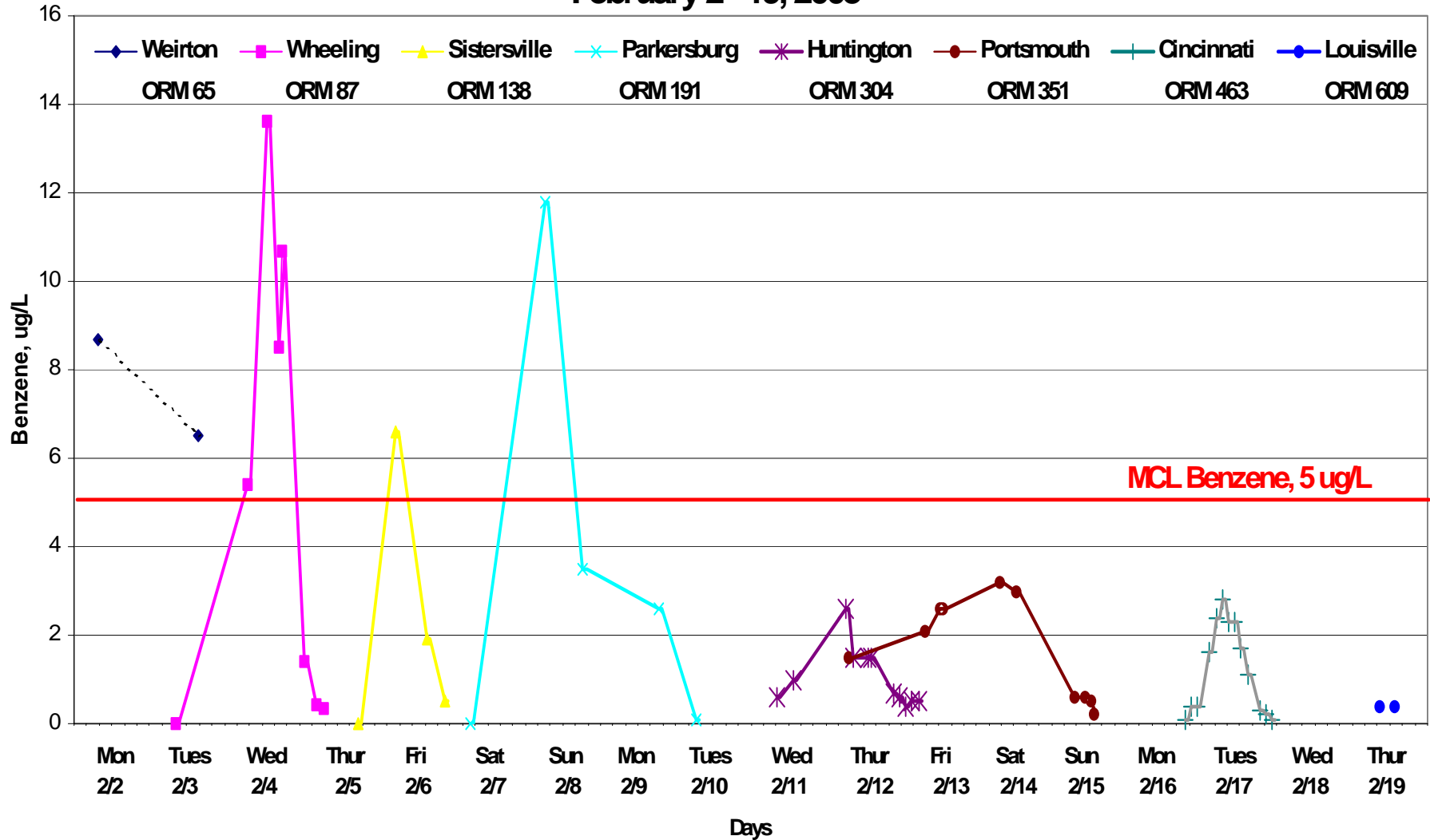
Organics Detection System Installations





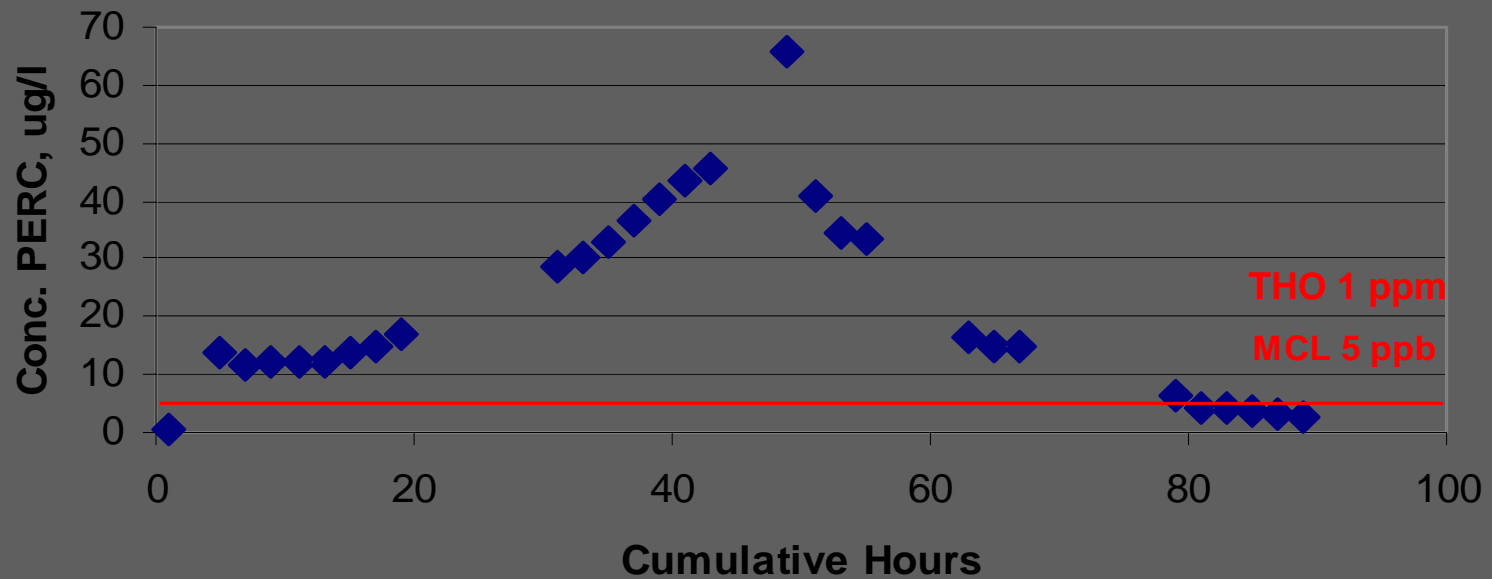
Spill Detection Program, Volatile Organics

ORSANCO ODS Benzene Detections February 2 - 19, 2003



ODS Spill Detection

Perchloroethylene Detections
January 30 - February 3, 2004



Mid Valley Pipeline Spill

- ⇒ Break occurred on 1/26/05 at 0100 hrs.
- ⇒ First reports to local emergency management personnel from citizens reporting strong odor
- ⇒ Confirmation of problem at daylight from helicopter flyover
- ⇒ Remote pressure sensor tripped pumps within 10 minutes of break

Event Information

- ⇒ Initial reports estimate loss at 63,000 gallons
- ⇒ Quickly updated to 80,000 gallons
- ⇒ Final estimate was 262,542 gallons released over a four day period
- ⇒ Estimated 167,454 gallons recovered

Pipeline Characteristics

- ⇒ 22" diameter
- ⇒ Longview, TX to Toledo, Ohio
 - 1,000 miles
- ⇒ Light Louisiana Sweet Crude
- ⇒ 900 psi
- ⇒ 195,000 bbls/day
- ⇒ Break located 50' from rivers edge

Pipeline Characteristics

- ➔ Break caused by erosion of soil around pipeline under stream bed and shore
- ➔ Subsidence caused pipe to bend, then break at weld seam
- ➔ Took approximately 4 days to secure leak and replace broken section of pipe

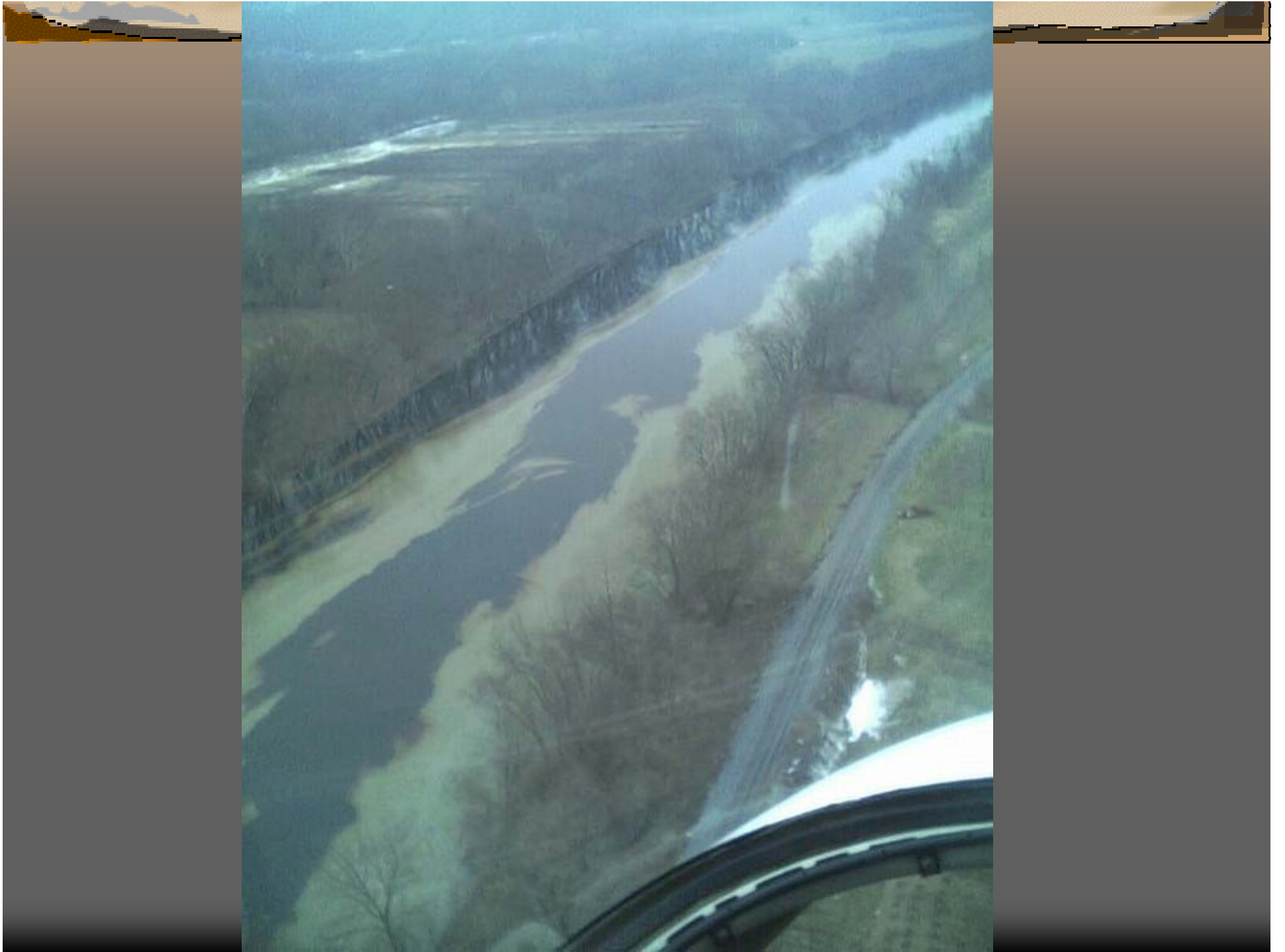




01/30/2005

Response Actions

- ⇒ Booming operations contain oil in Kentucky River
- ⇒ Oil travels 11 miles first day, @ 0.5 mph
- ⇒ Recovery operations set up at several locations but access to river limited
- ⇒ Use Lock & Dam 1 for containment and recovery





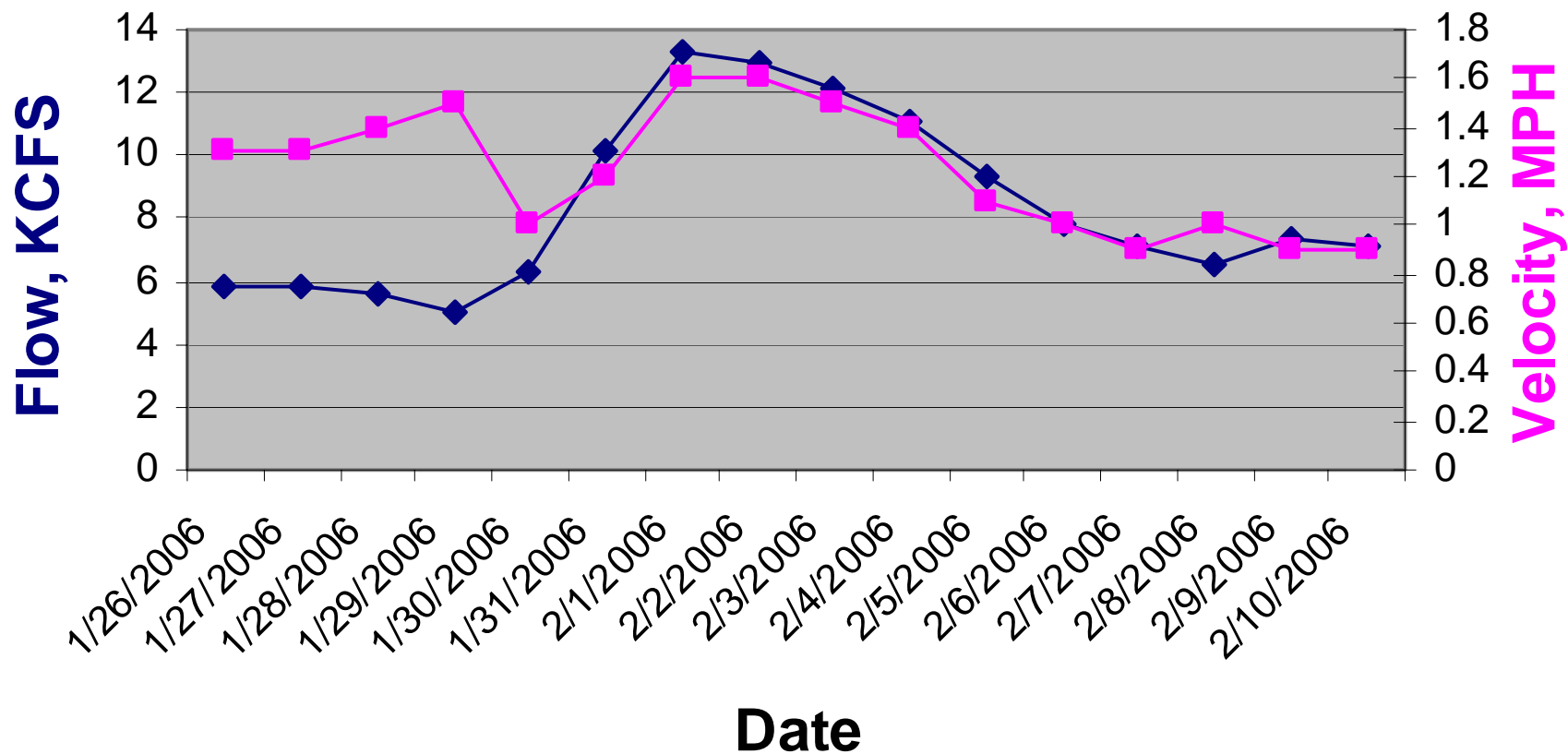


Response Actions

- ⇒ Containment of oil successful until flows increase in Kentucky River on 1/30 – 1/31 following a rain event
- ⇒ Increased debris loads break booms
- ⇒ Oil escapes to Ohio River 1/31

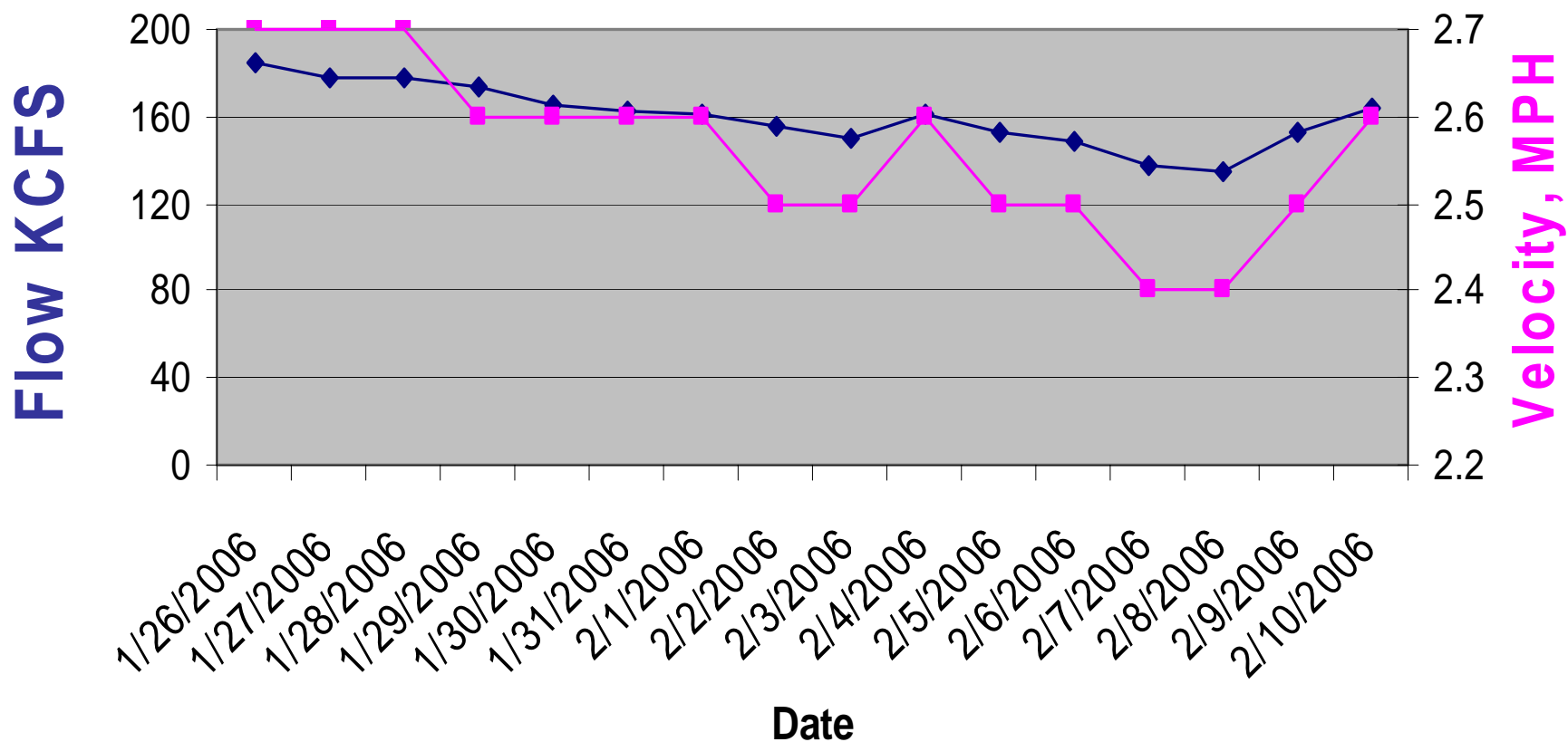
Kentucky River Flow and Velocity

January 26 - February 10



Ohio River Markland Dam Flow & Velocity

January 26 - February 10









1/31/2005 3:38pm

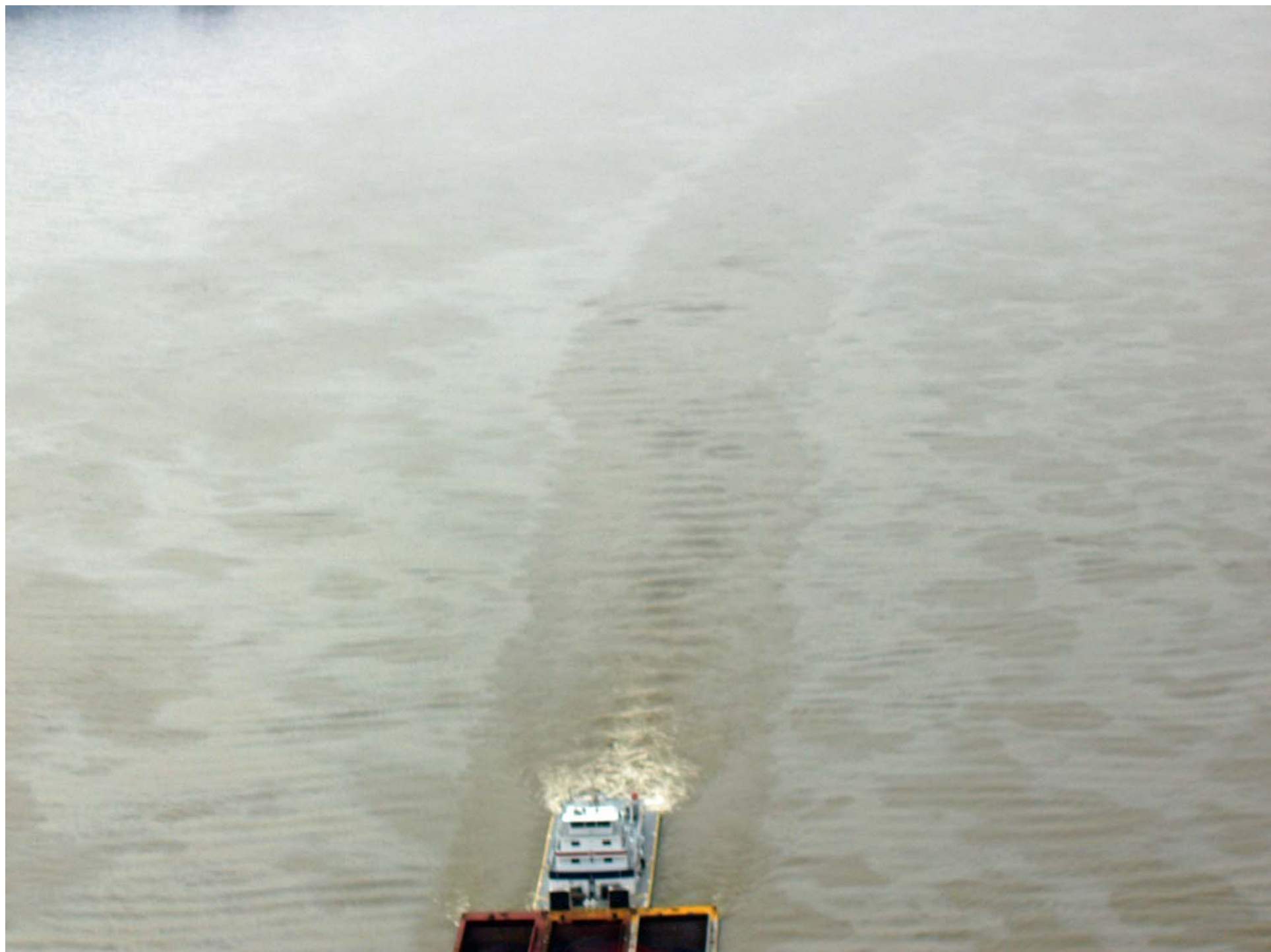








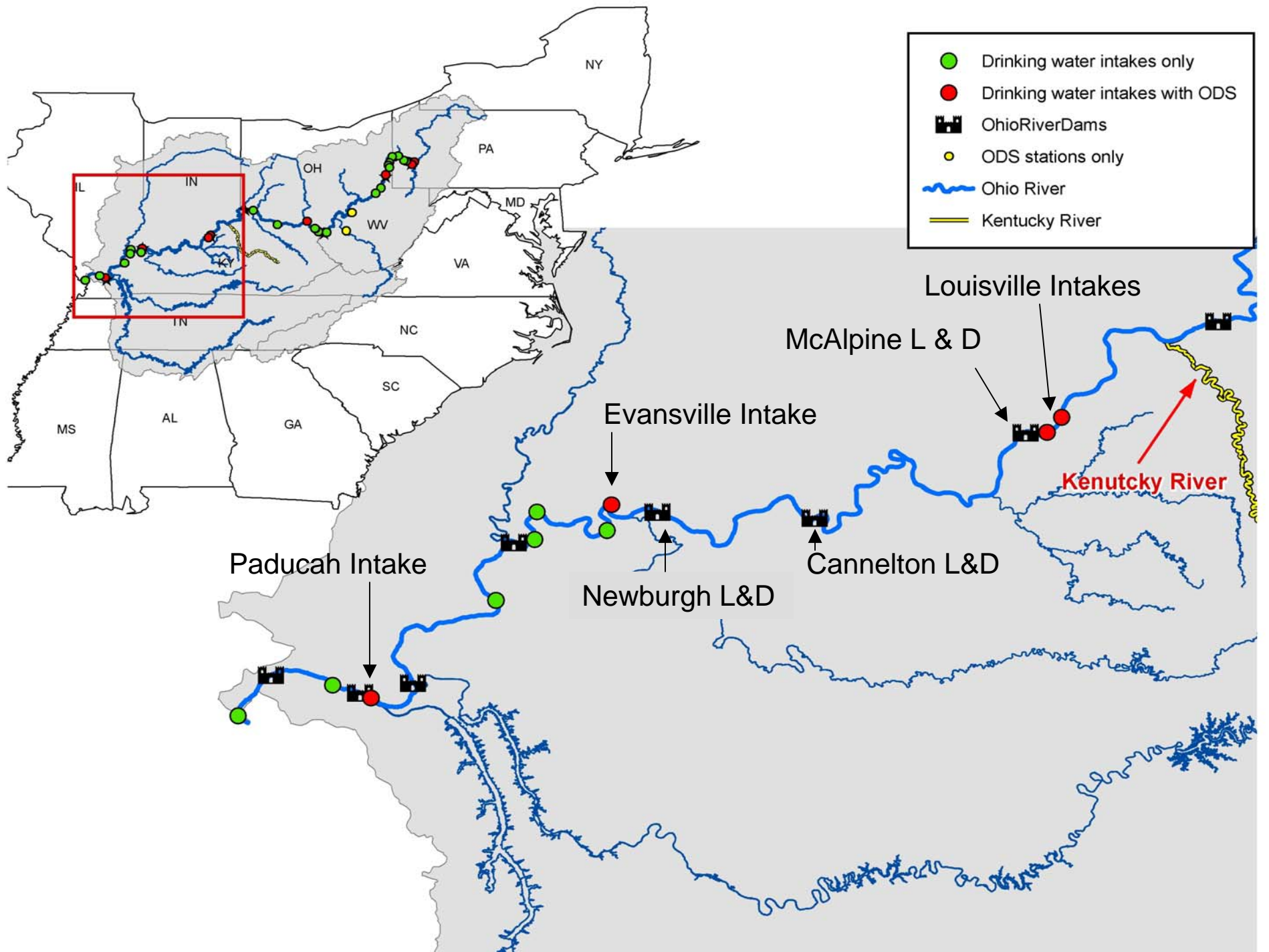






Threat to Drinking Water Utilities

- ➔ No drinking water intakes on Kentucky River downstream of spill site
- ➔ Ten drinking water intakes on Ohio River downstream of Kentucky River confluence
- ➔ First utility downstream, Louisville, Kentucky, 48 miles, participant in ORSANCO ODS
- ➔ Upstream of Ohio River McAlpine dam



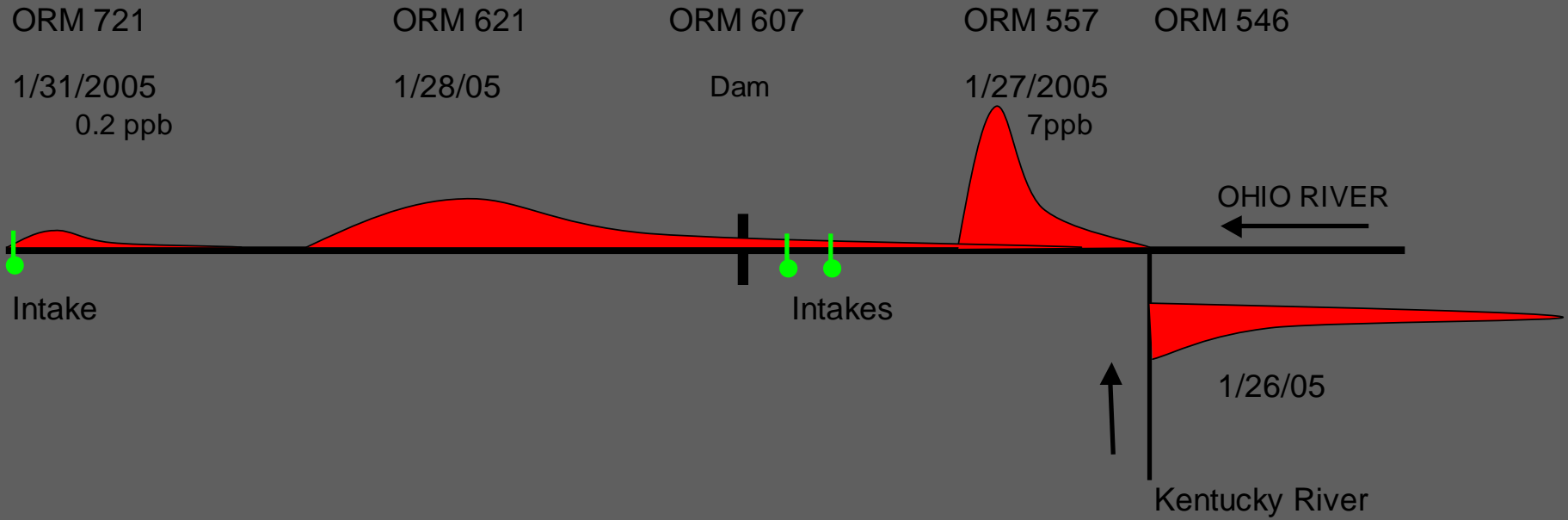
Downstream Sampling

- ⇒ Louisville Water Co. begins shore-based sampling activities from several locations immediately following release notification
- ⇒ Analysis finds BTX compounds in Ohio River ahead of any noticeable sheens
- ⇒ First BTX detection 13 miles downstream of confluence, Jan. 27, 1200 hrs. in Ohio River, 7ppb
 - Booming operations held until 1/31

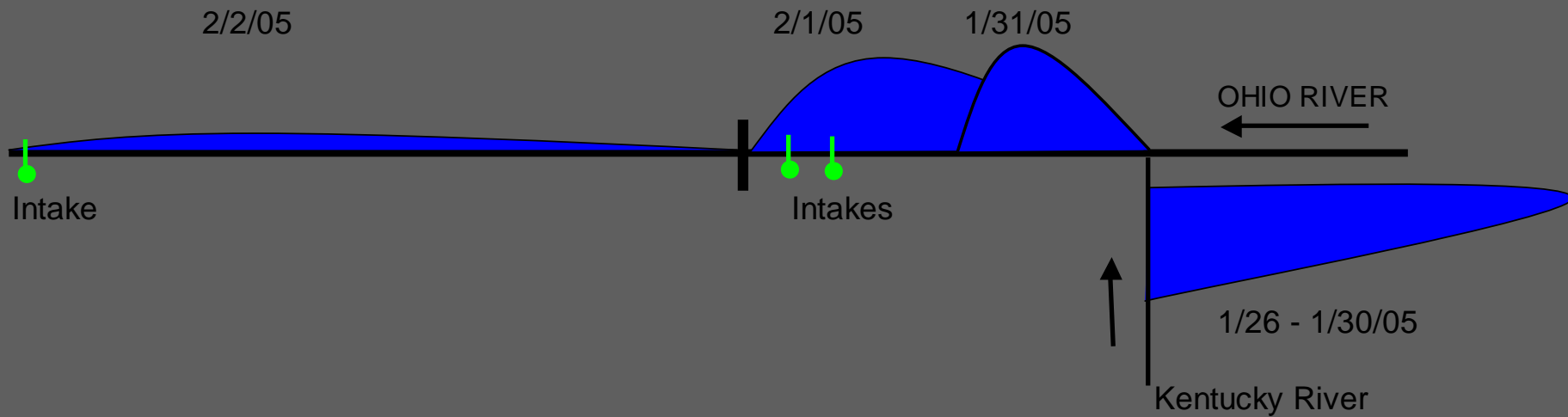
Downstream Sampling

- ⇒ Detections confirm projections based on flow/velocity information
- ⇒ 0.5 mph for Kentucky River
- ⇒ 2.7 mph for Ohio River
- ⇒ Louisville Water ODS detects low levels of BTX for weeks
- ⇒ Evansville Water detects BTX on 1/31

BTX PLUME

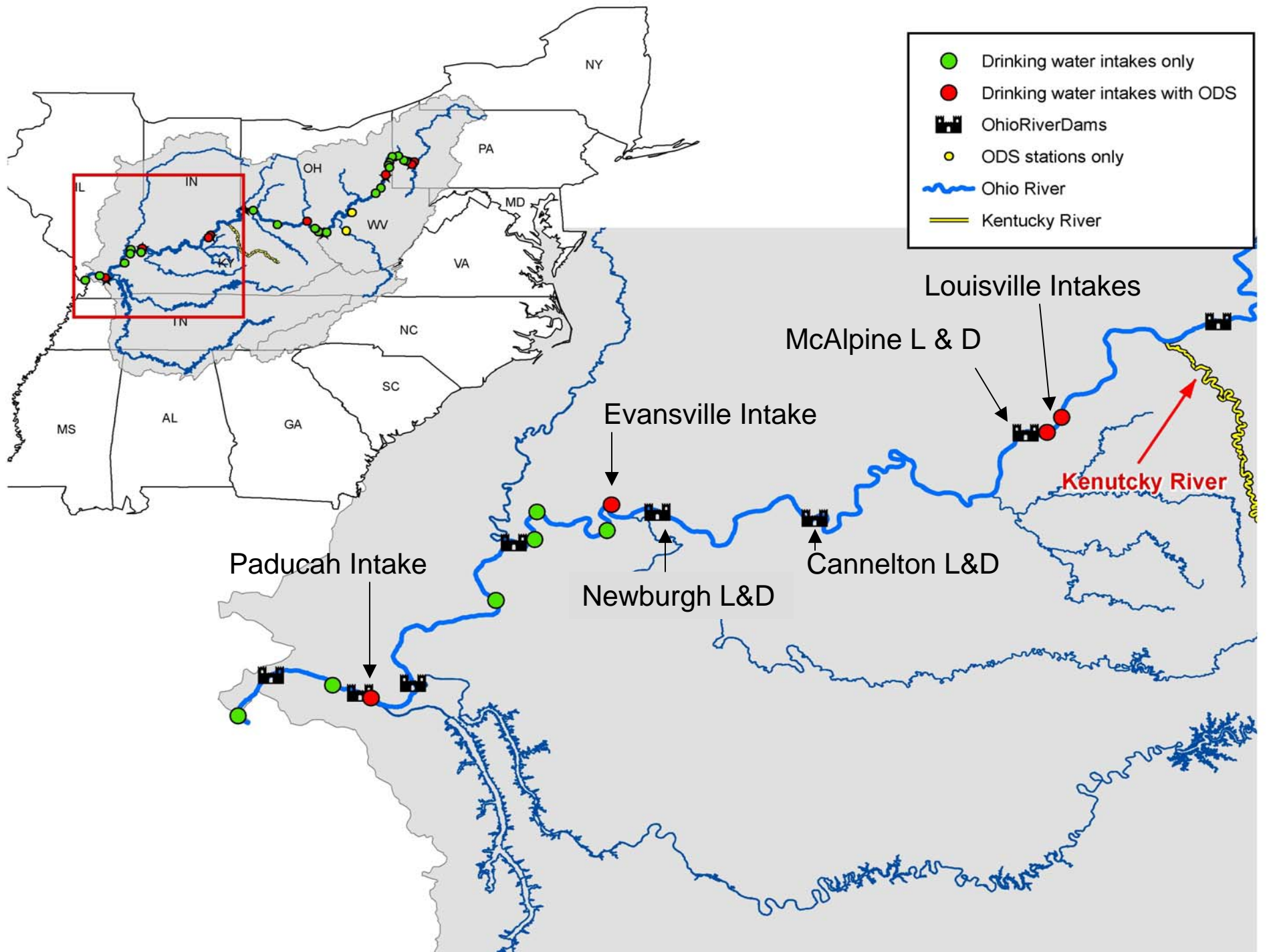


SURFACE OIL PLUME



Kentucky River Crude Spill

- ⇒ BTX compounds picked up by ODS
 - Louisville, Evansville, Paducah
 - Louisville up to 7 ppb
 - Evansville, < 0.2; Paducah, <0.1
- ⇒ On-river tracking efforts undertaken with fluorometry, Turner 10-AU
- ⇒ New, hand held fluorometers purchased for use at utilities, TD 500



SECTION 162.100
 regulated navigation area:
 The waters of the Ohio River
 at Mile 603.5, downstream to

regulated navigation areas contained in

shall be operated within the regulated
 the permission of the Captain of the Port,
 of emergency and except for passage

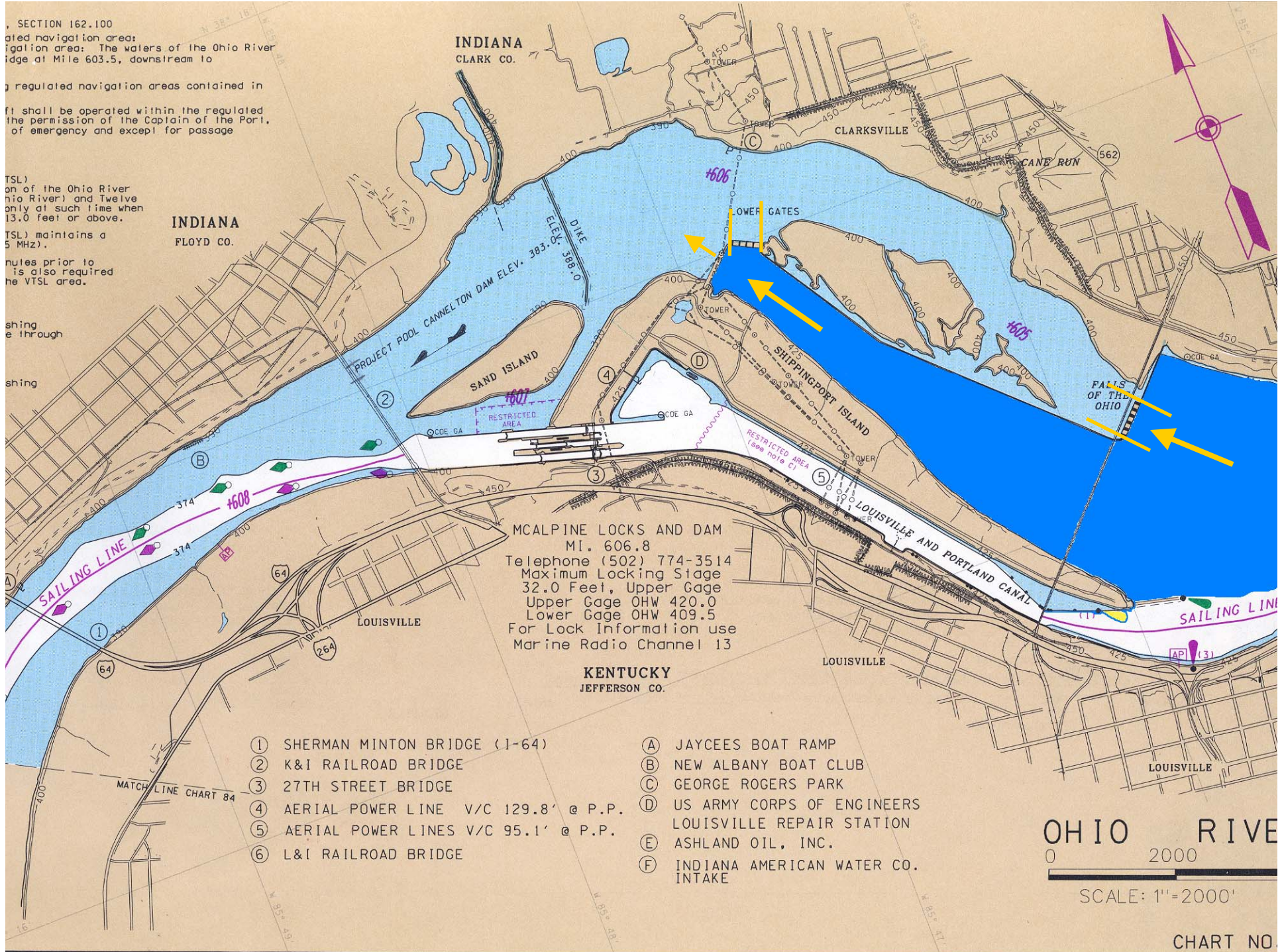
(TSL)
 on of the Ohio River
 Ohio River) and Twelve
 only at such time when
 13.0 feet or above.

(TSL) maintains a
 5 MHz).

rules prior to
 is also required
 the VTSL area.

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MCALPINE LOCKS AND DAM
 MI. 606.8
 Telephone (502) 774-3514
 Maximum Locking Stage
 32.0 Feet, Upper Gage
 Upper Gage OHW 420.0
 Lower Gage OHW 409.5
 For Lock Information use
 Marine Radio Channel 13

KENTUCKY
 JEFFERSON CO.

- ① SHERMAN MINTON BRIDGE (I-64)
- ② K&I RAILROAD BRIDGE
- ③ 27TH STREET BRIDGE
- ④ AERIAL POWER LINE V/C 129.8' @ P.P.
- ⑤ AERIAL POWER LINES V/C 95.1' @ P.P.
- ⑥ L&I RAILROAD BRIDGE

- Ⓐ JAYCEES BOAT RAMP
- Ⓑ NEW ALBANY BOAT CLUB
- Ⓒ GEORGE ROGERS PARK
- Ⓓ US ARMY CORPS OF ENGINEERS
LOUISVILLE REPAIR STATION
- Ⓔ ASHLAND OIL, INC.
- Ⓕ INDIANA AMERICAN WATER CO.
INTAKE

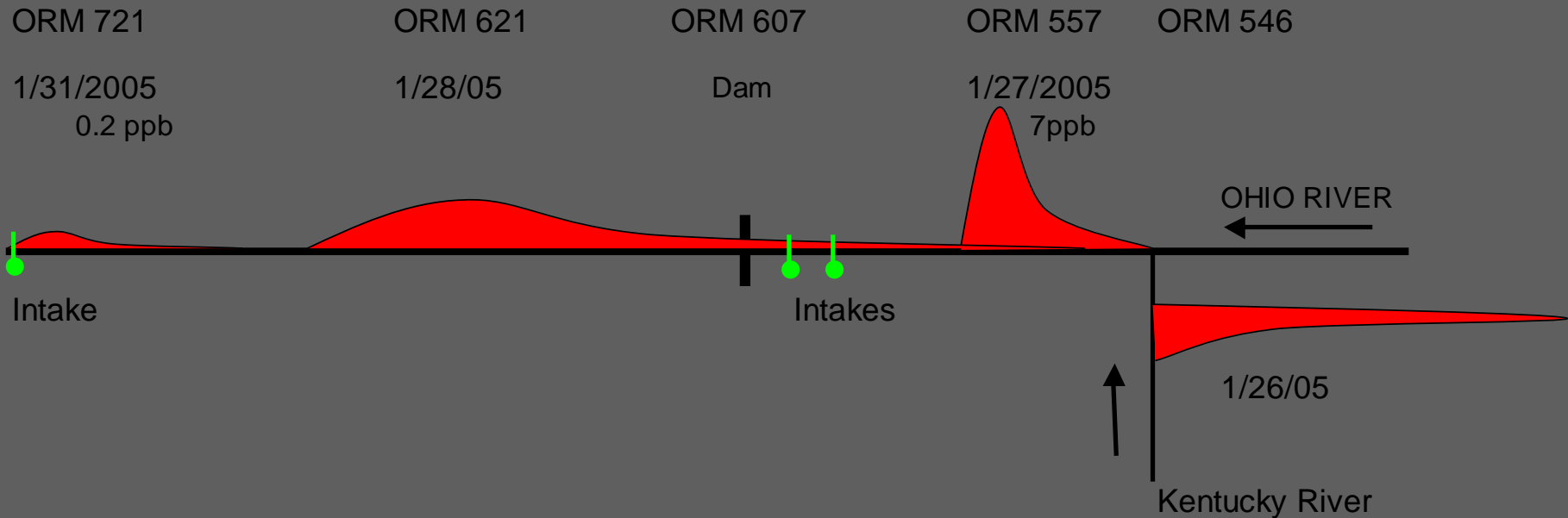
OHIO RIVER

0 2000

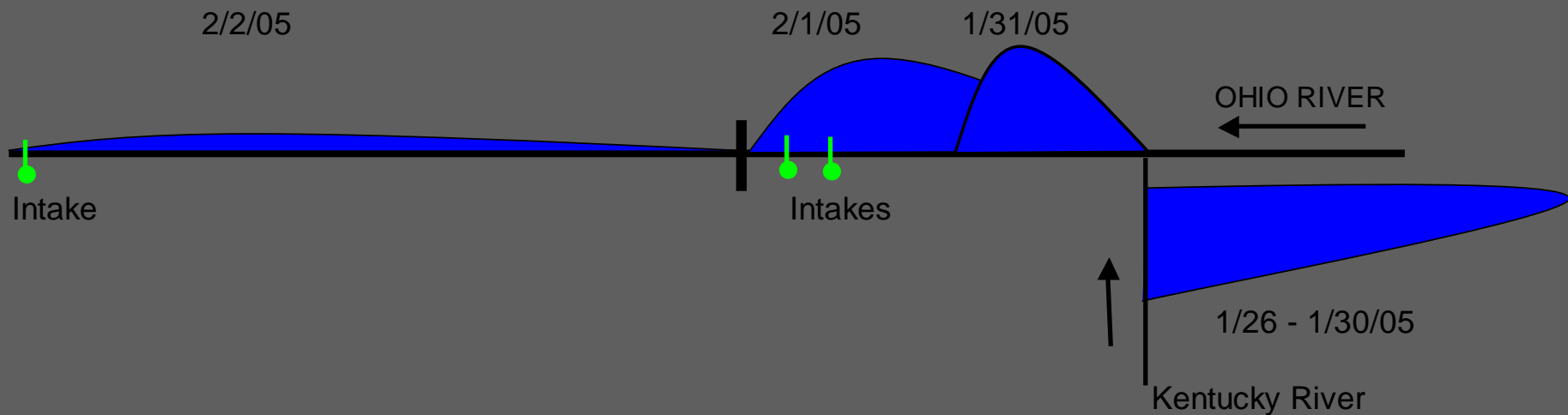
SCALE: 1"=2000'

CHART NO.

BTX PLUME

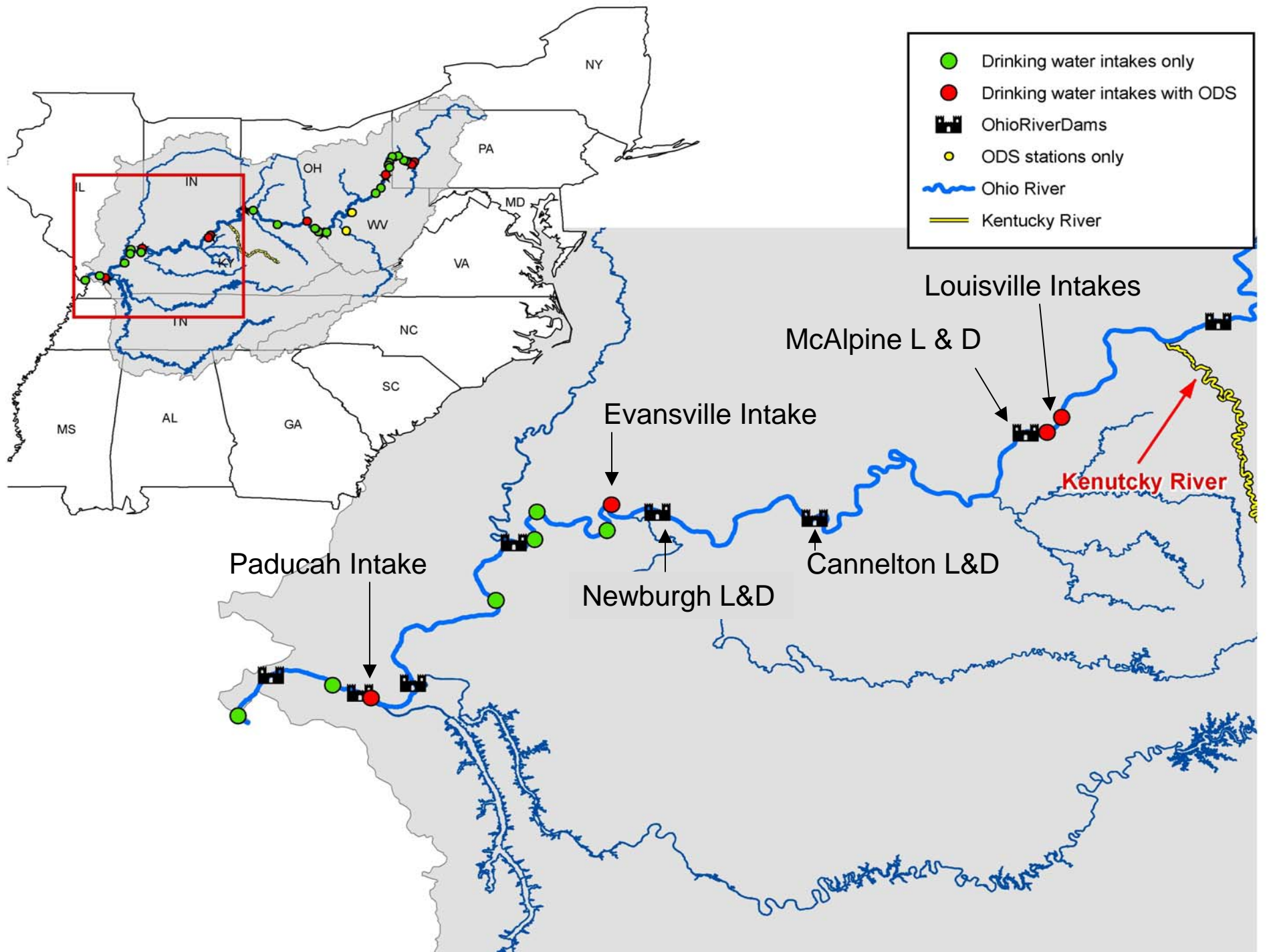


SURFACE OIL PLUME



Conclusion

- ➔ There's more to oil spills than surface sheens
- ➔ The ORSANCO Organics Detection System protects drinking water utilities from known and unknown spills/contaminants
- ➔ Coordinated efforts between utilities provide the best source water protection
- ➔ ORSANCO spill detection model applicable to any (industrialized) river system



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Questions?

