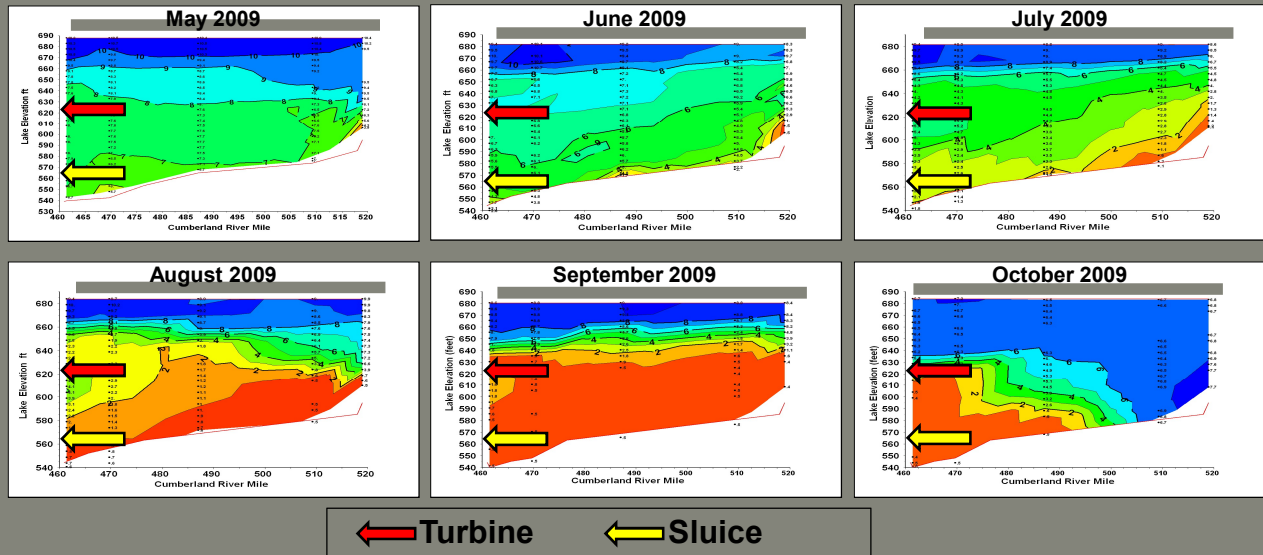


# Lake Cumberland Dissolved Oxygen (mg/l) Longitudinal Profiles – 2009



1

## WATER QUALITY RESTORATION OPTIONS

### Operational modifications

- Turbine usage restrictions
- Sluicing

### Powerhouse techniques

- Turbine venting
- Air or oxygen injection
- Install auto venting turbines (Future)



2

## FIXED-CONE VALVE



3

## Wolf Creek Turbine & Sluice Releases



### Turbine Releases

- Withdraw relatively warm water ( $>63^{\circ}\text{F}$ ) from mid-depth in lake
- Relatively calm discharge
- Releases can have dissolved oxygen levels  $< 2\text{ mg/l}$



### Sluice Releases

- Withdraw cold water ( $\sim 52^{\circ}\text{F}$ ) from deep in the lake
- Turbulent discharge
- Releases are saturated with dissolved oxygen  $\sim 10\text{ mg/l}$

4

# FEBRUARY 2019 HIGH WATER EVENT



US Army Corps  
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