

## Presentation Information

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| Presenter   | Laurie Drinkwater  |
| Title       | Coupled Human-Natural Systems: Hypoxia and the Mississippi River Basin as a Model System |
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### Abstract:

Human activities have doubled the amount of biologically active nitrogen on a global basis, with agriculture accounting for 75% of the human-derived nitrogen. The Mississippi River Basin, which encompasses 322,500 km<sup>2</sup> or 40% of the continental US is one of the world's most productive agricultural regions. Industrialized agriculture in the Basin is responsible for ecological and human health risks that derive from what is arguably an inefficient and inappropriate agricultural system with respect to nitrogen management. In our view, the Basin is an example of a tightly coupled but maladaptive human-environmental system. For example, the yields and agronomic efficiency in these agricultural systems have steadily increased while environmental consequences continue to mount. At the level of firms and geopolitical territories, polluters are rewarded for exporting risks downstream. Farming areas with the greatest crop yields and economic returns have been engineered to enable these extraordinary yields while also increasing the vulnerability of these farms to nutrient losses. As a result, these key regions contribute disproportionately to nitrogen pollution. So called "best management practices" that have been developed to address pollution risks are the least effective in terms of their impact on nitrogen retention, while alternative agricultural practices known to deliver major reductions in nitrogen losses have not been pursued due to prevailing institutional arrangements including economic incentive structures at multiple scales. The capacity for institutional and technical innovation directed toward improvements in nitrogen management is lacking. The spatial and temporal distribution of resource allocation - i.e., social responses to relevant pollution and risks - reflects social values and the political economic context of natural resource management. That is to say, there is no systematic effort in place to halt pollution, and it could be said that the dominant institutional arrangements in place serve to "sustain the unsustainable".