

# Ravenna Facility-Wide Surface Water Study

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RAB Meeting  
September 26, 2005

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### **Presentation Outline**

- Introduction to biological studies for surface water
- Description of the surface water activities at RVAAP in 2002 - 2003
- Results of the biological assessment from summer 2003
- Conclusion and Next Steps

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### **Why Do a Facility Wide Surface Water Study??**

- There are chemicals on the surface of soils onsite that potentially could be detrimental to fish and other stream life if they were transported into streams and ponds onsite.
- Some ponds were created as part of the load process – settling ponds
- Assessment of stream conditions as they enter RVAAP, after each area of concern, prior to leaving facility

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## What is a Surface Water Study

- Assessment of the life in flowing surface water, fish and invertebrates and the habitat available for that life
- Ohio one of most progressive States in surface water assessment using biomonitoring of aquatic life and habitat
- Comprised of IBI, ICI and QHEI in a standard methodology (will be explained in next slides)

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## IBI -- Index of Biotic Integrity (Fish)

- Designed to measure the aquatic vertebrate community and the surrounding conditions by using fish species as indicators
  - 12 fish community variables divided in three main categories
    - Species richness and composition
    - Trophic composition
    - Fish abundance and condition

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## Scoring the IBI

- Results of each of the 12 variables is compared against an Ohio specific undisturbed site (reference) result

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### ICI – Invertebrate Community Index

- Designed to measure the health of the invertebrate community
- We use various types of sampling that provide a place for invertebrates to live
- 10 Variables that are compared to a high quality water reference and scored similarly to the IBI

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### QHEI – Qualitative Habitat Evaluation Index

- Can they actually live there?
- Qualitative assessment of the physical characteristics of a sampled stream (i.e. shape, water flow, substrate, in-stream and stream bank vegetation, canopy)

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### Methods

- Combining with the IBI and ICI with QHEI allows for better causal relationships (i.e. is it less desirable real estate or is it a contaminant effect)
- ICI/IBI/QHEI results are computed by a computer program developed by OEPA for automatic scoring from data sheet input

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## Scoring and Attainment

- Attainment – determined by a complex equation of IBI/ICI/QHEI scores
  - Full – very similar to reference streams
  - Partial – somewhat similar to reference streams
  - Non – not similar to reference streams

Attainment status does not automatically mean the stream is contaminated. It is different from reference streams (physical or chemical differences)

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## Who performs these types of studies

- Ohio has specialists in the OEPA who perform this type of study full-time
  - Have advanced degrees in fish physiology, aquatic toxicology, ichthyology, limnology, invertebrate zoology
- In Ohio, certification is a requirement!
- Our field team: Biological – Elizabeth Ferguson, Dave Altwater, and Mike Gray; Chemical – Paul Zorko, John Jent, Francis Zigmund, Kathy Krantz; Field Team and Oversight – Eileen Mohr and Todd Fisher

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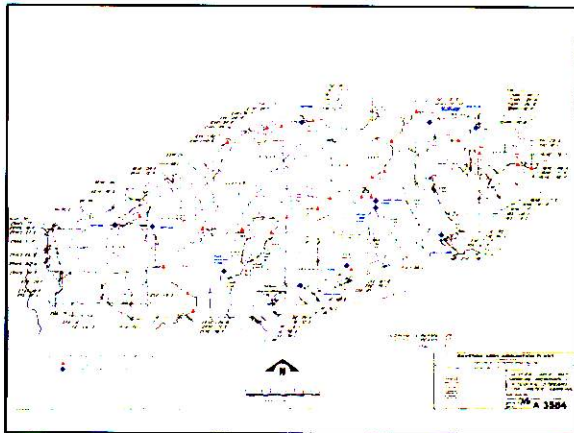
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### Sediment and Water Sampling Protocol

- Sampling along identical stream reach as the biological assessment or from random sites in pond
- Surface water at a single point from center of reach or pond (recorded pH, temp, DO at this site)
- Samples analyzed for the suite of chemicals of interest for RVAAP surface water and limited physical parameters

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### Difference Between Stream and Pond Studies

- Streams and Rivers have a specific protocol, background or reference thresholds, and sampling protocol
- Ponds, Lakes and Wetlands do not have a standard protocol but one is being developed and background or reference databases are not available so we use reference ponds to compare data

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### Streams Assessment

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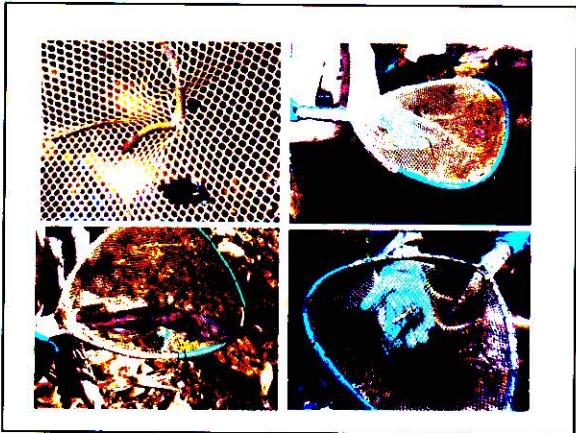
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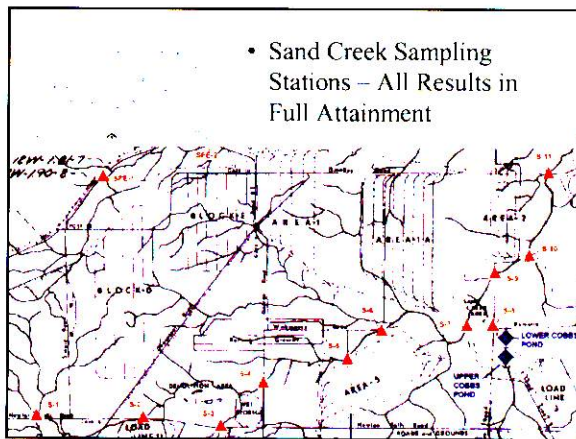
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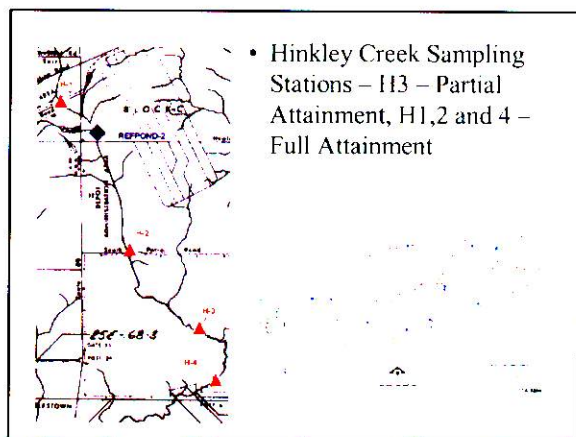
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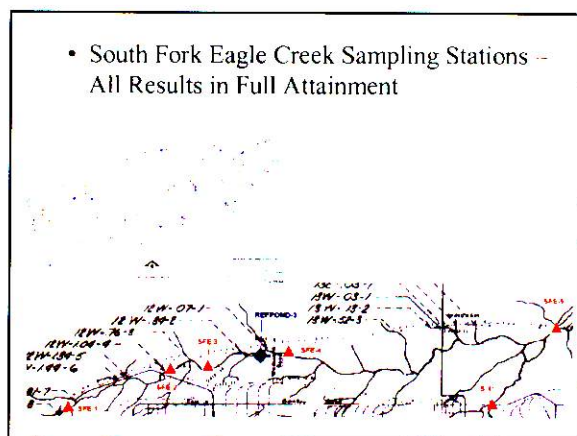
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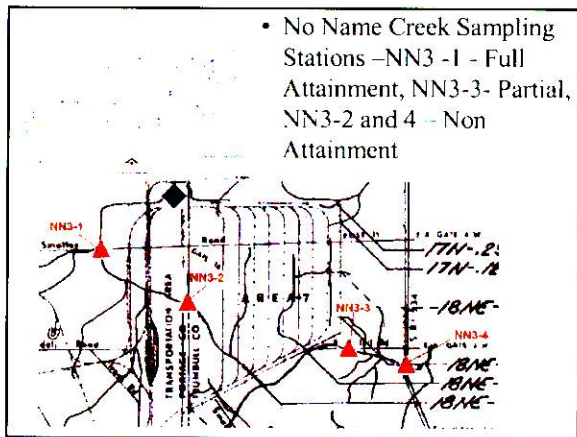
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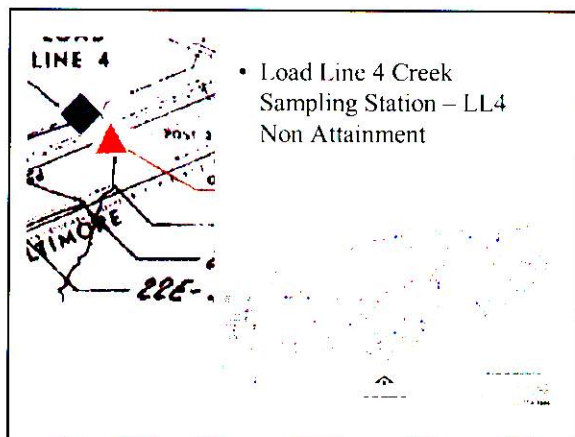
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**Ponds/Wetlands Assessment**

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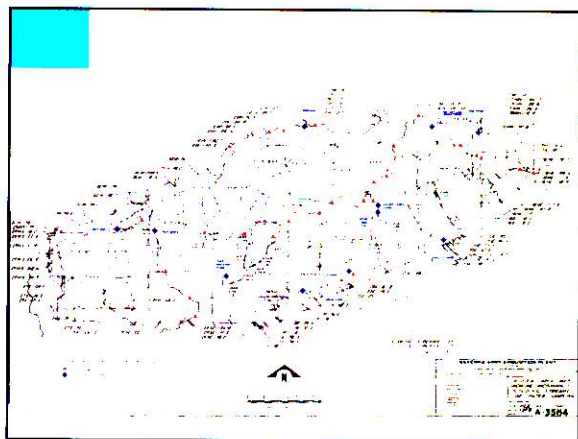
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**Ponds/Wetlands Assessment**

- Chemical analysis
- Physical parameters
- Fish community assessment (ponds)
- Invertebrate community assessment
- Funnel trap comparisons
- Habitat assessment

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## Ponds/Wetlands Assessment

- One pond showed both low level chemical contaminants and significant difference from reference ponds. Kelly's Pond
- Issue -- Presence of overpopulation of Asian Grass Carp, causing sediment suspension and lack of vegetative growth
- No Wetlands showed significant differences from reference wetlands

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## Conclusions - General

- Streams and ponds within bounds of RVAAP are in very good condition biologically
  - Minimal disturbance
  - Presence of sensitive and threatened species
  - Great riverbank vegetation and cover
- Chemically -- Contaminants were noted at very low levels -- largely below the most conservative screening levels
- Worst case potential pulse of contaminants occurred (floods of 2003) and resulted in no impact chemically or biologically to the streams

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## Next Step in Process

- Kelly's Pond -- still under investigation
  - Impact of overpopulation of Asian Grass Carp?
- Facility-Wide monitoring team continuing discussions and plans to continue to protect the surface water of RVAAP
  - Next meeting in October 2005

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## Reference Web Sites

- <http://www.epa.state.oh.us/dsw/bioassess/BioCriteriaProtAqLife.html> (reference documents for ICLIBI and QHEI)
- <http://www.epa.state.oh.us/dsw/bioassess/ohstrat.html> (Biological Assessment - General)
- <http://www.epa.state.oh.us/dsw/rules/index.html> (Laws and Rules)
- <http://www.epa.state.oh.us/dsw/401/cram50um/s.pdf> (wetlands Assessment)

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