City of Austin
Austin Water
Austin Water Utility

TCEQ Experimental Exemption Permit
Annual Research Report 2009-2010

TCEQ Permit No. WQ0003823000

Austin Water - Center for Environmental Research and The Hornsby Bend Biosolids Research Partnership

Long-term Study of the Ecological Impacts of Biosolids Land Application

Austin Water Utility Hornsby Bend Biosolids Management Plant
Austin Water Utility Center for Environmental Research

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Environmental Engineer, Hornsby Bend

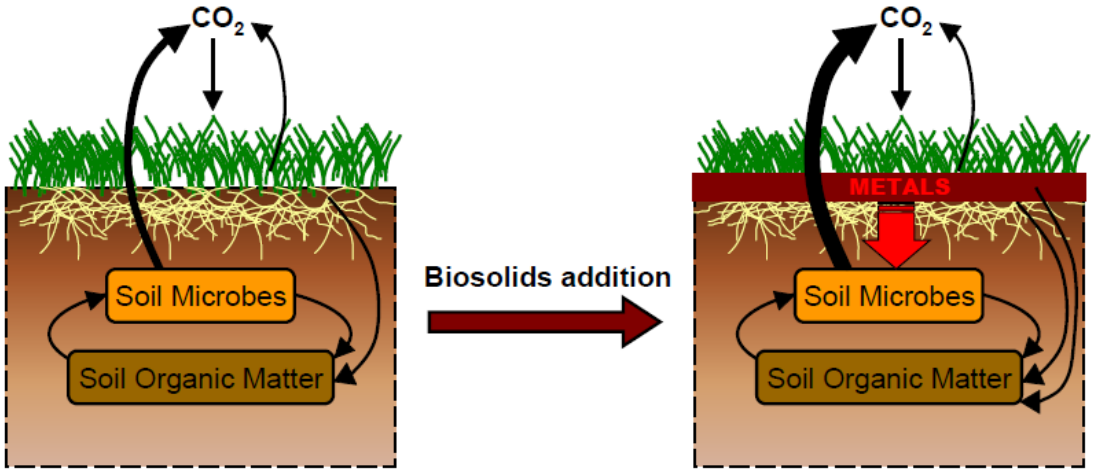
July 2010

Contents

I. Report Summary 2009 - 2010

The current report reflects research activity under the Experimental Exemption for Permit WQ0003823000 for the period July 2009 – June 2010.

- Completed first year of ETC research sampling by USDA, USGS, and TPWD
- Expanded earthworm sampling with TPWD and University collaborators
- Preliminary data from USGS, USDA, and TPWD laboratories arriving
- Hosted May 2010 Environmental Trace Contaminants workshop for City of Austin in partnership with USGS researchers
- Regular soil and groundwater sampling for 2010 planned for late summer



II. Land Application and Experimental Exemption Fields Map

III. Background and Rationale for the Hornsby Bend Biosolids Research

On both a national and international level, questions are being raised about the safety of biosolids reuse, particularly in terms of Class B biosolids. The National Biosolids Partnership has initiated efforts to address these concerns on a national level, and the USGS is leading the initiative to research the environmental impacts of wastewater and biosolids by the Federal Government. In 2001, the TCEQ supported a similar effort in Texas by granting an experimental exemption to Austin Water to allow for the development of biosolids research at the Hornsby Bend Biosolids Management Plant. Austin Water's Center for Environmental Research at Hornsby Bend created a biosolids research partnership as an effort to address concerns about biosolids reuse both nationally and in Texas. Although there has been no formal public opposition to Austin's biosolids reuse program, Austin Water and other local entities are very interested in furthering our knowledge of the effects, both positive and negative, of land applying and composting biosolids to assure the public that reuse is a safe, sustainable practice.

From Austin Water's perspective, it is more economically effective, environmentally sustainable, and ecologically beneficial to reuse biosolids through land application and composting than to landfill the material. Biosolids reuse incorporates beneficial nutrients and organic material into agricultural soils and urban soils, particularly those that have been degraded by intensive agriculture and urban development. The goal of the CER's research effort is to assess the long-term safety, sustainability, and ecological impacts of applying Class B biosolids to the Hornsby Bend facility site. Most of the existing biosolids research has until now been focused on nutrients, crop yields, and contaminants, but significantly, not more holistically on soil biology and ecosystem processes. Over the planned course of research, this project will utilize crop productivity records, soil biodiversity indicators, and other parameters to address some of the ecological questions associated with biosolids.

IV. Summary table of land application fields at the Hornsby Bend site

Biosolids land application fields include those applied annually at the site since 1986. These older fields are now applied every other year (bi-annually) in accordance with the Nutrient Management Plan. The Experimental Exemption fields are applied at 10, 20, and 30 dry tons per acre (DT/acre) and consist of adjacent agricultural land purchased by the Austin Water Utility in 2000 to expand the onsite land application acreage. This additional acreage allows comparisons of application methods, including annual application for over 20 years, new application, and application at varying rates.

Fields in use since 1986	Acreage	Application Rate	Application Frequency
Tract B	27.1	9.8 DT/acre	Bi-annual
Sideroll	60		Currently not used
CP1E	9	9.8 DT/acre	Bi-annual
CP1W	32.7		Currently not used
CP2E	13.6	9.8 DT/acre	Bi-annual
CP2W	26.5		Currently not used
Admin/Pecan Orchard	15.6	9.8 DT/acre	Bi-annual
Tree Farm	8.7		Currently not used
CP 3	16.6	9.8 DT/acre	Bi-annual
CP 4	13.6		Currently not used
South Tract	40	9.8 DT/acre	Bi-annual
Fields under Experimental Exemption			
Platt 1	60.7	30 DT/acre	Annual
Platt 2	57.8	30 DT/acre	Annual
Platt 3	47.5	20 DT/acre	Annual
Platt 4	42.6	20 DT/acre	Annual
Platt 5	26	10 DT/acre	Annual
Platt 6	22	10 DT/acre	Annual
Tract C	28.8	10 DT/acre	Annual

V. Climatology Report for 2009-2010

The two years of exceptional drought end with rains beginning in September 2009, but not before the last blast of drought heat in July and August 2009.

- JULY 2009 WAS THE WARMEST MONTH ON RECORD WITH AND AVERAGE TEMPERATURE OF 89.5 BEATING THE OLD RECORD OF 89.1 SET IN 1860.
- JULY SET A NEW ALL-TIME HIGHEST MONTHLY AVERAGE MINIMUM TEMPERATURE OF 76.9 BEATING THE OLD RECORD OF 76.7 SET IN 1998.
- JULY 2009 WAS THE WARMEST JULY BEATING THE OLD RECORD OF 88.3 SET IN 1860.
- JULY SET A NEW RECORD HIGHEST AVERAGE MAXIMUM TEMPERATURE OF 102.0 BEATING THE OLD RECORD OF 101.7 SET IN 1923.

For Austin-Bergstrom - AUGUST 2009 IS THE 8TH WARMEST AUGUST ON RECORD, HAVING AN AVERAGE TEMPERATURE OF 86.8 DEGREES. THE RECORD IS 89.0 SET IN 1951 AND 1985.

AUGUST 2009 IS THE 3RD AUGUST WITH THE HIGHEST AVERAGE MAXIMUMS OF 100.2. THE RECORD IS 101.3 SET IN 1951.

Rains return in September and October 2009 and continued rain through winter months restores soil moisture.

- 6.98 INCHES MAKES THIS THE 4TH WETTEST SEPTEMBER ON RECORD.
- 6.90 INCHES MAKES THIS THE 10TH WETTEST OCTOBER ON RECORD.
- THE MONTHLY RAINF ALL OF 3.29 INCHES AT AUSTIN BERGSTROM IN JANUARY 2010 MAKES JANUARY 2010 THE 14TH WETTEST JANUARY OF RECORD AT AUSTIN BERGSTROM FROM 1943 TO 2010.

ABIA February weather record average low temperatures

- THERE WAS A RECORD LOW TEMPERATURE OF 22 DEGREES ON THE 17TH, THE OLD RECORD WAS 26 SET IN 2003.
- THERE WAS A RECORD LOW TEMPERATURE OF 23 DEGREES ON THE 25TH, THE OLD RECORD WAS 24 SET IN 1960.
- THE MONTHLY AVERAGE TEMPERATURE OF 45.9 DEGREES IS TIED FOR THE COLDEST FEBRUARY, ALONG WITH 1978.
- THE DAILY AVERAGE HIGH TEMPERATURE OF 56.8 DEGREES, IS THE 2ND COLDEST FOR FEBRUARY
- THE DAILY AVERAGE LOW TEMPERATURE OF 35.1 DEGREES, IS THE 2ND COLDEST FOR FEBRUARY.
- THERE WAS 0.3 INCHES OF SNOW AND SLEET ON THE 23RD.

April and May – below average rainfall

AT AUSTIN BERGSTROM MAY 2010 WAS THE 8TH DRIEST MAY SINCE 1943 WITH 1.01 INCHES OF RAIN FOR MAY...4.11 INCHES BELOW NORMAL. MAY IS THE WETTEST MONTH ON AVERAGE FOR AUSTIN SINCE THE BEGINNING OF RECORDS AND FROM THE LATEST 30 YEAR NORMALS.

April PRECIPITATION (INCHES)
TOTAL 1.44
AVG. 2.63
DEFICIT -1.19

May PRECIPITATION (INCHES)
TOTAL 1.01
AVG. 5.12
DEFICIT -4.11
MAY 2009 1.73

Rain returns in June

JUNE PRECIPITATION (INCHES)
TOTALS 4.15

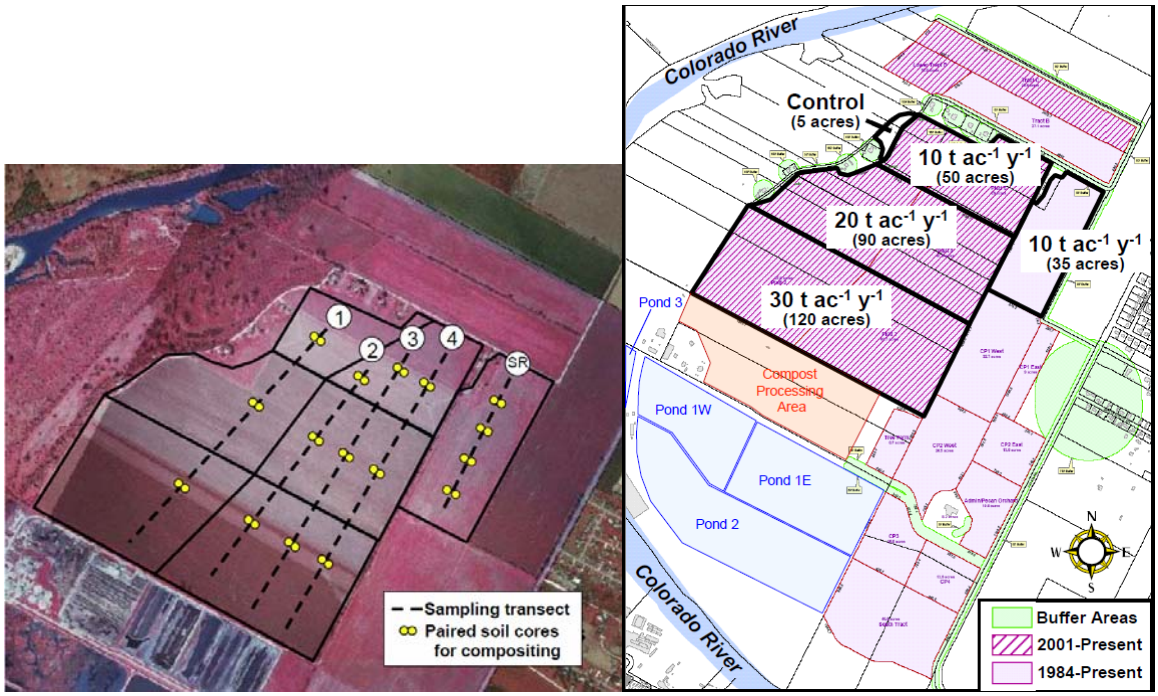
VI. Key Events for 2009-2010

- Soil core sampling by USDA and worm sampling by TPWD completed – soil cores delivered to USGS [Sept 16]
- TPWD Environmental Contaminants Laboratory earthworm sampling with Dr. George Damoff, Stephen F Austin University and greenhouse aquatics sampling by TPWD staff September through March with assistance from Dr. Pat Richardson UT and Peg Wallace [Dec 8]
- TPWD earthworm sampling for December with George Damoff, SF Austin University and Pat Richardson UT and Peg Wallace [Jan 27]
- TPWD earthworm sampling for December with George Damoff, SF Austin University and Pat Richardson UT and Peg Wallace [Feb 24]
- Meeting Mike Canova USGS Austin about Hornsby etc samples data arriving [Feb 19]
- Data received in spreadsheets from Mike Canova [Feb 24]
- TPWD earthworm sampling for March with George Damoff, SF Austin University and Pat Richardson UT and Peg Wallace [Mar 24]
- ETCs workshop with USGS at the CER – 88 attend [May 17]

Sampling September 2009 – March 2010

With the return of rain in September 2009, we were finally able to complete USDA soil core sampling and begin regular organism sampling with Texas Parks and Wildlife Department's Environmental Contaminants Laboratory. Soil core sampling took place on September 16 and involved meter long cores from research fields, one older field, and control areas.

USDA Baseline Soil Core Sampling Transects



USDA soil coring

USDA soil coring

Jody Slagle, Dr. Richardson, Dr. Damoff earthworm sampling

TPWD staff aquatic organism sampling in greenhouse

TPWD Environmental Contaminants Laboratory, also began earthworm sampling on September 16. This sampling was overseen by earthworm expert Dr. George Damoff of Stephen F Austin University, while greenhouse aquatics sampling was handled by TPWD staff. Dr. Damoff and TPWD staff returned to sample once a month November through March with assistance from Dr. Patricia Richardson and Peg Wallace of the University of Texas.

Sampling Dates 2009-2010 – September 16, November 3, December 8, January 27, February 24, March 24

May 2010 CER/USGS ETCs Workshop and USDA presentation for the National Biosolids Conference

On May 17, the Center for Environmental Research and USGS held a full-day environmental trace contaminants workshop at the CER. The morning of presentations by USGS researchers focused on their current studies of environmental trace contaminants in water, wastewater, and the environment, both nationally and in Texas, including Hornsby Bend. The presenters and topics -

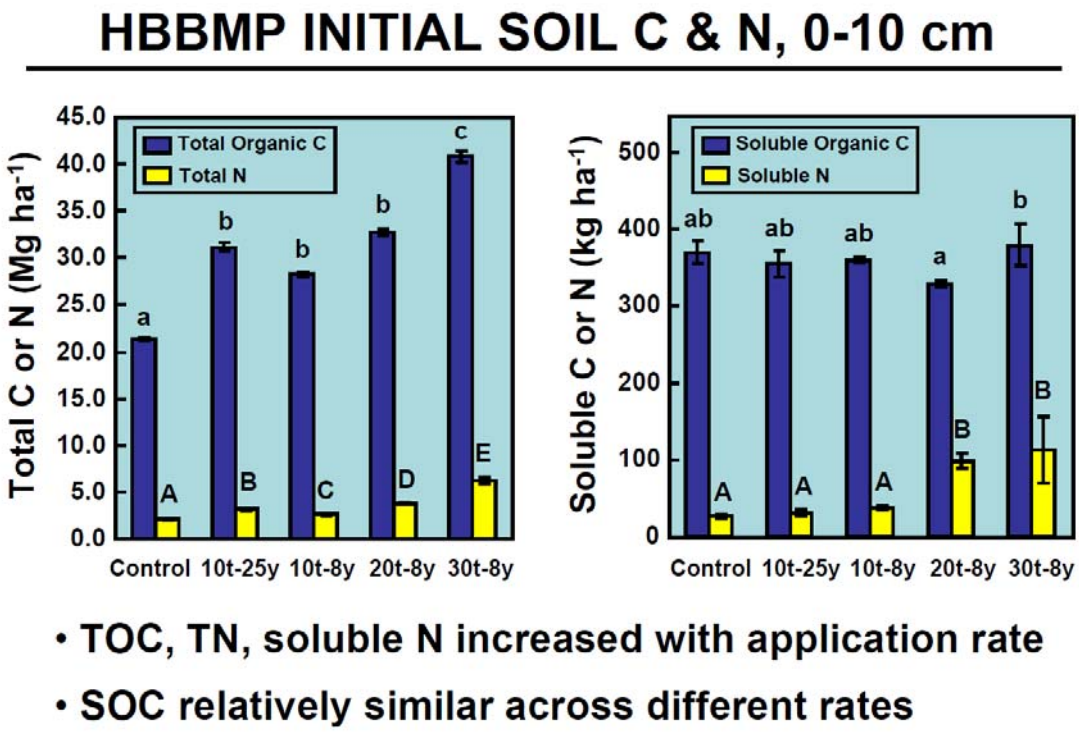
- Ed Furlong, USGS National Water Quality Lab (NWQL), Denver, CO - Emerging Contaminants Methods Development at USGS
- Dana Kolpin, Research Hydrologist, USGS Iowa Water Science Center, Iowa City, Iowa and

  Bruce Brownawell, Professor, Stony Brook University, Stony Brook, NY [by webcast] - Quaternary Ammonium Compounds Study
- Tim Oden, Water-Quality Specialist, USGS Texas Water Science Center, Houston, TX - Overview of Emerging Contaminants Studies at USGS
- Pete Van Metre, Research Hydrologist, Austin, TX - Selecting Emerging Contaminants for Study for the USGS National Water-Quality Assessment Program
- Mike Canova, Hydrologist, Austin, TX - Update on USGS Contribution to Hornsby Bend ETCs

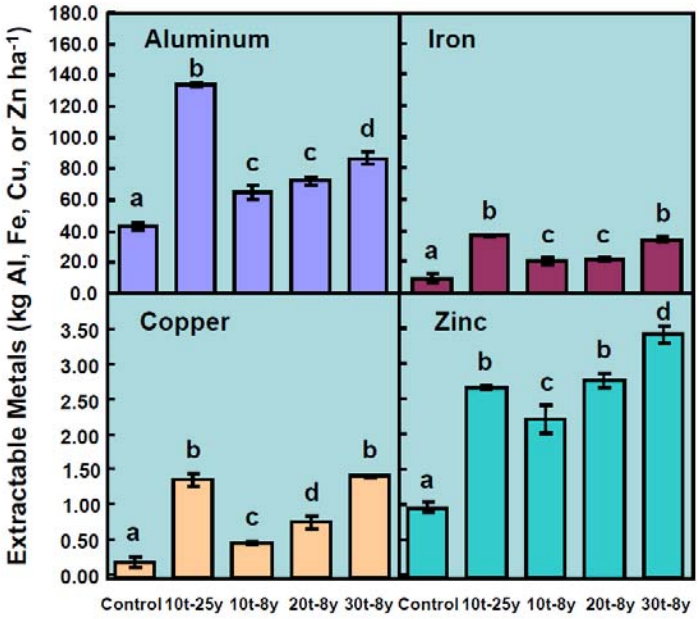
The afternoon session focused on assessing City of Austin issues of ETCs and opportunities for collaboration between USGS and the City of Austin on monitoring and research. The afternoon session resulted in the formation of a City of Austin ETC Working Group coordinated by the CER which will meet on a regular basis in the future. USGS Hydrologist

Lynne Fahlquist and CER Coordinator Kevin Anderson organized the seminar. The seminar was attended by 88 City of Austin staff from five different departments along with staff from USGS, USDA, TCEQ, Texas Water Development Board, Texas Park and Wildlife Department, and Travis County.

Also in May, Dr. Virginia Jin from the USDA presented the first preliminary data from the Hornsby Bend biosolids research at the National Biosolids Conference in Savannah, Georgia. Her presentation focused on initial soil nutrient cycling and metals data that she and Dr. Mari-Vaughn Johnson have generated. What follows are some of the preliminary graphs of data and tentative conclusions presented at the conference:

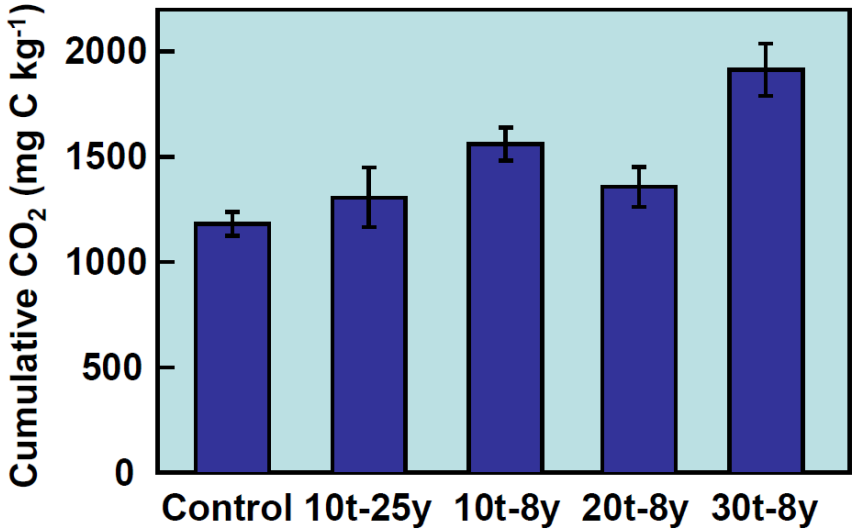


HBBMP INITIAL SOIL METALS, 0-10 cm



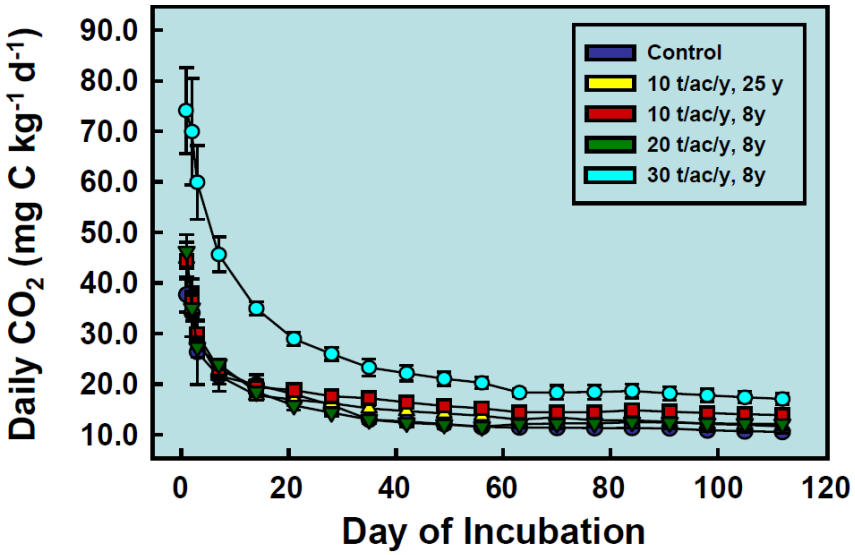
- Metals greater than control in all fields
- Highest levels in long-term and 30 t ac^{-1} y^{-1} treatments
- As, Ni similar trend
- Se not different
- Cd, Pb not detected

CUMULATIVE CO_2 PRODUCTION



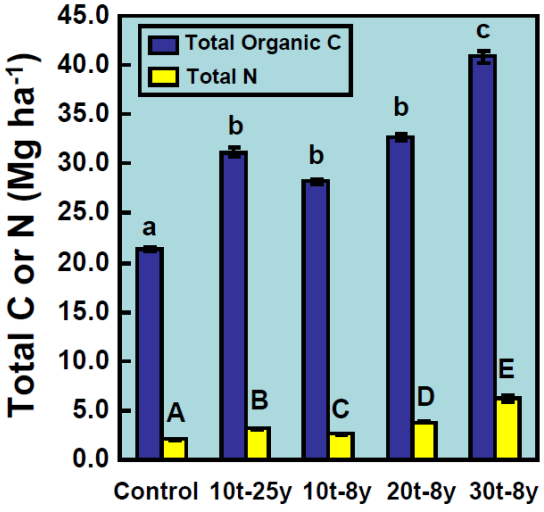
- Soil respiration increases in more recently treated fields and with increasing application rate

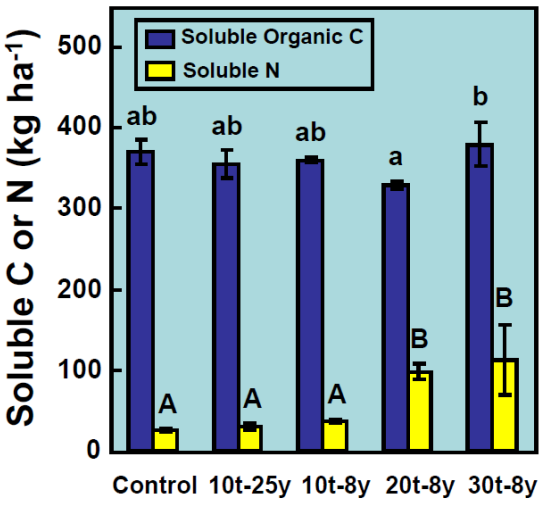
DAILY CO_2 RESPIRED



- Daily respiration highest at 30 t ac^{-1} y^{-1} but not different in long-term treated soils despite higher metal loads

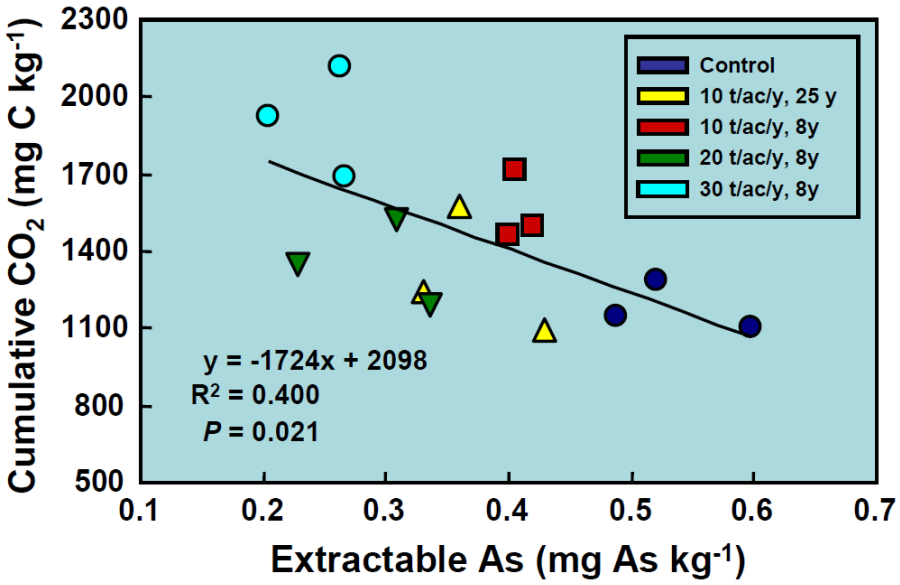
HBBMP INITIAL SOIL C & N, 0-10 cm





- TC, TN, SN increased, but SOC relatively similar
- Microbes stimulated by high water-soluble C availability and adequate N supply

CUMULATIVE CO_2 vs ARSENIC



- As levels decreased with increasing application rate
- Greater biomass removal at higher rates

Preliminary Conclusions -

- Biosolids application rate and history affected soil nutrients (C, N) and metal loading
- Microbial respiration increased with higher application rates despite increased metal loading due to greater availability of C and especially N
- Potential negative impacts of metal loading on microbial activity confounded by greater availability of organic substrates
- Apparent negative impact of extractable As related to removal via plant uptake and biomass harvests rather than reflecting any toxicity effect

VII. USGS Sampling Sites Map

VIII. Hornsby Bend Groundwater Wells Map

IX. Biosolids Research Partnership

The research partnership and their contributions for this project are as follows:

- AWU Hornsby Bend Biosolids Management Plant

Jody Slagle, P.E., Biosolids Reuse Engineer and Research Project Manager

- Provides research support
- Coordinates hauling and land application
- Supervises University of Texas undergraduate interns and students

- AWU Center for Environmental Research

Kevin M. Anderson, CER Coordinator and Research Project Manager

- Manages research partnership with USDA, USGS, TPWD Environmental Contaminants Lab, University of Texas, and Texas A&M University
- Writes grants in collaboration with research partners
- Supervises University of Texas undergraduate interns and students

- U.S. Department of Agriculture – Agricultural Research Service Grassland, Soil, and Water Research Laboratory, Temple, Texas

USDA research scientists, Dr. Mari-Vaughn Johnson and Dr. Virginia Jin

- U.S. Geological Survey Texas Water Science Center, Austin, Texas

- U.S. Geological Survey National Water Quality Assessment Laboratory in Denver, Colorado

- Texas Parks and Wildlife Department - Environmental Contaminants Laboratory, San Marcos, Texas

- Stephen F. Austin University

- Consultation services provided by Dr. George Damoff

-University of Texas at Austin

- Consultation services provided by Drs. Richard H. Richardson and Patricia Q. Richardson, Department of Integrative Biology
- Hydrology research by Department of Geological Sciences

- Soil Food Web, Inc. Laboratory

- Provides qualitative and quantitative analyses of soil and compost for soil food web criteria

- Texas Plant & Soil Lab, Inc.

- Provides conventional soil analyses

X. Historical Background for Hornsby Bend site and research

2009

- Research partnership receives $399,347 USDA research grant focused on Environmental Trace Contaminants [ETCs]
- First ETC research sampling by USDA, USGS, and TPWD
- Host Environmental Trace Contaminants meeting for City of Austin
- CER Sideroll study of mammal and fireant density and soil peturbation
- Soil Food Web sampling not possible in 2008 due to exceptional drought conditions
- Regular soil and groundwater sampling for 2009 completed

2008

- USDA researchers from USDA-ARS Grassland, Soil, and Water Research Laboratory, Texas Parks and Wildlife Department Environmental Contaminants Laboratory, and USGS join the biosolids research project
- Research partnership applies for USDA research grant
- Expand research focus to include Environmental Trace Contaminants [ETCs]
- Host first Emerging Environmental Contaminants meeting for City of Austin
- University of Texas School of Geosciences begins hydrogeology research at Hornsby Bend

2007

- Application of Unison Novel Broadleaf Herbicide to fields to control growth of broadleaf weeds on the Platt fields on March 20 and other Hornsby Bend fields on April 5.
- Soil Food Web sampling and ground water sampling completed 2007
- Results of the two-year study, **"**Repellency of Red Imported Fire Ants (*Solenopsis invicta*) to Dillo Dirt, a Sewer Sludge-Based Compost Material," with Texas A&M Cooperative Extension entomologist Elizabeth Brown reveal sporadic differences, inconsistency over time, and the necessity of further testing to develop definite conclusions.

- The first 8 months of 2007 was the wettest start to a year on record for Austin-Bergstrom [39.33 inches], and then the rains stopped in mid-August for a very dry second half of 2007. Despite the dry fall, 2007 was the seventh wettest at Austin Bergstrom, with 45.91 inches.

2006

- Sampling of the permitted fields at Hornsby Bend was completed, including first analysis for soil food web characteristics and conventional nutrient criteria. First-year results indicate expected bacteria-dominated soils, which are desirable for grasses.
- A Nutrient Management Plan set new reduced recommended biosolids application rates for the fields not included in the Experimental Exemption based on nitrogen and phosphorous levels. This change forces an adjustment in research protocol for Hornsby Bend.

2005

- The Experimental Exemption is discontinued as a separate permit and incorporated into the Permit WQ0003823000. The Exemption now includes land only at Hornsby Bend (Platt fields 1-6 and Tract C).
- UT-Austin collaborators decide to serve the Hornsby Bend Research Partnership in an advisory-only capacity based on the loss of the Webberville fields for research.

2004

- Land application ended at the Webberville site. Because the Experimental Exemption was incorporated into the permit, it could no longer include the offsite fields at Webberville. Land application at Webberville stopped in late 2004.
- The Platt fields continue to be marked and mapped at the Hornsby Bend site.
- A new farming lease begins for the entire Hornsby Bend site utilizing two farmers and includes the fields under the Experimental Exemption (the Platt fields and Tract C).

- Platt fields are sprigged with Bermuda grass for hay production.
- A study of the repellent effects of composted biosolids (Dillo Dirt) on fire ants (*Solenopsis invicta*) with Texas A&M Cooperative Extension entomologist Elizabeth Brown begins.

2003

- Vegetation is shredded on Platts 1, 2, 3, and 4, which formerly grew row crops unsuitable for hay. Application of Unison Novel Broadleaf Herbicide to fields to control growth of broadleaf weeds.
- Hay is baled from Platts 5 and 6, which previously grew hay.
- The Texas A&M soils laboratory analyzes soil samples before land application begins at the Platt fields, and University of Texas students conduct preliminary biological assays on the samples.
- Fields at Hornsby Bend and Webberville receive biosolids land application.
- Organic control treatments for fire ants are studied on plots near Platt 6 in collaboration with Travis Extension.

2002

- Webberville study plots are enlarged in keeping with traditional farming practices and are applied with three rates of biosolids across sorghum and feed corn crops.
- The new Platt fields on the Hornsby Bend property are divided into six large-scale study plots [Platt 1 – 6] on 258 acres of agricultural fields in preparation for land application and sprigging to hay crops.
- The Platt fields are marked and mapped at the Hornsby Bend site with 10-acre buffer zones for roadways and wells. These buffer zones serve as control sites, which receive no biosolids land application to allow comparisons with the application plots.

2001

- The Experimental Exemption is granted by the (former) Texas Natural Resource Conservation Commission (TNRCC) to research the long-term effects of biosolids land application on soil biology. The Exemption includes offsite fields at Webberville as well as the Platt fields and Tract C field at Hornsby Bend.
- Land application of Class B biosolids begins to approximately 600 acres of farmland at Webberville (not part of the Hornsby Bend site) and includes multiple sets of one-acre research plots of land in varying application rates under the Experimental Exemption.

2000

The City purchases adjacent "Platt" agricultural and bottomland [457 acres], expanding the Hornsby Bend site to 1237 acres.

1988

The Center for Environmental Research (CER) is established at the Hornsby Bend site in partnership with the University of Texas and Texas A&M University.

1987

Biosolids composting begins as a pilot program to recycle City of Austin yard waste and a portion of the biosolids.

1986

Hornsby Bend Biosolids Management Plant is built as a reuse/recycling facility for all of Austin's sewage sludge, including use of biosolids land application on permitted agricultural fields onsite.

1957

City of Austin sewage treatment ponds built at Hornsby Bend and total 185 acres.

XI. 2001 – 2004 Historical Narrative of Experimental Exemption design activity

Webberville

(Although the City no longer land applies biosolids at Webberville, the history of research at these fields provides information for the ongoing research at Hornsby.)

In its first year (2001), this project involved a first land application of Class B biosolids to some 600 acres of farmland at the Webberville site by Synagro, Inc., and the Austin Water Utility committed to a second hauling and application contract. The research team planned and laid out multiple sets of one-acre research plots at the Webberville site that received varying application rates of biosolids. First-year land application at Webberville concluded with no complaints from neighbors. In fact, neighboring farmers inquired about getting involved with the application program. The farmers receiving the biosolids were extremely impressed with the apparent increase in crop growth and productivity, and they became excited about the cumulative effects of continuing applications. Preliminary results indicated increased crop productivity correlating to increasing biosolids applications.

In the second year of application at Webberville, researchers, farmers, and the contractor, Enviroganics, Inc., learned a great deal. The small one-acre research plots were determined to pose more difficulties than the results warranted. Harvesting equipment could not accurately quantify the yields from such small areas. In addition, the research team had doubts about the accuracy of application in such small areas. As a result, the decision was made to change to larger field areas to be more in keeping with traditional farm practices. Fields were “banded” with three rates of application across sorghum and feed corn crops. Unfortunately, the spring season was unusually dry, and the crop yields were poor, and research results were adversely affected. Even with less than ideal weather, the farmers had greater yields from the biosolids applied areas than from commercial fertilizer. However, soil nitrate levels showed high in only one sampling below six inches. This occurred in field AC-1 and only in the area applied with 30 dry tons per acre. None of the other fields receiving this loading rate exhibited

this effect. Application was adjusted downward in the next year to avoid nitrate build up and movement.

In the third year of application, the fields were applied without the small research plots. A variety of crops harvested included hay, winter crops, and row crops such as sorghum and feed corn. The fields also included some pastureland for cows. Favorable rain in the spring allowed good harvests for the summer of 2004. According to the farmers, they experienced increasing yields in proportion to the amounts of sludge applied. The farmers continued to be very excited about the observed improvements in the soil and crops and anxiously awaited the next year's application. In addition, improvements in soil organic matter, fertility, and biological activity are expected over time with subsequent applications.

Some objections were raised by a neighboring community about the odors and "sludge dumping" occurring at the Webberville site. A meeting and presentation could not be coordinated with the community's City Council, but one of the concerned citizens visited the site and was given a tour. This citizen appeared to leave with a complete change of heart, observing nothing wrong with the sludge application program, and community objections subsided.

Because the Experimental Exemption was incorporated into the permit, it could no longer include the offsite fields at Webberville. Land application at Webberville stopped in late 2004.

Hornsby Bend

The research team began working in 2002 to design and create large research fields (25-30 acres) and small-scale research plots (1-4 meter$^{2)}$ on the new Platt fields at the Hornsby Bend property. However, because of experience with smaller plots at Webberville, the plan was adjusted to focus on only larger plots. Lessons drawn from the experience at Webberville influenced plot design. The research team worked closely with land application staff in laying out fixed roadways that defined field edges and minimized journeys across plots in order to avoid compaction.

During 2003 – 2004 all the plots were marked and mapped on the new Platt fields at the Hornsby Bend site, which were divided into six plots labeled Platt 1 through 6 (see attached map in Appendices). Buffer zones were created for roadways and wells, which continue to function as control sites that receive no biosolids for comparison to application plots. The six plots range in size from 22 – 60.7 acres with two plots receiving each rate of application. The large plots allow for the averaging of application rates across larger areas, avoiding the uneven application problems in small plots. These large plots also represent the decision of the research team to focus on "real world" application situations rather than artificial application protocols of small (meter square) plots. This decision was made because the small plots would not adequately address our research interest in long-term soil food web dynamics. Additionally, there has been little long-term research on large plots, and Hornsby Bend offers a unique opportunity to create large long-term plots.

Final Details of Platt Fields

FIELD	ACREAGE	BIOSOLIDS
Control areas	Approx. 10 acres	No application
Platt 1	60.7 acres	30 dry tons/acre
Platt 2	57.8 acres	30 dry tons/acre
Platt 3	47.5 acres	20 dry tons/acre
Platt 4	42.6 acres	20 dry tons/acre
Platt 5	26 acres	10 dry tons/acre
Platt 6	22 acres	10 dry tons/acre

Plot size and application rates on the Platt fields at Hornsby Bend

Permanent markers and vehicle roadways delineate all the plots. Roadbase was laid down for the main roadway between all the plots in order to concentrate vehicle travel to limited areas thereby avoiding compaction on the plots. Soil samples were taken before application began and analyzed by the Texas A&M soils laboratory. Additionally, during the summer of 2003, University of Texas students did preliminary biological assays on soil samples from the Platt fields. Before land application began in June 2003, vegetation was shredded on Platt 1, 2, 3, and 4 (which had been in row crops in previous years and were not suitable for hay), and hay was baled from Platt 5 and 6 (which were previously used for hay production).

During 2003 – 2004 a new farming lease was created for the entire farm site at Hornsby Bend (both the fields under the Experimental Exemption and the land under the standard permit). The lease began in the fall of 2004 and includes the farmer in research decisions about the crops grown and techniques used. All fields were converted to hay production, providing continuous ground cover and eliminating opportunities for runoff and erosion, while also supporting uniform crop-related comparisons across all fields.

AWU – Center for Environmental Research
Environmental Trace Contaminants and Austin Workshop with the USGS
May 17, 2010

Attendees

USGS
Bob Joseph, Director, USGS Texas Water Science Center, Austin, TX
Bob Joseph Guest
Mike Dorsey, Hydrologic Data Collection and Management Chief, Austin, TX
Ann Ardis, Supervisory Hydrologist, Austin, TX
Tim Oden, Water-Quality Specialist, Houston, TX
Ed Furlong, USGS National Water Quality Lab (NWQL), Denver, CO
Barbara Mahler, Research Hydrologist, Austin, TX
Pete Van Metre, Research Hydrologist, Austin, TX
MaryLynn Musgrove, Research Hydrologist, Austin, TX
Mike Canova, Hydrologist, Austin, TX
Patty Ging, Hydrologist, Austin, TX
Lynne Fahlquist, Hydrologist, Austin, TX
George Ozuna, Deputy Director for Hydrologic Studies, San Antonio

Attending via Webex
Dana Kolpin, Research Hydrologist, USGS Iowa Water Science Center, Iowa City, Iowa
Bruce Brownawell, Professor, Stony Brook University, Stony Brook, NY

USDA Grassland Soil and Water Research Laboratory
Mari-Vaughn V. Johnson, Ph.D., Research Scientist
C. Green Ross, Ph.D., Research Scientist
Nadia Bonuma from Federal University of Santa Maria, Brazil

Texas Commission for Environmental Quality
Rebecca L. Villalba, Wastewater Permitting Section Storm Water & Pretreatment Team
Elaine Hassinger, Wastewater Permitting Section Storm Water & Pretreatment Team
Katie Greenwood, Wastewater Permitting Section Storm Water & Pretreatment Team
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