Appendix 2B-6: STA-6 Mercury Special Studies Interim Report

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SUMMARY

Stormwater Treatment Area 6 (STA-6) experienced anomalously high methylmercury (MeHg) concentrations in the discharge from Cell 3 in June 2001 and from Cell 5 in June 2002. Both incidents followed reflooding after extended periods of cell dryout. The second incident produced a peak MeHg concentration at the point of discharge about twice as high as the first. MeHg biomagnifies in fish at the top of the Everglades aquatic food chain up to 10,000,000 times the concentrations in the surrounding water. MeHg is also potently toxic because of its ability to accumulate in organs and tissues and disrupt protein structure and function, including the brain of the developing fetus. Concerns were expressed that the anomalously high concentrations of MeHg produced by such first-flush events could threaten the health of fish-eating wildlife species attracted to STA-6 or impair the use of the receiving waters as a sport fishery if such conditions persisted.

In response, the District voluntarily initiated special studies of water and soil to more accurately quantify the MeHg status of the system over time, identify potential causes, and determine whether or which mitigative actions might be required, as was the case in STA-2 Cell 1 (See Appendix 2B-7). This involved increasing the frequency of surface water monitoring of the common inflow and individual cell outflows from quarterly to every four weeks and soils from every three years to every twelve weeks. The list of routinely monitored constituents was also expanded. The Mercury Special Studies (MSS) began in June 2002 and are currently on-going although these studies were initially scheduled to have been completed in July 2003 following the last planned soil collection. This appendix presents the summary of the MSS results through April 30, 2003, available as of June 30, 2003.

KEY FINDINGS

> The MeHg anomaly dissipated rapidly from the Cell 5 water column, returning to near baseline conditions by the third cycle of enhanced surface water monitoring (each cycle = 4 weeks).
>
> Due to its much shorter hydraulic retention time, Cell 3 could have experienced a first-flush MeHg pulse of even greater magnitude than Cell 5 that was missed because of the timing of the post-reflood sampling event.
>
> The fraction of THg converted to MeHg in surficial soils, expressed as percent methylmercury (%MeHg), is an indicator of the net MeHg production rate occurring there. The %MeHg in Cell 3 and Cell 5 surficial soils declined progressively (monotonically) over time, with Cell 3 peaking

initially at 6.3 percent in August 2002 and then declining to 2.5 percent, 2 percent, and 1.75 percent in October 2002, January 2003, and April 2003, respectively. During those same soil sampling events, the corresponding Cell 5 values were 1.8 percent, 1.2 percent, 1.1 percent, and 1 percent, respectively. These observations suggest that Cell 3 is more efficient at producing MeHg than Cell 5, both in the short term and, perhaps, for the long term.

Both Cell 3 and Cell 5 were net importers of total mercury (THg) and net exporters of MeHg, but the calculated export of MeHg for Cell 5 was substantially more than for Cell 3.

Based on the mass budget calculations, the most significant input pathway of MeHg load to STA-6 was the inflow, but for the THg load the inflow and atmospheric deposition made roughly equal contributions.

Cell 3 and Cell 5 converted roughly 15 percent and 30 percent of the inorganic mercury [$Hg(II)^{+2}$] from inputs plus change in storage into MeHg, respectively. This suggests that the anomalous MeHg event in Cell 5 was the result of conditions more favorable to maximum MeHg production, albeit over a very short period of time.

All mass budget calculations must be used with caution, however, because the daily MeHg concentration data must be interpolated between four-week monitoring events. Nevertheless, the accuracy of the mass budget calculations using data collected every four weeks is a vast improvement over those based on data collected every three months.

Seepage in both cells was high relative to inflow, which likely accelerated transfer of both mercury species from the water column to the sediment. It may also have leached soluble constituents, including but not limited to inorganic mercury [$Hg(II)^{+2}$] and MeHg, from the surficial soil into the deeper soil horizon and thence the surficial aquifer.

The rate of THg removal from the Cell 5 water column was greater than calculated for flow dilution, change in storage, and seepage alone. Therefore, other removal processes must have been at work, such as transport to another compartment (e.g., soil/sediment or plant biomass). When the soil/sediment uptake pathway was added to the mass budget calculation, the fit between observed and calculated THg concentrations improved substantially, albeit in the low concentration range encountered during the latter months of the study.

The rate of MeHg removal from the Cell 5 water column was also greater than calculated for flow dilution, seepage, and change in storage alone. However, contrary to the experience with THg, the addition of transfer to the soil/sediment compartment had no discernable effect on the calculated MeHg mass budget or concentrations. Thus, internal processes of particle settling and decomposition–and not diffusive exchange with the underlying sediment–may have been the predominant MeHg removal processes in Cell 5.

The production of MeHg in Cell 3 and Cell 5 appears to have responded similarly to inputs of $Hg(II)^{+2}$ from rainfall but differently to the influences of inflow constituent concentrations and loads.

These similarities and differences are reflected in the intra-correlations and inter-correlations between potentially influential hydrologic factors (e.g., stage, hydraulic residence time), input factors (e.g., inflow and rainfall concentrations and loads), and soil constituent factors (e.g., bulk density, moisture, and chemistry).

The most important differences between Cell 3 and Cell 5 soil chemistries occur for acid volatile sulfide (AVS). Soil AVS increased almost 19 times and about 5.5 times from the second to the fourth sampling events in Cells 3 and 5, respectively. However, the expected inverse relationship between soil MeHg and AVS was weak in Cell 3 soils at Lag-0 weeks and became increasingly positive for each preceding soil sampling event. In Cell 5, the correlation between soil AVS and MeHg was initially weak-to-moderately positive, but it became moderately to strongly inverse by the second preceding soil sampling event.

The above exploratory data analysis via linear correlation analysis cannot be considered definitive due to the small number of soil samples collected to date within cells and over time. Nevertheless, it is clear that the soils in Cells 3 and 5 differed substantially in the way their biogeochemical cycles influenced MeHg production. Whether this was due to differences in cell hydrology, chemistry, microbiology, or some combination of these is not yet known and cannot be extracted from the results of these exploratory data analyses.

Ultimately, correlation is not causation, and only controlled laboratory microcosm studies and field mesocosm studies can systematically discriminate the factors that are likely to be causing or mediating the transport and fate of $Hg(II)^{2+}$ and MeHg from those that are the product of mere association. Such studies are not presently planned for STA-6.

KEY CONCLUSIONS

The reflooding of treatment cells after an extended period of dryout is the most likely cause of the MeHg anomalies in Cell 3 and Cell 5 in summer 2001 and 2002, respectively.

The differences between the mass budgets for THg and MeHg based on quarterly and every-other-biweekly sampling are significant. If the uncertainty in the magnitude of the exported annual MeHg load is considered problematic, retaining the more frequent monitoring of surface water would appear to be appropriate.

The gross export of approximately 35-40 grams per year (g/yr) of MeHg (of which between 5 and 10 grams were likely produced internally) is unlikely to have a significant downstream environmental impact.

However, the combined effect of inflow and internally produced MeHg is reflected in the localized buildup of MeHg levels to concentrations that approach or exceed the Florida fish consumption advisory threshold of 0.5

parts per million (ppm) in the flesh of age class 3 year largemouth bass (*Micropterus salmoides*) residing in the discharge collection canal.

The high seepage rates in both treatment cells may change the absolute and relative concentrations of key influential factors in surficial soils over time via leaching in such a way that MeHg production and transport may be increased or decreased.

KEY RECOMMENDATIONS

Return to monitoring G-354C only, as G-354A and G-354C are statistically indistinguishable in terms of average annual THg and MeHg concentrations and are only occasionally distinguishable on a sampling event basis.

Post the discharge collection canal so as to limit top-predator fish consumption by sport and subsistence fishers.

Limit the area and duration of dryout in both treatment cells to reduce the magnitude and frequency of occurrence of anomalous MeHg events in STA-6.

Conduct leaching studies on the STA-6 soils to better characterize the long-term effect of high seepage rates with inflow water and inflow-rainwater mixtures on soil chemistry and MeHg production potential.

If further understanding of the influences of soil chemistry on net MeHg production via univariate and multivariate regression analysis is of interest, continuing the STA-6 soil monitoring should be a priority. This is because the patterns of the intra-correlations and inter-correlations with soil and outflow MeHg concentrations and %MeHg are very different than in STA-2 soils.

If the uncertainty in the quantity of MeHg exported annually from STA-6 is a concern, then the increased frequency of mercury monitoring of inflows and outflows should continue.

Otherwise, a return to quarterly monitoring should be premised on the commitment to time the sampling so as to capture the first-flush excess MeHg production following reflooding after extended periods of dryout.

If anomalously high MeHg concentrations are encountered, initiate more frequent sampling for three consecutive four-week periods.

If the anomalously high MeHg concentrations persist through the next quarterly sampling event, then more frequent mercury monitoring should be reinstituted as an appropriate adaptive management response. Otherwise, return again to routine monitoring.

INTRODUCTION

This report details and interprets the results obtained to date by the Mercury Special Studies (MSS) initiated in Stormwater Treatment Area 6 (STA-6) in response to an anomalous methylmercury (MeHg) event that occurred in STA-6 Cell 5 in June 2002. The anomalous MeHg event followed reflooding after an extended period of dryout. This is the second such event, the first having occurred in Cell 3 in June 2001.

The objectives of the Mercury Special Studies were as follows:

1. Quantify the rate of recovery of STA-6 from the MeHg anomaly
2. Quantify the net export of total mercury (THg) and MeHg out of STA-6
3. Identify the possible cause(s) of the anomaly
4. Develop appropriate mitigative measures, if possible, should the anomaly persist or recur

The analysis of the near- and far-field downstream impacts of the discharge of excess MeHg from STA-6 is outside the scope of this study. However, progress has been made in the construction of a steady-state, bioenergetics-based food chain submodel with which to predict the average disposition and bioaccumulation of MeHg produced in a constructed wetlands or canal food chain. This submodel uses the average surface water concentration of the limiting nutrient, total phosphorus, to determine the rate of production of plant biomass and detritus with which to feed the autotrophic and saprotrophic food chains based on the conversion efficiency of biomass at each step in the food chain. The bioaccumulation of MeHg concentrated at one trophic level follows the flow of organic carbon up the food chain. Since the organic biomass conversion efficiency at each step is only about 10 percent but the transfer efficiency of MeHg is about 95 percent, this necessitates the biomagnification of the concentration of MeHg at each step in the food chain, even though the absolute mass of MeHg stored at each step in the food chain is 5 percent less than the preceding step. This submodel will eventually be incorporated as a module in the Everglades Mercury Cycling Model v2+. However, it is anticipated that this work will not be completed prior to the completion of the STA-6 Mercury Special Studies Final Report. Moreover, there is currently no dynamic version of this module, and a transient pulse of excess MeHg production, as was the case for STA-6 Cell 5 in June of 2002, requires dynamic rather than steady-state bioaccumulation modeling to simulate the phenomenon.

The unfiltered total mercury and MeHg monitoring of the common inflow (G-600) and Cell 3 (G-398B) and Cell 5 (G-354A and G-354-C) outflows increased from quarterly to every four weeks. The list of monitored inflow/outflow parameters was expanded to include total suspended solids (TSS) and dissolved organic carbon (DOC). The interior soils monitoring increased from every three years (triennially) to every 12 weeks, and the coring depth was changed from 10 centimeters (cm) to 4 cm. The soil monitoring list was expanded from just total mercury (THg) and methylmercury (MeHg) to include total nitrogen (TN), total phosphorus (TP), total sulfur (TS), total iron (TFe), total manganese (TMn), total calcium (TCa), and total magnesium (TMg), and acid volatile sulfide (AVS), as well as ash, moisture, and bulk density (BD). These constituents were selected because they were known or believed to influence the transport or fate (biogeochemical cycling) of inorganic mercury [$Hg(II)^{2+}$], which is converted to the more toxic and bioaccumulative MeHg by sulfate-reducing bacteria under conditions depleted of dissolved oxygen. THg can be expressed (for all practical purposes) as the sum of $Hg(II)^{+2}$ and MeHg.

The study began following reflooding of STA-6 in June 2002 and continued through July 2003 when the last set of soil samples was collected. The analysis of the complete set of surface water and soils data will be presented in the *2005 Everglades Consolidated Report*.

BACKGROUND

THE EVERGLADES MERCURY PROBLEM

Methylmercury is the most fundamental, organic form of mercury and is produced from inorganic mercury in rainfall, stormwater runoff, and soil or sediment by naturally occurring aquatic bacteria (primarily sulfate-reducing bacteria, or SRB). In the Everglades, this occurs almost exclusively in surficial soil or sediment under conditions virtually devoid of oxygen but in the presence of sulfate. The MeHg produced as an inadvertent byproduct of SRB metabolism is readily taken up but only slowly eliminated by aquatic organisms, and the rate of elimination decreases with increasing size. This results in the biomagnification of the concentration of MeHg at each step in the aquatic food chain. MeHg is also potently toxic because of the efficiency with which it disrupts protein structure and function, targeting the brain, liver, kidney, and reproductive organs and tissues. In the Everglades, mid-predator fish, such as the sunfish, and top-predator fish, such as the gar, have bioaccumulated MeHg to levels that may threaten the most sensitive, most exposed members of fish-eating wildlife species and their predators, including the endangered woodstork, Everglades mink, and Florida panther. Because more than 95 percent of the mercury in fish flesh is MeHg, the concentrations are most often reported as total mercury, which is easier and less expensive to analyze.

Top-predator sport fish, such as the largemouth bass (*Micropterus salmoides*), may biomagnify MeHg in its flesh up to 10,000,000 times the concentration of MeHg in the surrounding water. The toxic MeHg also crosses the placental barrier in mammals and bioaccumulates in the mother's milk, so that it can interfere with the development of organs and tissues in the growing fetus and the nursing infant, especially the brain. This is the basis for the human health advisories for limited fish consumption in Florida issued by the Florida Department of Health. Below 0.5 parts per million (ppm) THg in the flesh of top-predator fish (i.e., largemouth bass), unlimited fish consumption is recommended. For fish with THg concentrations between 0.5 ppm and 1.5 ppm, the limited fish consumption advisory recommends no more than one, eight-ounce portion per week for adult men but no more than one portion a month for women contemplating pregnancy, pregnant women, women nursing infants, and growing children. Above THg concentrations of 1.5 ppm, no fish should be consumed, irrespective of gender, reproductive status, or age. All portions of the Everglades remain under the no or limited fish consumption advisories. This issue has impaired the use of the Everglades as a sport fishery.

THE EVERGLADES MERCURY CYCLE

Inorganic mercury enters the Everglades in stormwater runoff, rainfall, dustfall, gas transfer from the air to water, or aqueous transfer from soil to water (Fink and Rawlik, 2000; Rumbold et al., 2000). In the Everglades, more than 98 percent of the new inorganic mercury is supplied by atmospheric deposition (Atkeson et al., 2002). It is believed that most of the "old" inorganic mercury in soil is so strongly bound to the inorganic sulfides (Ravichadran et al., 1997; Jay et al., 2000) and sulfhydryl groups in the organic carbon fraction (Haitzer et al., 2002) that it is unavailable for biogeochemical processing. However, some inorganic mercury is complexed with iron oxyhydroxide or iron sulfide species present in the soil (Lockwood and Chen, 1974; Yin et al., 1997), and this soil fraction is likely to be more bioavailable than the inorganic mercury complexed with the sulfhydryl moiety or precipitated with sulfide. Absent in a dryout event, MeHg in the Everglades is likely produced primarily from inorganic mercury present in wet and dry atmospheric deposition and surface flow (Krabbenhoft et al., 2001).

It is likely that the qualities of the water influent to STA-6 Cells 3 and 5 were virtually indistinguishable, as were the quantity and quality of wet and dry atmospheric deposition (USEPA, 1997; Guentzel, 1997; Guentzel et al., 2001). Therefore, the substantial differences in the MeHg concentrations in soil and water between cells must be attributed to some other factor or factors, such as antecedent land use, antecedent stage-duration with and without dryout, differences in the hydraulic loading rates or seepage rates, or intrinsic differences in soil chemistry.

Following soil dryout, it is likely that labile carbon, sulfur, and iron species in surficial soils are oxidized, albeit to different degrees and at different rates (Dmytriw et al., 1995; Yin et al., 1997; Krabbenhoft and Fink, 2001; Fink, 2003a). Reinundation of oxidized soils is usually accompanied by a "first-flush" release of nutrients (Newman and Pietro, 2001) and trace metals, including inorganic mercury (Dmytriw et al., 1995; Yin et al., 1997; Rawlik, 2001b; Rumbold et al., 2001b). It has been hypothesized that the presence of high concentrations of oxidized species in a readily bioavailable form accelerates MeHg production until the pools are reduced by biotic or abiotic processes (Krabbenhoft et al., 2000; Krabbenhoft and Fink, 2001). Following the first-flush release of inorganic mercury, some of it is either converted to dissolved elemental mercury, Hg(0), and then lost to the overlying air via evasion (Vandal et al., 1995; Saouter et al., 1995; Krabbenhoft et al., 1998; Lindberg and Zhang, 2000; Zhang and Lindberg, 2000; Lindberg et al., 2002), precipitated as mercuric sulfide (Ravichadran et al., 1998), complexed with polysulfides (Jay et al., 2000) or complexed by dissolved organic carbon (Fink, 2003b), reabsorbed by suspended solids (Hurley et al., 1998), bacterial films (Hintelmann et al., 1993), algae (Hurley et al., 1998), or plants (SFWMD 1995–1999a,b; Fink and Rawlik, 2000; Fink, 2003b), or converted to MeHg (Gilmour et al., 1998a, 1999).

As with inorganic mercury, the MeHg produced from the bioavailable inorganic mercury is then complexed by dissolved organic carbon (Hintelmann et al., 1997), or reabsorbed by bacteria films (Hintelman et al., 1993), algae (Hurley et al., 1998; Miles et al., 2001; Moye et al., 2002) and floating and rooted macrophytes (SFWMD, 1995–1999a,b; Hurley et al., 1998; Fink and Rawlik, 2000), as well as the surficial peat soil (Ambrose and Araujo, 1998). Following its redistribution among dissolved, particulate, and complexed phases, the MeHg produced from the bioavailable inorganic mercury can be decomposed to inorganic mercury or elemental mercury in water by the action of sunlight (Sellers et al., 1996; Krabbenhoft et al., 1998; D. Krabbenhoft, USGS, personal communication, 2000), or demethylated by carbon-oxidizing or sulfate-reducing bacteria in the surficial sediment under anaerobic conditions (Oremland et al., 1991; Marvin-DiPasquale and Oremland, 1998; Pak and Bartha, 1998; Marvin-DiPasquale et al., 2000; Marvin-DiPasquale et al., 2001). The MeHg that is not sequestered can be transported via diffusive or advective processes into the water column or deeper into the soil profile (King, 2000) or bioaccumulated at each trophic level via the saprotrophic or autotrophic food chains (Cleckner et al., 1998).

If the duration of accelerated MeHg production is short because the soil pools of labile, bioavailable sulfate, carbon, and inorganic mercury are small and rapidly consumed, then the total mass of MeHg produced will be small and the magnitude and duration of subsequent excessive bioaccumulation of MeHg in top-predator fish and their predators will be short-lived. This is known as the "first flush effect." Conversely, if these pools are large or there is an external source of the limiting factor capable of sustaining a high, first-flush MeHg production rate for a long time, then the first-flush mass of MeHg produced will be large. It will then result in excessive bioaccumulation at the top of the food chain, and it will clear only slowly from the ecosystem. This results in the so-called "reservoir effect," first observed in hydroelectric reservoirs created by flooding forested glacial till soils in northern temperate regions (Bodaly et al., 1984; Scruton et al., 1994; Rodgers et al., 1995) but also observed in natural, created, or expanded wetlands (St. Louis et al., 1994; St. Louis et al., 1996; Kelly et al., 1997; Paterson et al., 1998). This has also resulted in the increase in MeHg body burdens in insect-eating birds (Gerrard and St. Louis, 2001) and fish-eating birds and mammals foraging in these water bodies (Wolfe et al., 1994).

However, if labile, bioavailable sulfate is present in substantial excess, surficial sediments remain anaerobic, and no other factor limits microbial metabolism or affects sulfur speciation, then sulfate will first stimulate MeHg production (Compeau and Bartha, 1985; Berman and Bartha, 1986; Gilmour and Henry, 1992; Gilmour et al., 1998a) and then inhibit it via the build-up of excess sulfide (Lamers et al., 1998) or polysulfides (Gun et al., 2000) by a mechanism that has not yet been fully elucidated (Craig and Bartlett, 1978; Gilmour et al., 1998b and 1999; Benoit et al., 1999a,b; Jay et al., 2000; Benoit et al., 2001; Marvin-DiPasquale et al., 2001). It has been hypothesized with moderate confidence (Gilmour et al, 1998b) that sulfide inhibition is causing eutrophic Everglades regions with conditions otherwise deemed ideal for MeHg production (e.g., ENR Project and WCA-2A-F1) to exhibit low MeHg production and correspondingly low concentrations in fish at all trophic levels (Cleckner et al., 1998; Lange et al., 1998, 1999; Loftus et al., 1998; Rumbold et al., 2000; Rawlik, 2001a; Rumbold et al., 2001a). Conversely, unimpacted or virtually pristine areas in the Everglades exhibit much higher MeHg production rates (e.g., WCA-2A-U3 and WCA-3A-15) and correspondingly higher concentrations in fish at all trophic levels. An alternative hypothesis is that sulfate eutrophication and sulfide toxicity (Lamers et al., 1998) has shortened the aquatic food chain in the phosphorus-impacted areas of the Everglades (McCormick et al., 1996, 1998, 1999), resulting in less MeHg bioaccumulation (Q. Stober, USEPA Region 4, personal communication).

Results of a joint USGS-District study of an Everglades dryout and burn that occurred in spring 1999 suggest that the relatively rapid decline from peak MeHg concentrations in porewater and soils was brought about by the rapid depletion of the excess sulfate pool created by the oxidation of inorganic and organic sulfides. However, the alternative hypothesis that this was caused by the relatively rapid onset of sulfide inhibition cannot be ruled out (Krabbenhoft et al., 2000; Krabbenhoft and Fink, 2001; Fink, 2003a). The relatively rapid onset of sulfide-inhibition in sulfur-amended agricultural soils could also explain why STA-1W Cell 5, after exhibiting a first-flush effect, relaxed back to ENR-like conditions within 180 days of start-up (Rawlik, 2001b).

The interest in the nitrogen cycle species in this context arises, in part, from the ability of some anaerobic denitrifiers (e.g., *Thiobacillus denitrificans* and *Thiomicrospira denitrificans*) to strip sulfur from surficial soil in the presence of an inorganic source of carbon has been quantified with the following stoichiometric relationship (Bezbaruah and Zhang, 2003):

$$55S + 20CO_2 + 50NO_3^- + 38H_20 + 4NH_4^+ \rightarrow 25N_2 + 4C_5H_7O_2N + 55SO_4^{2-} + 64H^+$$

In effect, the anaerobic denitrifiers are having the same effect as soil dryout by oxidizing soil sulfur to sulfate, although at a much slower rate. The production of sulfate from soil sulfur via this process could stimulate MeHg production up to a point if it inhibited the build-up of porewater sulfide or inhibit MeHg production if it fostered the build-up of porewater sulfide.

THE STA-6 MERCURY PROBLEM

Stormwater Treatment Area 6 has a potential mercury problem. STA-6 has experienced anomalously high MeHg concentrations in the discharge from Cell 3 in June 2001 and Cell 5 in June 2002. Both incidents followed reflooding after extended periods of cell dryout. The second incident produced a peak MeHg concentration at the point of discharge about twice as high as the first, so the District voluntarily initiated special studies of water and soil to more accurately quantify the MeHg status of the system over time, identify potential causes, and determine whether or which mitigative actions might be required, as was the case in STA-2 Cell 1 (see Appendix 2B-7). This involved increasing the frequency of surface water monitoring of the common inflow and individual cell outflows from quarterly to every four weeks and soils from every three years to every twelve weeks. The list of routinely monitored constituents was also expanded. The MSS began in June 2002 and is scheduled to be completed in July 2003 following the last planned soil collection. This is the summary of the results of the MSS through April 30, 2003, available as of June 30, 2003.

In July 2003, the District notified the Florida Department of Environmental Protection (FDEP), as stipulated in Condition (6)i of Exhibit C of the Everglades Forever Act (EFA) Permit No. 262918309, that it had detected an anomalous level of mercury in a sample of Cell 5 discharge water collected on June 20, 2002. The unfiltered THg concentrations at the inflow (G-600) and outflow (G-354C[1]) of STA-6 were 2.8 nanograms per liter (ng/L) and 9.4 ng/L, respectively, and 0.7 ng/L and 6.44 ng/L, respectively, for unfiltered MeHg. In addition, the corresponding outflow values for Cell 3 at G393B were 6.6 ng/L and 2.8 ng/L for THg and MeHg, respectively.

This event occurred after an intense period of rainfall that followed an extended period of dryout in both treatment cells. As discussed and documented previously (Krabbenhoft and Fink, 2001; Fink, 2003a), these conditions are most conducive to the production of a transient pulse of excess MeHg and a net export of THg and MeHg over a short period of time. Rainfall contains much higher THg concentrations than inflow water, so when the STA-6 mass export is corrected for the THg contribution from the intense rainfall event, the apparent net export of THg from both cells could disappear. This cannot be the case for MeHg, however, because the concentrations of MeHg in rain are only about 1-2 percent of the THg concentrations on average.

Moreover, this is not the first such anomalous MeHg event in STA-6. A similar event occurred following reflooding during the previous summer. At that time, the export of THg and MeHg occurred from Cell 3 rather than Cell 5 (reported in Appendix 4A-2 of the *2002 Everglades Consolidated Report*). The need to more accurately quantify the THg and MeHg loads in the system became self-evident. The only way this could be accomplished was via more frequent surface water monitoring. Better characterization of the surface water and soil chemistries that could be contributing to the MeHg responsiveness of STA-6 to these rewetting events also became necessary.

The District's expectation that this anomalous MeHg condition would resolve itself relatively rapidly was, in fact, met. However, continuation of the increased monitoring frequency from quarterly to every four weeks was primarily intended to more accurately quantify the THg and MeHg mass budgets so as to determine whether there had been net export of THg or MeHg on a long-term rather than short-term basis.

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[1] The values reported for THg and MeHg at G-354C are the arithmetic average values of one known and two blind duplicates values.

SITE DESCRIPTION

STA-6 (**Figure 1**[2]) is located in Hendry County in the southwest corner of the Everglades Agricultural Area (EAA). It presently consists of two independently operable treatment cells. Cell 5 (625 acres) lies north of and is separated from Cell 3 (245 acres) by a levee that runs from southwest to northeast. Inflow water is pumped through G-600 (under the sole control of the U.S. Sugar Corporation) into a distribution canal that feeds both treatment cells. Each cell then overflows by gravity into a discharge collection canal that funnels water through G-607 into the L-4 canal. The outflow weir elevations are set at 4.3 meters (m) (14.1 ft) NGVD (National Geodetic Vertical Datum), such that water depths greater than 0.52 m (1.7 ft) will flow out of Cells 3 and 5 and vice versa. On occasion, there is backflow from one or both cells through the inflow weirs into the inflow supply canal. On an as-needed basis, discharge water from STA-6 and the L-4 canal can be back-pumped to the U.S. Sugar Corporation farms. When some or all of this water is then pumped forward again, a reversal of the lag correlation between inflow and outflow results. This complicates the interpretation of the lag-correlation with inflow water quality as well as introducing additional uncertainty into the mass budget. Locations of STA-6 levees, culverts, and canals are depicted in **Figure 2**.

STUDY DESIGN

The locations of water and soil sampling sites are shown in **Figure 3**. Monitoring of mercury in indicator plants and fishes was to be added to the enhanced surface water and soil monitoring only if the anomaly persisted. This was not the case, however, so the focus of this report is on the interpretation of the results of the enhanced water and soil monitoring only. The location of the soil monitoring sites was also changed. This was done to coordinate sampling with an ongoing study of the effect of dryout on total phosphorus removal. That study was subsequently suspended.

No treatment marsh vegetation samples were collected for ultra-trace THg and MeHg analysis during this study. No rainfall samples were collected on-site for ultra-trace THg analysis using the equipment and protocols of the National Atmospheric Deposition Program's (NADP) Mercury Deposition Network (MDN). Instead, results were extrapolated from MDN sites operating at Andytown (FL04 at the junction of U.S. 27 and I-75) and the Everglades Nutrient Removal (ENR) Project (FL34 at the junction of I-80 and S.R. 84) prior to the initiation of this study, both some 75 km from the STA-6 site.

The planned analysis of porewater samples collected using in situ wells for sulfate, sulfide, $Fe(II)^{+2}$, $Fe(III)^{+3}$, calcium (TCa), magnesium (TMg), chloride (Cl), and DOC, was abandoned because the study that would have collected these samples was suspended (K. Pietro, SFWMD, personal communication). Moreover, these wells were not certified for the collection of ultra-clean mercury samples for ultra-trace THg and MeHg analysis. Unfortunately, a reliable method for such porewater sample collection was unavailable to the District at the initiation of the study. As a consequence, acid volatile sulfide (AVS) analysis of soil solids was substituted for the porewater sulfide analysis. Based on samples collected from 0 to 4 cm depth by the Academy of Natural Sciences Environmental Research Center (ANSERC) (primarily from one site in WCA-1, two sites in WCA-2A, one site in WCA-2B, and three sites in WCA-3A in the period 1995–1998) porewater sulfide was found to have a strong inverse correlation with the MeHg concentration in soils (r = -0.78). However, AVS is considered a rough surrogate for porewater sulfide, but its

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[2] All figures for this appendix are located on pages App. 2B-6-52 through App. 2B-6-78.

correlations with soil MeHg (r = -0.46) and porewater sulfide (r = 0.47) are weak to moderate. Thus, the development of a porewater sulfide sampling capability continues.

METHODS AND PROCEDURES

SAMPLE COLLECTION AND ANALYSIS

All rain samples were collected as weekly integrated samples by a modified Aerochemetrics® rainfall collector at the top of a 48-ft tower using the equipment and following the protocols of the National Atmospheric Deposition Program's Mercury Deposition Network (R. Brunette, Frontier Geosciences, personal communication). The samples were then shipped to Frontier Geosciences (FGS) of Seattle, WA, for ultra-trace THg analysis using modified methods equivalent to draft U.S. Environmental Protection Agency (USEPA) Method 1631. In addition, monthly integrated samples of rainfall were collected using the same equipment and protocols for MeHg analysis by FGS.

All surface water samples for analytes other than THg and MeHg were collected at 0.5 m depth via grab sample, filtered as required, and preserved according to standard methods and procedures. All anions and cations were obtained as filtered samples, while total organic carbon (TOC), total phosphorus (TP), and total Kjeldahl nitrogen (TKN) were obtained as unfiltered samples. Unpreserved, ultra-clean samples of surface water for ultra-trace THg and MeHg analysis were collected using "clean hands-dirty hands" technique in amber glass bottles with pre-cleaned Teflon-lined caps using a peristaltic pump. The water was drawn through a pre-cleaned, 3-m Teflon tube from a depth of 0.5 m in the canals and half the water depth in the wetlands. When the wetland water depth was below 10 cm, surface water sampling was suspended. No filtered THg or MeHg samples were collected for this project. Samples were kept on ice for transport to the analytical laboratory. All surface water analyses were conducted by the District's analytical chemistry laboratory using standard methods, with the exception of ultra-trace THg and MeHg, which were analyzed by FGS using cryogenic preconcentration and a UV fluorescence detector following modifications of draft USEPA Methods 1631 and 1630, respectively.

For soil sample collection, a 15-20 cm clean, clear butyrate tube was inserted into the stainless steel corer to collect the top 4 cm of soil. The corer was then driven into the sediment to the required depth using the corer's hammer. The butyrate tube was then capped and extracted from the corer. Water above the sediment layer was carefully decanted off. Large plant debris (e.g., roots, sticks, etc.), both living and dead, was removed from the top of the core using gloved hands. Any excess sediment, representing material deeper than desired cm depth, was removed and discarded. The core was then placed into a labeled plastic zipper storage bag, which was then inserted into a second plastic zipper storage bag to avoid cross-contamination. Samples were kept on ice for transport to the processing lab. All sampling utensils were rinsed a minimum of three times with in situ water before and after each use. All soil chemical analyses for constituents other than THg and MeHg were carried out following the standard on published methods by DB Labs of Gainesville, FL. All soil chemical analyses for THg and MeHg were carried out by FGS using modified USEPA Methods 1631 and 1630, respectively. References or Standard Operating Procedures (SOPs) for these methods are available from the laboratory upon request.

QUALITY CONTROL

A set of standard blanks, replicates, and spikes was analyzed in each run of the field samples for analytical validation purposes per standard methods or per USEPA Methods 1630 and 1631. In addition, the quality assurance protocol for ultra-trace THg and MeHg requires the collection of a field kit blank, a field equipment blank prior to sampling, two field replicates every quarter, and a field cleaning equipment blank at the end of the sampling trip. The field kit blank is used as a diagnostic for contamination introduced in the de-ionized (DI) water or bottles unrelated to field sampling but not to fatally flag the results of the samples collected using that field kit. If the THg or MeHg equipment or field cleaning equipment blank exceeds 0.5 or 0.05 ng/L, or the field replicate RSD is > 20 percent, the entire set of samples is fatally flagged. If a MeHg result is > 130 percent of a THg result, that data pair is fatally flagged. In addition, an equipment blank is collected from the rinsate of the butyrate sampling soil coring tube at the end of each sampling trip and the same for the homogenizers used for fish processing on a quarterly basis. However, due to the much higher concentrations in solid media relative to ambient water, a contaminated blank does not result in a fatal flag for any solid sample but is used as a diagnostic for evaluating the adequacy of equipment cleaning. In addition, due to the high natural variability in solid media THg and MeHg concentrations, the field replicate results are used for information purposes regarding sample variability but not to flag sampling trip results.

MISSING DATA FOR REPORTING YEAR MAY 2002-APRIL 2003

The Mercury Special Studies in STA-6 began in June 2002 with an increase in the frequency of water sampling, from quarterly to every four weeks. In August 2002 there was an increase in soil sampling frequency from once every three years to every 12 weeks. Therefore, water and soils data for this reporting year are missing for May 2002. The addition of TSS and DOC to the routine every-four-week inflow and outflow monitoring began in August 2002, so data for May, June, and July 2002 are missing.

DATA CENSORSHIP, INTERPOLATION, AND REDUCTION

FLAGGED DATA

For the mass budget calculations, flagged data were not deleted, but for the exploratory data analysis, flagged data were deleted. The first set of acid volatile sulfide analyses for samples collected at all six sites on August 6, 2002 were flagged, because they failed laboratory precision criteria. This problem was rectified subsequently. The total sulfur (TS) result for a soil sample collected at site G354A on August 6, 2002 was also fatally flagged due to laboratory imprecision. There were no field flagged data from the soil analyses, because there are no field QC requirements. However, with each surface water or ground water sampling trip, a field kit preparation blank, field equipment blank, and field cleaning equipment blank are collected. Field replicates are collected quarterly to evaluate field sampling reproducibility (precision). One set of surface water samples collected on July 16, 2002, was flagged due to a reversal, where MeHg was more than 30 percent greater than THg, which is a logical inconsistency with the requirements of conservation of mass.

DATA INTERPOLATION AND EXTRAPOLATION TO FILL MISSING DATA GAPS

The Cell 5 outflow concentration was calculated as the average of the values measured at culverts G-354A and G-354C. G-354C was not sampled for the first two sampling events, so G-354A data were substituted, because the average concentrations of THg and MeHg in both Cell 5 culverts are virtually indistinguishable statistically, as demonstrated by subsequent monitoring (this study). For the first sampling event the G-393B sample was not taken, because the culvert was not flowing. Subsequently, staff has been instructed to collect a sample regardless of whether the culvert is flowing. This data gap was filled by averaging the THg and MeHg values from the preceding and succeeding 4-week periods (bracketing values). For the mass budget calculations, the daily concentrations of unfiltered THg and MeHg between the 4-week sampling events were approximated using a simple linear interpolation scheme.

Since no rainfall monitoring was conducted at STA-6, it was decided to substitute the average of the THg concentrations in the weekly integrated rainfall samples from the Arthur R. Marshall Loxahatchee National Wildlife Refuge (ENR/LOX, or FL34 at I-80 and SR-12) and the Andytown site (FL07 at US27 and I-75) for the same time period. This is consistent with the observation that the average THg deposition rate does not vary significantly throughout South Florida (Guentzel et al., 2001). Rain samples have also been collected at STA-2 (FL-99) near the S-6 pump station, which is roughly half the distance between STA-6 and Andytown. The average ratio of FL-99 to either the ENR Project or Andytown site is about 0.8. A reduction in the calculated rain THg concentration by 20 percent could be justified but was not implemented for this exercise. Therefore, no rainfall data were censored. The daily rain THg concentration values were then approximated from the weekly values using a linear interpolation scheme. Missing weekly rainfall values were caused by the absence of a sufficient volume of rainfall upon which to perform the THg analysis and not due to contamination or laboratory or field QC criteria violations.

For the analysis of the correlations between cell outflow THg, MeHg, and %MeHg and inflow or outflow water chemistries, only the G-393B reversal was censored. The %MeHg was calculated by dividing the MeHg concentration by the corresponding THg concentration and multiplying by 100. For the first cycle of linear correlation analysis, the dry soils concentration data (mg/kg) were not reduced or transformed. For the second cycle of linear correlation analysis, the dry soils concentrations were converted to equivalent volume concentration by multiplying the soil concentration value by the corresponding bulk density value. The %MeHg in soils was calculated by dividing the MeHg concentration by the corresponding THg value and multiplying by 100.

These same procedures were also followed for the constituents other than THg and MeHg. However, due the absence of a significant wet or dry deposition contribution of these other constituents relative to the inflow load, the contribution of atmospheric deposition was omitted from this analysis. Whether this is appropriate in the context of the burning of sugarcane fields and enhanced ultra-giant particle (ash) deposition must be addressed elsewhere.

MASS BUDGET ANALYSIS

The procedures followed here paralleled those applied to the THg and MeHg mass budgets for the ENR Project (Miles and Fink, 1998; SFWMD, 1999; Fink, 2000). The THg and MeHg loads and fluxes were calculated by multiplying the measured concentration for that period by the corresponding water volume or flux. Wet deposition flux of THg was calculated by multiplying the approximated daily rainfall THg concentration by the daily rain depth for the same day. Dry deposition of THg was assumed to be 50 percent (USEPA, 1997; Atkeson et al., 2002) of the average annual wet deposition flux of 22 ug/m^2-yr (Guentzel et al., 2001). The concentration of MeHg was assumed to be 1 percent of the THg concentration, based on the average of the monthly integrated MeHg concentration values at Loxahatchee and Andytown (FDEP, unpublished data). The daily THg or MeHg rainfall load was then calculated by multiplying the wet or dry deposition flux by the surface area of the cell.

Inflow and outflow loads were calculated by multiplying the instantaneous unfiltered THg or MeHg grab sample value for each biweekly period by the total flow volume for that period. Cell 3 change in surface water storage was calculated in three steps. First, averages were determined for the inflow and outflow THg and MeHg concentrations for Cell 3 (to approximate the average interior concentration, which was not monitored). Second, this average value was multiplied by the corresponding average cell depth and surface area. Third, the value for time (t-1) was subtracted from the value from time t. This procedure was repeated for Cell 5, except that the average of the two outflow culverts (G-354A and G-354C) was used to approximate the outflow concentration of THg and MeHg. Seepage load was calculated by multiplying the seepage volume by the spatially averaged surface water concentration calculated in the same way as for change in storage. The STA-6 annual evasion flux of elemental mercury Hg(0) was assumed to be approximately the same as that estimated for the ENR Project, based on floating chamber measurements conducted by Lindberg and co-workers of the Oak Ridge National Laboratory (ORNL) in Oak Ridge, TN (Lindberg et al., 1999; Lindberg and Zhang, 2000; Lindberg et al., 2002) in the period 1996-1998. The annual value was then divided by 365 to approximate the average daily evasion flux value. More sophisticated approaches involving the two-layer Whitman model of gas diffusion and the calculation of the layer thicknesses from wind velocity, water and air temperatures, and water depth, while perhaps more intellectually satisfying, proved inaccurate. This was because they underestimated the surface water flux by about a factor of five for the ENR Project, and, in any case, put a disproportionate effort into quantifying a second-order loss process (SFWMD, 1999b; Lindberg et al., 2002; Lindberg and Zhang, 2000; Zhang and Lindberg, 2000). Change in surficial sediment storage was calculated by multiplying 0.04 m by the measured bulk density and concentration of THg or MeHg at time (t+1) and subtracting from that result the same product at time (t).

These same procedures were also followed for the constituents other than THg and MeHg. However, due the absence of a significant wet or dry deposition contribution of these other constituents relative to the inflow load, the contribution of atmospheric deposition was omitted from this analysis. Whether this is appropriate in the context of the burning of sugarcane fields and enhanced ultra-giant particle (ash) deposition must be addressed elsewhere.

Table 1[3] summarizes the surface water concentration data (unfiltered THg and MeHg and other potentially influential factors) for the period June 2002 through April 2003, collected at the common inflow (G-600) and the outflow to Cell 3 (G-393B) and two of the Cell 5 outflows (G-354A and G-354C). Figures 4A and 4B juxtapose the STA-6 Cells 3 and 5 inflow and outflow THg and MeHg concentrations, respectively, over time with the corresponding rainfall depth and stage. **Table 2** contains the average of the ENR Project and Andytown weekly rainfall THg concentration data generated by the NADP's Mercury Deposition Network (MDN). The soils concentration data for THg, MeHg, and other potentially influential factors collected to date are iterated in **Table 3** and depicted in **Figures 5A** through **5D**.

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[3] All tables for this appendix are located on pages App. 2B-6-79 through App. 2B-6-130.

Table 4A sets forth the mass budget calculation results for THg and MeHg for Cell 3 and Cell 5 and combined, while **Table 4B** does the same for a select set of constituents other than THg and MeHg. **Table 4C** iterates the percent change in soil concentration and stored mass load for all of the constituents monitored in the soil.

CORRELATION ANALYSIS

This section describes the exploratory analysis of the surface water and soil chemistry data collected to date using univariate linear correlation analysis on untransformed data. The potential influences of water depth and hydraulic residence time (HRT = V/Q) on outflow THg, MeHg, and %MeHg concentrations were evaluated by calculating the correlation between the parameter at t = 0 and the MeHg concentration in the Cell 3 (G-393B) and Cell 5 outflows (average of G-354C and G-354G). The analysis was then extended to include lag t-1 day through t-14 days, t-21 days, t-28 days, t-56 days, and t-84 days and then repeated for the average stage and HRT for those same time periods. Those results are contained in **Table 5** and **Table 6**, respectively.

Table 7 and **Table 8** set down the Pearson correlation coefficients quantifying the apparent influences of rainfall THg concentration and load, respectively, on Cell 3 and Cell 5 outflow THg, MeHg, and %MeHg concentrations for the same time periods. This was calculated following the same procedure as in the preceding for stage and HRT (as described above) except that instead of the average rainfall load, the sum of the loads was substituted. The influences of inflow THg and MeHg loads on outflow THg, MeHg, and %MeHg were evaluated as per the preceding and are summarized in **Table 9**. **Tables 10** and **11** iterate the correlations between the inflow concentration and load, respectively, of the routinely monitored surface water constituents other than THg and MeHg and the THg, MeHg, and %MeHg concentration in the Cell 3 (G-393B) and Cell 5 outflows (average of G-354C and G-354G). **Table 12** sets forth the co-correlations of routinely monitored inflow and outflow constituents other than THg and MeHg.

To evaluate the potential influences of treatment wetland soil chemistry on THg, MeHg, and %MeHg in the outflows of Cells 3 and 5, the THg, MeHg, and other constituent concentrations in soil collected during the quarter were paired with the outflow THg and MeHg concentrations in samples collected on the date immediately following the soil sample collection date and then for the soil sampling event in the preceding quarter to evaluate the effect of time lag. **Tables 13A**, **B,** and **C** contain the results of the co-correlations among the various soil constituents with THg, MeHg, %MeHg, and each other for Cell 3, Cell 5, and combined, respectively. The ratios of the Pearson correlation coefficients for the Cell 3 and Cell 5 soil co-correlation analyses are iterated in **Table 13D**. **Tables 14A** through **14D** set forth the combined Cell 3 and Cell 5 soil constituent co-correlations for each of the four sampling events carried out in August and October 2002 and January and April 2003. A fifth soil sampling event was planned July 2003. The potential influences of the change in soil constituent concentration and mass storage at Lag-0 (concurrent) and Lag-12, -24, and -36 weeks on outflow THg, MeHg, and %MeHg are contained in **Tables 15A** and **B**. The influences of inflow surface water chemistry on Cell 3 and Cell 5 combined soils chemistry are captured in **Table 16A**. The influences of soil chemistry on Cells 3 and 5 outflow surface water chemistry are addressed in **Tables 16B** and **16C**. **Tables 17A** through **17C** repeat these analyses based on transformed soil concentrations ($\mu g/M^3$ vs. $\mu g/kg$). **Tables 18A** and **18B** summarize the results of the exploratory correlation analysis for pairing of the Lag-12 weeks soils data with the Cell 3 and Cell 5 outflow water chemistry data, respectively.

RESULTS

MASS BUDGET ANALYSIS

Water Budget

The water budget supplied by others was modified in two ways. The change in storage was recalculated based on daily changes in stage, and the residual was added to the seepage term for both treatment cells to close the water budget. The results are summarized in **Table 4**.

The water budget indicates that 2002-2003 was not a typical year in the sense that evapotranspiration (ET) exceeded rainfall by about 20 percent, whereas in a more typical year rainfall exceeds ET by about 15 percent. The annual inflow to Cell 3, which is only 245 acres, was about 90 percent of the value for Cell 5, which is 625 acres. The magnitudes for total annual seepage were also roughly equal, suggesting that Cell 3 is seeping at almost three times the rate of Cell 5, per unit area. The annual average hydraulic retention times (HRTs) of the two cells, which were calculated by dividing the annual average volume by the average annual flow, were very different (Cell 3 = 5.5 days; Cell 5 = 21 days). This is consistent with the effect of roughly equal annual average inflow volumes spread over very different surface areas at roughly the same annual average water depth.

Chloride Budget

Chloride is monitored every-other-biweekly period (every 4 weeks) at the common inflow (G-600) and the outflows to Cell 3 (G-393B) and Cell 5 (G-354C). For purposes of calculating the chloride budget, the concentration for the intervening biweekly periods were calculated by averaging the bracketing measured values. The daily concentration values between biweekly periods were then interpolated using a linear interpolation scheme. The results of the chloride budget summarized in **Table 4** are consistent with the modified water budget for Cell 3, but they produce a negative residual for Cell 5. This could indicate that the Cell 5 seepage term is overestimated by about 15 percent. An alternative interpretation is that the propagated error in the water budget accounts for the discrepancy.

For Water Year 2003, the average outflow chloride concentrations in Cells 3 and 5 exceeded the average inflow concentration, although neither was statistically or analytically significant. Perhaps most surprisingly, the flow-weighted average inflow and outflow chloride concentrations were 88, 83, and 80 mg/L for G-600, G-393B, and G-354C, respectively, while the numerical averages at those same sites were 95, 97, and 99 mg/L, respectively. This suggests that when the water is standing rather than flowing in the canals or when the interior stage falls below the weir elevation of 14.1 ft NGVD, chloride is evapoconcentrated. Conversely, when the inflow and outflow waters are flowing, the inflow chloride concentration is substantially lower than its inflow average and the interior water averages, diluting the interior concentrations. When the stage rises above the outflow weir crest level, the outflow water also reflects that dilution.

Mercury Species Mass Budgets

WATER COLUMN

The monitoring frequency of THg and MeHg at the inflows and outflows increased from quarterly to every four weeks beginning on June 20, 2002. The preceding sampling event was in February 2002. Linear interpolation of the February and June 2002 data could have been used to fill "missing" values for May and June 2002. However, there were virtually no inflows to or outflows from STA-6 during this unmonitored period, because there was little rainfall during this time. In response, U.S. Sugar Corporation was retaining water on rather than releasing water from its fields. Thus, while a full year of increased monitoring data is not yet available, the mass budget calculations for THg and MeHg should be very close to their actual annual budgets.

The results of these mass budget calculations indicate that both Cell 3 and Cell 5 are net importers of THg (-68 percent and -62 percent, respectively, of the corresponding input load [inflow plus wet deposition plus dry deposition]). But they are net exporters of MeHg (+6 percent and +44 percent of the input load, respectively). When the two mass budgets are combined, STA-6 is a net importer of THg (-35 percent) but a next exporter of MeHg (+26 percent). The total annual export of MeHg is about 40 g/yr, with about 31.5 g entering via the inflow, 0.5 g added by wet deposition, and 8 g net produced internally. When the one MeHg datum flagged for reversal is deleted and replaced by the average of the bracketing measurements, the internal production is reduced to roughly 4 g, and the gross annual export is reduced to about 36 g. However, if the change in water column storage and seepage terms are added to the combined cell MeHg mass residual, then as much as 60 g of MeHg was produced internally. The potential significance of the net export of MeHg from STA-6 is taken up in the Discussion section of this report.

SOIL

In Cell 3, both THg concentration and load decreased (-5 percent and -31 percent, respectively). However, THg concentration increased while load decreased (23 percent and -22 percent, respectively), in Cell 5. The absolute loss of THg in soil storage from Cell 3 surficial soil was about 234 g, compared to a loss of about 158 g in Cell 5. Since neither Cell 3 nor Cell 5 was a net exporter of THg, the mercury species making up the THg must have been shifted to another storage compartment, lost to the overlying air, or lost to leaching to a deeper soil horizon and thence the underlying surficial aquifer, with the seeping surface water passing through the surficial soil horizon. This conjecture is supported by the change in soil storage for other conservative constituents, none of which exhibited net export from STA-6 Cells 3 or 5 but did exhibit a net loss from soil storage (see **Table 4C**).

VEGETATION

No data were collected for concentrations of THg and MeHg in plant biomass during the course of the study. Nor were the coverages and densities of plant biomass measured or estimated from aerial photographs and ground-based quadrat studies, respectively. Thus, it was not possible to calculate the quantities of THg and MeHg stored in plant biomass at the start-up of the study or the change of plant storage of THg and MeHg over the course of the study. However, STA-6 has been operated continuously since 1998, and it is likely that the plant canopy is nearly mature, such that there should be no significant net change in storage of THg or MeHg due to a change in plant biomass between August 2002 and August 2003. Nevertheless, the first-flush pulse of anomalously high MeHg in surface water was probably removed from the water column initially by being rapidly absorbed by the plant detritus, sediment floc, and algae, and this bolus of excess MeHg has probably been released subsequently by the decomposing plant detritus and dying and decomposing algal biomass over the course of the study. This underscores the importance of quantifying plant biomass and its changes over time and lag-correlation analysis with which to extract the delayed influence of the change in plant storage on the export of THg and MeHg from a treatment wetland. The former is outside the scope of the study, but the latter plays a prominent role in the following exploratory data analysis of surface water and soil constituent concentrations and loads and their changes over time.

Other Constituents Mass Budgets

The results of the annual mass budgets for Cell 3, Cell 5, and combined for constituents other than THg and MeHg are summarized in **Table 4B**. It is important to note that all Cell 3 constituents evaluated exhibited net storage (i.e., inputs-outputs-change in storage > 0), while Cell 5 Cl, DOC, and silicate (SiO_2) exhibited apparent net export, albeit by less than 5 percent. In general, both cells removed roughly the same percentages of TKN, TP, TS, and TFe on an annual basis, but the order of efficiency in Cell 3 was $NO_x > NH_4 >$ TFe > TP, while the order in Cell 5 was $NH_4 > NO_x >$ TP > TFe.

Cells 3 and 5 had dramatic increases in AVS concentrations (1,942 percent and 454 percent, respectively), TS concentrations (256 percent and 133 percent, respectively), AVS loads (1,242 percent and 254 percent, respectively), and TS loads (146 percent and 45 percent, respectively). However, both TS and AVS exhibited high analytical variability, which resulted in some data being flagged in the first and last round of sampling, respectively. Therefore these calculated changes in storage, while suggestive, must be applied with some caution. Moreover, in general, calculations for Cell 3 must be considered moderately uncertain, because the spatial average of each parameter value was based on the average of only two sampling sites per sampling event, while those for Cell 5 are less uncertain, because the spatial average was based on four sites per sampling event.

CORRELATION ANALYSIS

Hydrologic Parameters versus Surface Water Quality

STAGE

The average of the spatially averaged daily stage value for each cell for that day (Lag-0) and the preceding 1-14 days (Lag-1 through Lag-14), 28 days (Lag-28), 56 days (Lag-56), and 84 days (Lag-84) were paired with the corresponding outflow concentrations of THg, MeHg, and %MeHg calculated from those concentrations. The results for Cell 3 and Cell 5 are displayed in **Tables 5A** and **5B**, respectively. For Cell 3 THg the correlation is weak through Lag-28 days, increases at Lag-56 days, and becomes weakly negative at Lag-84 days, while that with MeHg ($r = 0.7$ to 0.77) and %MeHg ($r = 0.73$ to 0.80) is moderately positive through Lag-28 days. Conversely, Cell 5 exhibits moderately positive correlations with THg and MeHg but a weak correlation with %MeHg across the same variable span. Recollecting that Cell 3 never exhibited a first-flush pulse of excess MeHg production, the positive relationship between high flow and high stage suggests that THg is being supplied by a spatially diffuse source, most likely rainfall, while most of MeHg is being supplied by the inflow. This is reflected in the fact that the flow-weighted annual average Cell 3 inflow and outflow MeHg concentrations are virtually indistinguishable. Conversely, for Cell 5, it is likely that both THg and MeHg are being supplied by spatially diffuse sources, and there is some memory of the first-flush event in both the THg and MeHg concentrations, as reflected in the weak to moderate inverse correlation with stage at Lag-84 days. The apparent strong correlation between MeHg and %MeHg in Cell 3, with its short hydraulic retention time (HRT), and the apparent disconnect between those same parameters in Cell 5 can be explained in terms of the differences in the sources and the routes and rates of transport and transformation processes between $Hg(II)^{2+}$ and MeHg, the effect of which should increase as the hydraulic retention time (HRT) increases.

HRT

For purposes of this analysis, the hydraulic retention time (HRT) was calculated on a daily basis by dividing the effective volume of each cell by the outflow flow rate. When the daily HRT calculated in this way exceed 365 days, the result was censored from the database. This still resulted in the average of the censored daily HRT values for Cells 3 and 5 exceeding the corresponding HRTs calculated using annual average values by a factor of roughly four and two, respectively. However, if (1) the internal production flux is highly responsive to fresh inputs of $Hg(II)^{2+}$ from inflow and rain, and (2) the accumulation of MeHg in the water column is highly responsive to flow dilution of the internal production flux, then accounting for an effective HRT on a daily basis and averages over various antecedent periods are appropriate. To carry out the required analysis, the daily HRTs were then averaged over the preceding 0-14 days, 28 days, 56 days, and 84 days. These values were then paired with the corresponding THg and MeHg outflow concentrations collected every four weeks for each cell. For Cell 3, only the G-393B site is monitored, while for Cell 5 the average of G-354A and G-354C values was used. The corresponding %MeHg was calculated from these paired THg and MeHg outflow concentrations.

The results for Cell 3 and Cell 5 are displayed in **Tables 6A** and **6B**, respectively. For Cell 3, aside from the weak positive correlation (r = 0.31 to 0.33) between the outflow THg concentration and the daily average HRT for the average of Lag-5 to Lag-13 days, the correlations between HRT and THg, MeHg, and %MeHg have a weak inverse relationship, probably from the rapid dilution result from high flow through Cell 3. This also suggests that inflow is a more significant source of THg and MeHg when the HRT is short and that spatially distributed sources of THg and MeHg are more significant than the inflow when the HRT is long. This pattern is reversed for Cell 5, with THg exhibiting a weak inverse correlation for the average of Lag-0 and Lag-1 days and a weak positive correlation for only the average of Lag-2 and Lag-3 days. Correspondingly, the correlation with MeHg is weakly positive initially but peaks at the average of Lag-5 and Lag-6 days (r = 0.63), while those for %MeHg are positive and moderate for the average of Lag-0 and Lag-1 days (r = 0.71) and Lag-5 through Lag-8 (0.72-0.63). This result suggests that inflow is diluting a spatial source of THg when the inflow volume is high and that the build-up of MeHg in Cell 5 responds relatively rapidly to decreased flow and generally increases with increasing HRT up to roughly the average of Lag-28 days. However, as noted in the preceding summary of the effect of stage on outflow THg, MeHg, and %MeHg, the differences in the sources, routes, and rates of processing of $Hg(II)^{2+2}$ and MeHg are likely to have an increasing influence on the absolute and relative concentrations of these species as the HRT increases. This complicates the interpretation of the results of this exploratory correlation analysis.

Rainfall versus Surface Water Quality

CONCENTRATIONS

For this exploratory data analysis, the weekly rainfall THg concentration (Lag-0) was paired with the corresponding outflow THg and MeHg concentrations and the fraction MeHg. The process was then repeated with Lag-7 days (preceding week), Lag-14, Lag-21, and so on through Lag-56 days and then Lag-84 days. While interpolating between weekly measurements would allow an evaluation of potentially more rapid responses than weekly, this would have been based on linear interpolated values between measured values, which would have the effect of suppressing variability and thus the discriminatory power of the correlation analysis. These results are iterated in **Table 7**.

In both cells the strongest albeit weak to moderate correlations between rainfall THg and outflow THg and MeHg occurred with Lag-1 week, suggesting that there is a rapid response of methylating bacteria to an influx of "fresh" $Hg(II)^{2+}$ in rain. This would be consistent with observations made by USGS scientists by dosing in situ mesocosms with stable mercury isotopes (Orem et al., 2002). There was also a weaker positive correlation at Lag-5 weeks that may reflect the recycling of $Hg(II)^{2+}$ deposited 35 days prior to the collection of the surface water sample, possibly as a result of the decomposition of plant biomass. However, in Cell 5, there was again an apparent disconnect between the correlation with the concentration of MeHg and the fraction MeHg at Lag-5 weeks with the same possible explanation.

LOADS

The THg rainfall load (calculated by multiplying rainfall THg concentration by rainfall volume) was then paired with the outflow THg and MeHg concentration and the percent MeHg calculated from these values as Lag-0 and the correlations quantified. This analysis was then repeated with the rainfall THg load deposited the preceding day (Lag-1) through 14 days (Lag-14), 28 days (Lag-28), 56 days (Lag-56), and Lag-84 (Lag-84). While the daily rain THg concentrations were estimated using a linear interpolation scheme, these results were multiplied by measured rainfall values, introducing a degree of variability that would allow meaningful discrimination of short-term influences of less than one week duration. In the second cycle of calculation, the sum of the loads over these same periods was then substituted for the lag loads themselves (Sum Lag). The results for Cell 3 and Cell 5 are summarized in **Tables 8A** and **8B**, respectively.

The effect of rainfall dilution could explain the initial weak positive correlation with THg ($r = -0.05$) and the weak inverse correlation with MeHg concentration ($r = -0.11$ at Lag-0). However, as the magnitude and duration of the rainfall increases, this is progressively less likely for THg, because rain contains much higher concentrations of THg (13.4 ng/L is the annual average of spatial average for the ENR Project and Andytown sites) than does the surface water upon which it falls. So, for example, if the annual net THg load computed for Cell 3 (inflow plus wet and dry deposition – seepage – evasion) is divided by the total annual flow out of Cell 3, the THg concentration attributable solely to flow dilution would be 6.30 ng/L, while the outflow average from Cell 3 at G-393B is 1.01 ng/L for this reporting period. Nevertheless, the initial effect of a rainfall event is that the standing or flowing water in the treatment cell dilutes the much more concentrated $Hg(II)^{2+}$ in rain with the less concentrated THg in the wetland surface water. However, this dilution effect will decrease over time with increased intensity and duration of rainfall.

For THg, the positive correlations peaked at Lag-4 (r = 0.88), Lag-8 (r = 0.93), and Lag-12 (r = 0.96) days, while MeHg peaked at Lag-2 (r = 0.63), Lag-5 (r = 0.91), Lag-8 (r = 0.93), and Lag-12 days (r = 0.81), and %MeHg peaked at Lag-2 (r = 0.95), Lag-6 (r = 0.96), Lag-10 (r = 0.91), and Lag-13 (r = 0.70) days. Thereafter the correlations become weakly negative. The first set of MeHg and %MeHg peaks suggests an almost immediately increased production of MeHg in response to a fresh supply of bioavailable $Hg(II)^{2+}$ load. This would be consistent with USGS observations in mesocosms dosed with stable mercury isotope (Orem et al., 2002). The second set of peaks at Lag-4 through Lag-6 suggests a somewhat delayed but still rapid methylation response to the effect of rainfall addition of $Hg(II)^{2+}$. The second and third peaks may reflect rapid mobilization from compartments with a high and moderate turnover rate, respectively. The weak positive or inverse correlations in between these peaks could reflect the rapid uptake of $Hg(II)^{2+}$ and MeHg by these compartments. However, because the peaks occur at multiples of 4 to 6 days, which is roughly the annual average HRT calculated for Cell 3, the underlying influence of HRT cannot be ruled out. The Sum Lag results show a similar pattern, but the variability between peaks is buffered by summing over that lag period rather than using the instantaneous daily load for that lag period.

For Cell 5, a similar pattern of responses is observed, but the first peak at Lag-2 days is substantially muted relative to Cell 3 (e.g., r = 0.18 and 0.10 for Cell 5 MeHg and %MeHg versus r = 0.63 and r = 0.95 for the corresponding Cell 3 outflow constituents). The second set of peak occurs at Lag-4 days (r = 0.85, 0.89, and 0.86 for THg, MeHg, and %MeHg, respectively), while the third and fourth occur at Lag-8 (r = 0.96, 0.96, and 0.84, respectively) and Lag-12 (r = 0.96, 0.99, and 0.85, respectively) days. In between these peaks the correlations become weakly positive or negative, and after the last peak the correlations become weakly negative. There are no peaks at Lag-7, Lag-14, or Lag-21 days, so it is unlikely that the correlations are artifacts of the linear interpolation between weekly sampling events or that they are directly related to the underlying influence of its annual average HRT. For purposes of comparison, the THg concentration calculated from dilution of the annual Cell 5 THg load with the annual Cell 5 outflow is 4.92 ng/L, as compared to the annual average for the reporting period of 0.87 ng/L. Again the most likely explanation for the discrepancy is absorption to living, dying, and dead plant biomass, floc, and surficial peat soil and/or seepage into the underlying soil horizon.

Inflow THg and MeHg Loads Versus Outflow THg, MeHg, and % MeHg Concentrations

For the purpose of evaluating the influence of inflow THg and MeHg loads on outflow THg, MeHg, and %MeHg concentrations, the outflow concentrations were paired with corresponding inflow load at the same time (Lag-0), one day before (Lag-1), and so on up to 14 days (Lag-14), then 21 days (Lag-21), 28 days (Lag-28), 56 days (Lag-56), and 84 days (Lag-84). The Pearson correlation coefficients were then calculated. The cycle of analysis was then repeated with the load sum over those same periods. The results for Cell 3 THg and MeHg loads and Cell 5 THg and MeHg loads are set forth in **Tables 9A** through **9D**, respectively. For Cell 3, there is no significant correlation between outflow THg and inflow THg load across the entire spectrum of lag-correlation analysis, while MeHg and %MeHg show an immediate influence that persists out to Lag-28 days. This suggests that something other than the inflow load is making a substantial contribution to the outflow THg concentration, while the inflow load for MeHg and %MeHg, which are strongly co-correlated with inflow THg load, are making an immediate and sustained contribution with a memory much longer than the average annual HRT for Cell 3. This is supported by the inflow MeHg load analysis.

The pattern in Cell 5 is different. For Lag-0 and Lag-1, the correlations with THg and MeHg or %MeHg are slightly positive or negative. At Lag-2, the correlations with THg and MeHg increase dramatically (r = 0.86 and 0.62, respectively), re-peak at Lag-5 and persist out to Lag-10 days. Concurrently, %MeHg shifts from weakly negative at Lag-2 (r = -0.02) to weakly positive Lag-3 through Lag-10 days, then weakly negative again, with intervening peaks out of phase with either THg or MeHg at Lag-4 and Lag-28 days, albeit with a weak positive Pearson correlation coefficient (r = 0.41). This suggests that Cells 3 and 5 are processing point source $Hg(II)^{+2}$ very differently. By contrast, the processing of the diffuse rainfall source of $Hg(II)^{+2}$ appears to be similar. The pattern of the results of the inflow MeHg load correlation analysis were also different, with the correlations with THg and MeHg starting high at Lag-0 (r = 0.83 and 0.71, respectively) and remaining high through Lag-21 days (r = 0.87 and 0.68, respectively), while %MeHg remained weakly positive or negative from Lag-0 (r = 0.10) through Lag-56 but peaks at Lag-84 (r = 0.50). This likely indicates that influence of $Hg(II)^{+2}$ point source load on internal MeHg production is initially inconsequential but that the slow processing of point source $Hg(II)^{+2}$ into MeHg occurs on a much longer time scale. The sum load correlations for Cell 3 and Cell 5 show similar patterns, albeit with lower peak magnitudes and longer persistence.

Surface Water Quality versus THg, MeHg, and % MeHg

The following parameters were monitored biweekly at the common inflow at G-600, Cell 3 outflow at G-393B, and Cell 5 outflow at G-354C: temperature, dissolved oxygen (DO), pH, specific conductance (SPEC CON), total suspended solids (TSS), turbidity, color, ammonium (NH_4), TKN, TP, orthophosphate (OPO_4), total dissolved phosphate ($TDPO_4$). In addition, these parameters are monitored every-other-biweekly period (13 times/yr): alkalinity (ALK), hardness (HARD), DOC, nitrate+nitrite (NO_x), SO_4, SiO_2, Cl, Na, K, Mg, Ca, and Fe. To evaluate their influence on THg, MeHg, and %MeHg in the Cell 3 and Cell 5 outflows, the outflow water quality data were paired with the corresponding mercury species values (Lag-0). The analysis was then repeated with Lag-1 (4 weeks previous), Lag-2 (8 weeks previous), and Lag-3 (12 weeks previous). For the biweekly parameters, there were n = 11 pairs. For the every other biweekly parameters, there were n = 10 pairs. For Lag-1, Lag-2, and Lag-3 analyses there were one, two, and three less pairs, respectively. The results are summarized in **Tables 10A** through **10E**.

The intra-correlations among G-600 constituents are set down in **Table 10A**. At G-600, unfiltered THg exhibited strong positive correlations with Lag-0 total phosphate (TPO_4) (r = 0.96), OPO_4 (r = 0.94), and color (r = 0.91), and strong inverse correlations with Ca (r = -0.89), Cl (r = -0.72), and ALK (r = -0.68). The strong inverse relationship with specific conductance is virtually identical to that of Ca and probably is the result of a strong positive co-variance (See **Table 12A**). There was a weak positive correlation between Lag-1 THg and Lag-0 THg (r = 0.34). The Lag-1 positive correlation with TSS increased substantially from nonexistent to nearly moderate (r = 0.56), while all other positive correlations weakened substantially. The inverse correlation with TKN switched from very weakly negative to nearly moderately positive (r = 0.44). The Lag-1 inverse correlations with DOC, Fe, and SO_4 increased from weak (r = -0.14, -0.44, and -0.32, respectively) to nearly moderate (r = -0.64, -0.54, and -0.56, respectively). The inverse relationship with ALK increased from moderate (r = -0.68) to strong (r = -0.83). Lag-2 restored the strong positive correlations with pH, turbidity, and TSS. It retained the moderate inverse correlations with DOC, Fe, and SO_4. The strong inverse relationship with ALK decreased to moderate (r = -0.69). The influence of hardness on THg remained virtually constant across all timeframes (r = -0.57, -0.53, and -0.59, respectively).

For G-600 MeHg, the strongest positive correlations were with THg (r = 0.95), TPO_4 (r = 0.95), OPO_4 (r = 0.94), and color (r = 0.91) but not with turbidity or TSS, for which the correlations were virtually nonexistent. The strongest inverse correlations were with Ca (r = -0.87), Cl (r = -0.70), ALK (r = -0.68), HARD (r = -0.62), and Fe (r = -0.46). For Lag-1, the positive co-correlations with THg, TPO_4, OPO_4, and color have weakened substantially (r = 0.52, r = 0.44, r = 0.27, and r = 0.28, respectively), while the co-correlation with itself is weak (r = 0.44). There were no strong positive correlations, and the strongest positive correlation was with TSS. For Lag-1, the moderate inverse relationship with ALK has increased to strong (r = -0.83), while that for DOC has increased from very weak (r = -0.17) to moderate (r = -0.61). SO_4 increased from weak (r = -0.32) to moderate (r = -0.59), and Cl and Fe have increased (r = -0.80 and -0.53, respectively). Conversely, the correlation with Ca has decreased (r = -0.76). The Lag-1 correlations with pH (r = -0.61) and DO (r = -0.60) weakened substantially (r = -0.17 and -0.09, respectively). For Lag-2 correlations, the influence of TSS remained roughly the same as with Lag-1, while the very weak positive correlation with pH (r = 0.17) increased substantially (r = 0.88). The weak to moderate inverse relationships with ALK, HARD, SO_4, and Fe increased to moderate. The inverse correlation with NH_4 increased from r = -0.43 for Lag-1 to r = -0.76 for Lag-2, while that for NO_x decreased from r = -0.63 to r = -0.47. The most substantial decrease in positive influence were with TPO_4 (r = 0.065) and OPO_4 (r = -0.15). Lag-3 positive and negative correlations generally decrease in absolute magnitude from Lag-2, albeit not significantly so, while those for Lag-4 decrease substantially in magnitude.

At the downstream end, the relationships with G-393B and G-354C show similar patterns to that in G-600. At G-393B (See **Table 10B**), Lag-0 MeHg is strongly positively co-correlated with THg (r = 0.83), so the same pattern of magnitude and sign of correlation holds for each. MeHg was strongly positively correlated with TPO_4 (r = 0.87), OPO_4 (r = 0.84), turbidity (r = 0.80), TN (r = 0.64), NH_4 (r = 0.81), and color (r = 0.83). The strongest inverse correlations were with ALK (r = -0.92), Cl (r = -0.83), HARD and Ca (r = -0.69), $TDPO_4$ (r = -0.67), SiO_2 (r = -0.58), DOC (r = -0.49), SO_4 (r = -0.47), and Fe (r = -0.37). With Lag-1, all of the positive and negative correlations with THg have virtually disappeared, and all of the MeHg positive and negative correlations have weakened substantially, while those with %MeHg have increased in absolute magnitude substantially. The strongest positive %MeHg correlations with Lag-1 parameters are with TPO_4 (r = 0.96), OPO_4 (r = 0.93), NH_4 (r = 0.87), TKN (r = 0.85), turbidity (r = 0.89), and color (r = 0.71). The strongest inverse correlations are with ALK (r = -0.92), Cl (r = -0.79), DOC (r = -0.56), and pH and $TDPO_4$ (r = -0.55), and Ca and HARD (r = - 0.44 and -0.43, respectively). For Lag-2, all of the positive and negative correlations between %MeHg and the water quality parameters have virtually disappeared, and those with MeHg remained generally weak or weakened further. The positive correlations with THg have increased for some parameters substantially, e.g., NH_4 (r = 0.72), TKN (r = 0.71), and turbidity (r = 0.69). Correspondingly, some of the inverse correlations for THg have also increased substantially, e.g., ALK (r = -0.71), Cl (r = -0.65), SO_4 (r = -0.57), and DOC (r = -0.58). For Lag-3, THg positive and negative correlations have weakened, while those for MeHg and % MeHg have strengthened, albeit not to the same degree as for Lag-0 and Lag-1, respectively.

Table 10C summarizes the results of the correlation analysis of the influence of Cell 5 outflow (G-354C) constituents on each other. The Lag-0 positive and negative correlations with THg are very weak to weak, including the correlation between THg and MeHg. (This is also consistent with the observed apparent disconnect between THg and MeHg or %MeHg in Cell 5, per the analysis of the relationship with stage and HRT summarized in a preceding subsection and with inflow THg and MeHg loads summarized in the immediately preceding subsection). Conversely, the Lag-0 MeHg positive correlations with TPO_4 (r = 0.98), TKN (r = 0.85), OPO_4 (r = 0.75), and NH_4 (r = 0.54) are moderate to strong, as are the inverse correlations with Cl (r = -0.86), ALK (r = -0.85), DOC (r = -0.66), Ca (r = -0.63), and SO_4 (r = -0.60). Almost without exception, %MeHg exhibited almost the same magnitudes of positive and negative correlation values. For Lag-1, the THg, MeHg, and %MeHg correlations have weakened, but the patterns of relationships remain substantially the same as for Lag-0. For Lag-1, there are no strong positive correlations for THg, MeHg, or %MeHg, but the inverse correlations between MeHg and %MeHg with several water quality parameters have increased substantially. The strongest inverse correlations for MeHg are with pH (r = -0.99), SPEC CON (r = -0.93), TKN (r = -0.85), Color (r = -0.77), ALK (r = -0.66), Cl (r = -0.65), DOC (r = -0.54), and $TDPO_4$ (r = -0.53). The same pattern is observed for %MeHg. For Lag-2, the THg correlations remain weak, but the inverse correlations for MeHg have increased relative to %MeHg. For example, while the inverse correlation with DOC increased to r = -0.78 for %MeHg, the increase for MeHg was r = -0.90. For Lag-3, the strongest positive correlations for MeHg are similar to those for Lag-0. For example, NH_4 (r = 0.60), turbidity (r = 0.54), TPO_4 (r = 0.52), OPO_4 (r = 0.47), and TKN (r = 0.41), but the strongest inverse correlations are now with $TDPO_4$ (r = -0.75), Cl (r = -0.67), ALK (r = -0.64), and NO_x (r = -0.59).

In addition to the intra-correlations among the constituents in the inflow and the two outflows, the inter-correlations among the constituents in the inflow with those in the two outflows must also be evaluated. Focusing first on G-600 versus the Cell 3 outflow (G-393B), a perusal of **Table 10D** indicates that there is a weak positive correlation between THg (r = 0.33) but a moderate to strong correlation with MeHg and %MeHg (r = 0.74 and 0.88). By contrast, those same correlations at the Cell 5 outflow (G-354C) are r = 0.03, r = 0.38, and r = 0.45, respectively, indicating that the link between inflow and outflow is weaker in Cell 5 than Cell 3, which would be consistent with the differences in their respective HRTs. The strongest positive correlations of G-600 TP (r = 0.71), color (r = 0.68), and OPO_4 (r = 0.61) with G-393B MeHg and with %MeHg (r = 0.94, r = 92, and r = 0.80, respectively). The strongest inverse correlations between G-600 and G-393B MeHg are with ALK (r = -0.96), Ca (r = -0.94), Cl (r = -0.92), SPEC CON (r = - 0.72), SiO_2 (r = -0.70), HARD (r = -0.69), Fe (r = -0.68), SO_4 (r = -0.65), and DOC (r = -0.52). %MeHg follows the same pattern, but the magnitudes of the correlation coefficients are generally slightly lower. For Lag-1, the same patterns are observed, except that most of the positive and negative correlations have weakened slightly, and those with TPO_4 and OPO_4 have weakened substantially. By contrast, the inverse correlation with $TDPO_4$ remained relatively constant. For Lag-2, the correlation between G-600 TPO_4 and G-393B MeHg and %MeHg are now virtually zero, and those for OPO_4 have become slightly negative. Correspondingly, the inverse correlation between G-600 $TDPO_4$ and MeHg or %MeHg remains moderately negative. Lag-3 positive and negative correlations between G-600 parameters and G-393B THg, MeHg, and %MeHg have generally further weakened relative to Lag-2, but now both TP and OPO_4 exhibit weak inverse correlations with MeHg (r = -0.15 and -0.22, respectively) and %MeHg (r = -0.12 and -0.17, respectively). Lag-4 correlations did not strengthen any of the positive or negative correlations relative to Lag-3, possibly either because the memory effect has faded by then or because there were so few data left with which to pair inflow and outflow chemistries.

The focus now shifts to the influence of G-600 inflow chemistry on G-354C outflow THg, MeHg, and %MeHg concentrations. The results of the exploratory data analysis are iterated in **Table 10E**. Lag-0 Cell 5 outflow MeHg is positively correlated most strongly with turbidity (r = 0.70) and TSS (r = 0.58). It is inversely correlated most strongly with ALK (r = -0.90), Cl (r = -0.80), and DOC (r = -0.66). For %MeHg, the positive correlations with these same parameters are somewhat higher, while those with which MeHg was inversely correlated are somewhat lower. For Lag-1 (preceding 4 weeks), the strongest positive correlations between outflow MeHg and %MeHg are still with turbidity and TSS, but G-600 pH has switched from weakly inversely correlated (r = -0.23) with G-354C MeHg to strongly positively correlated (r = 0.83). The inverse correlations for MeHg and %MeHg have generally weakened. For Lag-2 (preceding 8 weeks), the correlations between outflow MeHg and %MeHg and the inflow turbidity and TSS are now weakly negative, as are the correlations with TPO_4 and OPO_4. Lag-2 Fe and SO_4 inverse correlations (r = -0.65) increased substantially over the corresponding L-1 values (r = -0.46). For Lag-3 (preceding 12 weeks), in general the positive and negative correlations with MeHg and % MeHg have weakened. There were some exceptions to this rule, however. The inverse correlation between TKN and %MeHg switched from weakly to moderately negative (r = -0.43) to moderately positive (r = 0.56). The same pattern was exhibited by turbidity and TSS.

Surface Water Quality Loads versus THg, MeHg, and %MeHg

Tables 11A through **11C** set forth the Pearson correlation coefficients for Cell 3 and Cell 5 outflow THg, MeHg, and %MeHg paired with inflow loads for Lag-0 through Lag-14 days, Lag-21 days, Lag-28 days, Lag-56 days, and Lag-84 days. **Tables 11D** through **11F** capture the results for the sum inflow loads for those same lag periods. The results indicate that THg in Cell 3 outflow was initially most strongly positively correlated with inflow TSS (Lag-0 days r = 0.61). This influence dropped off precipitously at Lag-1 day (r = -0.04), decreasing to a peak inverse correlation at Lag-9 days (r = -0.37). It then increased monotonically from r = -0.07 at Lag-12 days to r = 0.34 at Lag-84 days. This suggests that rapid settling of suspended solids is quickly removing the influence of this THg source. Other inflow constituents with potential influence on transport processes (i.e., DOC), showed a similar pattern, but the second positive peak occurred at Lag-28 days. The highest inverse correlations at Lag-9 days were with NO_x, Cl, and SO_4 (r = -0.54,
-0.53, and -0.42, respectively), while the highest positive correlations at Lag-28 were with Ca, Fe, SiO_2, TKN, and DOC (r = 0.73, 0.72, 0.72, 0.68, and 0.68, respectively). Cell 5 exhibited a different pattern, with Lag-0 TP, SiO_2, Ca, Fe, and DOC having the highest positive correlation coefficients (r = 0.82, 0.71, 0.70, 0.69, and 0.67, respectively) and TSS the lowest (r = 0.19). Further, the strength of these positive correlations generally persisted through Lag-21 days and decreased to weakly to moderately inverse correlations at Lag-84 days.

For Cell 3 MeHg, TP was the strongest positive Lag-0 correlate (r = 0.75). It peaked at Lag-3 days and remained roughly the same through Lag-14, then decreased to r = 0.56 at Lag-21 and r = 0.33 at Lag-28. TKN, CA, SiO_2, and DOC (Lag-0 r = 0.49, 0.47, 0.46, and 0.46, respectively) followed a similar pattern to TP, albeit with lower absolute magnitudes. TSS peaked at Lag-0 (r = 0.46), rapidly declined to very weak correlations, then peaked again at Lag-56 days (r = 0.73). Cell 5's pattern was similar to that for Cell 3 for most of the constituents, but the differences in the magnitudes of the correlation coefficients between TP and the other constituents were not as great. Also, the peak for most constituents occurred at Lag-7 days rather than Lag-3 days, and the influence of TSS peaked at Lag-3 days and reached its strongest inverse correlation value at Lag-56 days. The sum load lags showed similar patterns as the load lags, except that the influence was somewhat muted initially, and it persisted for longer periods because the loads were being summed.

Soil Quality versus Soil Quality

The influences of soil quality on the absolute and relative concentrations of THg and MeHg were evaluated in several ways. First, the averages were taken for STA-6 Cell 3, Cell 5, and combined for all four sampling events. The univariate correlation analysis was carried out on all possible soil constituent data pairs to assess the significance of between-cell differences under average conditions across seasons. **Tables 13A** through **13C** iterate the results of these exercises. The ratio of Cell 3 and Cell 5 results are displayed in **Table 5D**. To evaluate the effect of the maturation of the soil chemistry over time following reflooding, the analysis was then repeated for each of the four individual soil sampling events for the two sampling sites in Cell 3 and the four sampling sites in Cell 5. To quantify the effect of time lag influences on soil chemistry, the analysis was carried out by pairing the Lag-0 result with the Lag-1 (12 weeks previous) result at the same site. The effect of changes in soil storage between sampling events was then quantified in terms of absolute change and percent change from the preceding event. This was paired with the Lag-0 soil concentration to evaluate the influence of a mass flux in or out of the soil on soil chemistry intra-correlations.

The first cycle of correlation analysis of the soil parameters involved the combined averages of the four sampling events for Cells 3 and 5 carried out in August and October 2002 and January and April 2003. Most importantly, the %MeHg in soil is not correlated strongly with any other soil parameter when paired with combined Cell 3 and Cell 5 data collected concurrently. However, the correlation with soil total magnesium (TMg) (r = -0.42 to -0.66), total calcium (TCa) (r = -0.32 to -0.53), and total manganese (TMn) (r = -0.25 to -0.53) increases substantially with the preceding sampling event and each succeeding sampling event. However, both TMg and TCa are strongly co-correlated with each other (r = 0.93) and with TMn (r = 0.78), so while TMn may be controlling soil redox potential and thus sulfur speciation and sulfate-reducing bacteria activity, this is unlikely to be the case for TMg and TCa. However, to the extent that TMg and TCa are acting to increase TMn activity (and thus its influence on soil redox potential) by (1) weakening its affinity for soil particle surfaces, (2) increasing particle surface charge, or (3) competing with TMn for soil binding sites, the inverse correlation between soil TMg or TCa and %MeHg may be cause-and-effect and not a mere association. Interestingly, the correlations between %MeHg and soil total iron (TFe), total sulfur (TS), and acid volatile sulfide (AVS) are virtually nonexistent, whether paired with the concurrent value or each of the preceding sampling events. This is the opposite of what was observed in STA-2, where the inverse correlations between %MeHg and TFe, TS, and AVS are moderate, while those with TMn are virtually nonexistent, and the inverse correlations with TMg and TCa are weak. However, there are only n = 4 soil sampling events to analyze for the combined Cell 3 and Cell 5 averages, so these results must be considered of limited value.

For average conditions across all four sampling events, in Cell 3 the strongest albeit weak to moderate positive correlation between soil MeHg and soil %MeHg is with Fe (r = 0.47 and 0.49, respectively) and TP (r = 0.41 and 0.44, respectively). The strongest inverse correlation is with soil total sulfur (TS) (r = -0.56 and -0.53, respectively). The apparent positive influence of TP on soil MeHg concentration and %MeHg may be a spurious artifact of the strong co-correlation between TP and Fe (r = 0.87), however. AVS, which was expected to have a strong inverse relationship with soil MeHg concentration or %MeHg concentration, had an extremely weak inverse influence (r = -0.07). Interestingly, AVS is moderately to strongly positively co-correlated with Fe (r = 0.70), and it is weakly to moderately co-correlated with TS (r = 0.46). Therefore, the positive and inverse influences of Fe and TS appear to cancel out through AVS. AVS is believed to be comprised primarily of iron+sulfur complexes (Fe_xS_y), which can be liberated as hydrogen sulfide (H_2S) gas with the addition of a mineral acid solution of intermediate strength.

For average conditions across all four sampling events in Cell 5, the strongest positive influences on soil MeHg and %MeHg concentrations were TN (r = 0.65 and 0.49, respectively), AVS (r = 0.49 and 0.02, respectively), and THg (r = 0.39). (No correlation should be calculated for %MeHg with THg or MeHg, because it is derived by dividing the latter by the former). The strongest inverse influences on MeHg and %MeHg concentrations were % ash (r = -0.78 and -0.30, respectively), TP (r = -0.57 and -0.67, respectively), TMg (r = -0.17 and -0.75, respectively), or TCa (r = -0.18 and -0.70, respectively) and TFe (r = 0.04 and -0.65, respectively). Again, TP is strongly co-correlated with TMg and TFe, and TFe with TMg (r = 0.91), so it is not clear which, if any, is having a cause-and-effect influence and which is having an apparent influence due to the strong co-correlation with one or more of the other truly influential factors.

When the Cell 3 and Cell 5 data are combined, these very different patterns of co-correlation tended to cancel each other out, weakening the positive and negative influences on the soil MeHg and %MeHg concentrations. The biggest difference between Cell 3 and Cell 5 soil chemistry influences on MeHg and %MeHg (see **Table 13D**) was the nearly 12-fold increase in the correlation coefficient between TFe and MeHg between Cell 5 and Cell 3. The former did experience an anomalous MeHg event this year, and the latter did not. The next most substantial differences were with the correlations between TS and AVS and MeHg or %MeHg concentrations. The differences in these correlations suggest fundamental differences in the sulfur and iron biogeochemistries between cells, and these biogeochemistries are thought to have the most direct influences on mercury speciation in surficial soils and porewater where $Hg(II)^{+2}$ is most rapidly methylated (Gilmour et al., 1998a,b).

To evaluate the changes in the influences of soil chemistry on soil MeHg and %MeHg concentrations over time, the exploratory data analysis was then repeated for each individual sampling event for both cells. Those results are iterated in **Tables 14A** through **14D**. The combining of the data for the individual cells was necessitated by the fact that there were only two sampling sites in Cell 3. Unfortunately, this precluded the evaluation of the difference in the evolution of Cells 3 and 5 soil chemistries and their respective influences on soil MeHg production over time. The most significant, increasingly positive temporal trends in the influence on soil MeHg and %MeHg were for soil moisture content (r = 0.66 and 0.59, respectively, in August 2002 to r = 0.91 and 0.82, respectively, in April 2003) and AVS (from r = 0.64 and 0.61, respectively, for the October 2002 sampling event to r = 0.92 and 0.75, respectively, for the April 2003 sampling event). The largest increases in inverse correlations with MeHg and %MeHg concentrations was with TP (r = -0.23 and -0.21, respectively, in August 2002 to r = -0.40 and -0.39, respectively, in April 2003). Conversely, the largest decrease in a positive correlation with MeHg and %MeHg was with TFe (r = 0.56 and 0.39, respectively, in August 2002 to r = 0.31 and 0.17, respectively, in April 2003). The largest decrease in an inverse correlations was with percent ash (from r = -0.64 and -0.56, respectively in August 2002 to r = -0.39 and r = -0.45, respectively, in April 2003). One more soil sampling event for STA-6 was scheduled for July 2003 and should add to our understanding of the persistence of these trends and their significance from the standpoint of the influence of evolving soil chemistry on MeHg production, both in absolute terms and relative to the soil THg content.

The next phase of the exploratory data analyses involved the evaluation of the influence of soil mass storage on the absolute and relative concentrations of MeHg. Specifically, the analysis considered the influence of soil constituent mass on MeHg concentration, the soil constituent mass on MeHg mass, the change in soil constituent mass on change in MeHg mass, and the percent change in soil constituent mass and the percent change in MeHg mass, respectively. The mass of constituent in soil was calculated by multiplying the concentration by the bulk density, 0.04 m soil depth, and the area of the cell. The lag-correlations for soil samples collected at Lag-0 (concurrently), Lag-12 weeks, Lag-24 weeks, and Lag-36 weeks were evaluated for MeHg concentration and MeHg load. However, only Lag-0 and Lag-12 weeks could be evaluated for change in load and percent change in load, because of the reduction in the number of sample pairs necessitated by these calculations. **Tables 15A** and **15B** codify those results, which are also depicted in **Figures 10A** through **10D.**

The strongest positive correlations between MeHg soil concentration and Lag-0, Lag-12 weeks, Lag-24 weeks, and Lag-36 weeks were TFe, MeHg, AVS, and TMg or THg (r = 0.47, 0.89, 0.99, and 0.96 or 0.92), while the strongest inverse correlations for those same periods were TS, THg, TN, and ash content (r = -0.56, -0.67, -0.82, and -0.56). For MeHg load, the positive and inverse correlations in Cell 3 in that same order were TFe, MeHg, TS, and TS (r = 0.76, 0.75, 0.59, and 0.69) and TS, TS, TN, and TN (r = -0.47, -0.66, -0.72, and -0.63). Cell 5 showed a different pattern of inter-correlations. Positive correlations of MeHg concentrations for Lag-0, Lag-12, Lag-24, and Lag-36 weeks were strongest with TN, TN, TN, and TS. The strongest inverse correlations for those same periods were with ash, ash, AVS, and TFe (r = -0.78, -0.68, -0.69, -0.95). In reverse lag order, MeHg load was most strongly positively correlated with TN, MeHg, TN, and TN (r = 0.67, 0.38, 0.72, and 0.88), but the inverse correlations were strongest with TP, TP, TP, and TMn (r = -0.24, -0.40, -0.68, and -0.79) in that same lag order.

A comparison of the Cell 3 and 5 correlations is also instructive. For soil MeHg concentration, Cell 3 exhibited weak positive correlations with soil TP at all lags (r = 0.41, 0.31, 0.17, and 0.44, respectively), while Cell 5 TP exhibited a moderate inverse correlation that was more consistent across all lags (r = -0.57, -0.64, -0.63, and -0.55). When load is considered, Cell 3 switches from a positive correlation for Lag-0 and Lag-12 weeks (r = 0.62 and 0.18) to a negative correlation at Lag-24 and Lag-36 weeks (r = -0.54 and -0.28). Cell 5 still exhibits negative correlations for all lags (r = -0.24, -0.40, -0.68, -0.38). Cell 3 exhibits a strong positive correlation between MeHg concentration and AVS at Lag-24 weeks (r = 0.99), while Cell 5 exhibits a moderate inverse relationship (r = -0.69). TN in Cell 3 is initially weakly positively correlated with MeHg load (r = 0.39), but it switches to an inverse relationship for lags 12, 24, and 36 weeks (r = -0.15, -0.54, and -0.44), while Cell 5 TN shows only positive correlations (r = 0.67, 0.25, 0.72, and 0.88) for those same lags. Cell 3 TS switches from inverse correlations with MeHg concentration and load for Lag-0 and Lag-12 weeks to a positive correlation for Lag-24 and Lag-36 weeks, but Cell 5 TS exhibits only positive correlations with both variables for all lags. Clearly Cell 3 and Cell 5 biogeochemistries are very different, not only in their soil constituent inter-correlations at Lag-0, but in the way they respond to time lags, as well.

Soil Quality versus Surface Water Quality

The inflow surface water constituent data were then paired with the combined soils data from both cells (**Table 16A**) to evaluate the influence of inflow water chemistry on interior soils chemistry. Then soils data from each cell was paired with outflow water constituent concentration data from the immediately succeeding sampling event to evaluate the influence of soil chemistry on corresponding outflow chemistry. The cycle of analyses was then repeated with the soils data converted into the equivalent volume concentrations (mg/M3 versus mg/kg), the results of which are captured in **Tables 17A** through **17C**. The first analysis cycle was then repeated for the immediately preceding soil sampling event (Lag-12 weeks). The results are iterated in **Tables 18A** and **18B**.

The strongest positive correlations between inflow and soil MeHg were between inflow K, OPO_4, THg and MeHg (r = 0.97, 0.95, 0.81 and 0.98, respectively) and soil %MeHg (r = 0.94, 0.91, 0.89 and 0.95, respectively) for n = 24 data pairs. The strongest inverse correlations between inflow and combined soil constituents were between soil MeHg and pH, DO, Na, and Cl (r = -0.88, -0.75, -0.92, and -0.87). The same pattern held for %MeHg. Soil TS was positively correlated with inflow DO (r = 0.79), pH (r = 0.78), and Na (r = 0.76). It was strongly inversely correlated with TFe, NH_4, K, DOC, $TDPO_4$, and NO_x (r = -0.86, -0.77, -0.76, -0.76, -0.72, and -0.65, respectively). AVS was moderately to strongly positively correlated with inflow Na, DO, ALK, HARD, and Cl (r = 0.79, 0.73, 0.70, 0.65, and 0.62) and strongly inversely correlated with THg, SiO_2, NO_x, $TDPO_4$, K, and Fe (r = -0.98, -0.81, -0.74, -0.61, -0.60, and -0.55, respectively).

An analysis of the correlation between the THg in outflow surface water and Cell 3 soil parameters revealed that the strongest positive correlation with soil MeHg measured at the same time (r = 0.68), while the inverse correlations increase in the order THg (-0.68), TP (r = -0.69), TFe (-0.81), and TMn (r = -0.91). When the outflow THg is paired with the soil sampling values from the preceding sampling event, the inverse correlations with THg (r = -0.67 to r = -0.98) and TN (r = -0.47 to r = -0.87) increase substantially, while the other correlations weaken. For outflow MeHg, a strong inverse correlation is observed with Lag 0 soil THg (r = -0.92). Perhaps this should not be surprising, because it is likely that the release of labile $Hg(II)^{+2}$ from the surficial soil feeds the production of MeHg following rewetting after a period of dryout. However, this inverse relationship weakens substantially when outflow MeHg is paired with the preceding soil sampling event 12 weeks prior. Conversely, there is no correlation between average Cell 3 soil MeHg and outflow MeHg for n = 4 samples when concurrent samples are paired. The positive correlation increases to r = 0.98 for n = 3 samples when paired with the preceding soil sampling event. However, with only n = 3 samples of soil sample averages for AVS (one set was lost to flagging in the first sampling event), these results cannot be considered compelling, only suggestive.

In Cell 3 there is a weak positive correlation between outflow MeHg paired with concurrent soil AVS (r = 0.35), but in Cell 5 there is a strong inverse relationship (r = -0.99). Cell 5 shows a strong positive relationship with soil MeHg and a strong inverse relationship with soil THg when outflow MeHg is paired with the concurrent results. These relationships remain strong when the outflow MeHg is paired with the immediately preceding sampling event and the one preceding that. The inverse relationship with AVS is extremely strong (r = -0.99), but as noted above, the extremely small sample set makes such apparently strong correlations suspect. That said, the inverse correlations decrease in the order AVS, % moisture (r = -0.81), TP (r = -0.74), and TS (r = -0.72). The conversion of the soils concentrations from mg/kg to mg/M^3 had some effect on the pattern of correlations. For example, the inverse correlation between inflow sulfate concentration and soil TS increased from a tepid r = -0.35 to a torrid r = -0.97 with the conversion. When the outflow MeHg is paired with the preceding soil sampling event (Lag-12 weeks), none of these inverse correlations weaken and that for soil moisture increases, suggesting that the degree of antecedent dryout influences the magnitude and duration of soil excess MeHg production.

Rain and Stage versus Soil Quality

In the n = 4 soil sampling events, Cell 5 soil THg concentration was strongly inversely correlated with THg and MeHg inflow and rainfall loads averaged over the previous 4 weeks and the previous 12 weeks and with the preceding 4-week average water depth. However, it was strongly positively correlated with the average water depth of the preceding 12 weeks. Cell 3 exhibited the same pattern, but the correlation coefficients were weak to moderate, with the exception of the average water depth of the preceding three months, which exhibited a moderate to strong inverse correlation. Cell 3 and Cell 5 soil MeHg and %MeHg were strongly positively correlated with all preceding monthly and quarterly averages, with the exception of the preceding quarterly average stage, which exhibited a strong inverse correlation. This is the mirror image of the Cell 3 and Cell 5 soil THg correlation pattern. However, for Cell 5 the correlations with the preceding monthly averages were stronger than with the preceding quarterly averages, with the exception of water depth. This could suggest that Cell 5 soil chemistry responds more rapidly than Cell 3 to input THg and MeHg loads and "forgets" the effect of the second and third antecedent month inflow loads more quickly than does Cell 3.

DISCUSSION

SIGNIFICANCE OF DIFFERENCE BETWEEN G-254A AND G-254C CONCENTRATIONS

The average (and standard deviation) of THg and MeHg at G-254A for the period June 2002 to May 2003 were 0.865 (+/- 0.419) ng/L and 0.159 (+/- 0.132) ng/L, respectively, while the corresponding values for G-254C were 0.869 (+/- 0.442) ng/L and 0.136 (+/- 0.116) ng/L, respectively (D. Rumbold, SFWMD, personal communication). Using a paired t test, there was no statistically significant difference at the 95th percentile confidence level between G-254A and G-254C for THg ($t = 0.241$, $df = 9$ [one sample did not meet QC criteria], $P = 0.815$) or MeHg ($t = -0.295$, $df = 10$, $P = 0.774$). Although a propagated error analysis was not carried out, it is likely that this is also the case for the annual THg and MeHg loads calculated using either G-254A or G-254C versus the average of the two, which was used for the mass budget calculations discussed in the next section.

INTERPRETATION OF THE SURFACE WATER AND SOILS MONITORING DATA RESULTS

The fraction of THg converted to MeHg in surficial soils, expressed as %MeHg, is an indicator of the net MeHg production rate occurring there. The %MeHg in Cell 3 and Cell 5 surficial soils declined progressively (monotonically) over time, with Cell 3 peaking initially at 6.3% in August 2002 and then declining to 2.5%, 2%, and 1.75% in October 2002 and January and February 2003, respectively. For those same soil sampling events the corresponding Cell 5 values were 1.8%, 1.2%, 1.1%, and 1%, respectively. For comparison, the Everglades-wide average observed by the USGS in its 1995-1998 ACME survey of nine representative interior marsh sites was 1.75%. This suggests that even though Cell 3 did not experience a MeHg anomaly in the summer of 2002 as it did in 2001, it is more Everglades-like in its ability to convert $Hg(II)^{+2}$ to MeHg in surficial peat soil/sediment than is Cell 5. This is borne out by the ratios of the %MeHg in Cell 3 versus Cell 5, which ranged from 3.5 times at the beginning of the study to 1.7 times for the last soil sampling event. One can infer from this that STA-6 Cell 3 is more efficient at converting $Hg(II)^{+2}$ to MeHg under first-flush conditions for the short term and, perhaps, for the long term as well.

Even though a Cell 3 MeHg anomaly was not detected in this reporting year, on a spatial and annual average basis, the %MeHg in Cell 3 soils was 3.5 times that in Cell 5 soils at the onset of the Cell 5 anomaly. It declined to 1.7 times for the last sampling event in April 2003, suggesting that Cell 3 is more efficient at producing MeHg than Cell 5, both in the short term and, perhaps, for the long term. It is also possible that the much higher seepage rate in Cell 3 more than compensates for the higher average MeHg production rate in Cell 3 than in Cell 5, reversing the flux of excess MeHg from up into the water column to down below the 4-cm soil horizon (King, 2000). Another hypothesis is that, due to the extremely short Cell 3 HRT, it is possible that Cell 3 did, in fact, experience a MeHg anomaly that was missed because of the timing of the initiation of more frequent mercury monitoring in STA-6.

INTERPRETATION OF THE MASS BUDGET ANALYSIS RESULTS

All estimates of inflow, seepage, evasion, and outflow mass transport in this exercise are uncertain, and the magnitude of that uncertainty varies by pathway. The first source of uncertainty is in the inflow and outflow rates into and out of Cells 3 and 5. The second source of uncertainty stems from the expedient of sampling of the common inflow at the G-600 pump station rather than at each individual culvert flowing into Cell 3 or Cell 5. This is because THg and MeHg sorbed to settling particles can be removed from the water column of the inflow distribution canal. Some resuspension of these settled particles may occur at later dates under higher flow conditions, so the discrepancies introduced may not be significant on an annual average basis. However, this is a hypothesis that requires empirical data to accept or reject. Third, the use of linear interpolation to fill in daily THg and MeHg concentration data collected at 4-week intervals introduces substantial uncertainty into the inflow and outflow load estimates. The uncertainty is likely to be greater for the outflow than the inflow, because the variability of the G-600 inflow THg and MeHg concentrations (THg RSD = 1.18/1.57 = 0.75; MeHg RSD = 0.35/0.36 = 0.99) are less than Cell 3 at G-393B (THg RSD = 1.66/1.48 = 1.12; MeHg RSD = 0.87/0.53 = 1.65) and Cell 5 at G-354C (THg = 0.42/0.87 = 0.48; MeHg = 1.83/0.70 = 2.62). Moreover, the rate of decrease of the interior and outflow concentrations of THg and MeHg in both cells may have been atypically rapid due to the rapid increase in interior cell stage (volume dilution) and to the rapid loss of the extremely high concentrations when the outflow weirs were overtopped.

Absorption to standing crop biomass and surficial soil (see **Figure 6A**) may have also played a role in reducing the first-flush THg and MeHg peak concentrations even faster than can be accounted for via volume dilution and outflow removal. As a consequence, the linear interpolation of the data, even over a four-week period, probably overestimated the amount of THg and MeHg exported from the first-flush event in Cell 5. Fourth, interior concentrations were not measured in either cell, so for Cell 3 the interior concentration was estimated as the average of the inflow at G-600 and the outflow at G-393B and for Cell 5 at G-600 as the average of outflows at G-354A and G-354C. If THg decreased and MeHg increased exponentially rather than linearly across either cell, this would have increased the uncertainty in the estimate of the mass removal via seepage, compounding the uncertainty in the seepage magnitude from the uncertainties in the water budget. Finally, for THg, the estimate of the magnitude of the loss rate for evasion of Hg(0) from open water is somewhat uncertain, and this uncertainty would be compounded by the uncertainty in the interior water THg concentration, but evasion is considered a second-order correction to the annual THg mass budget and the significance of its uncertainties will not be considered further.

Despite these uncertainties, the accuracy of the mass budget calculations using data collected every four weeks is a vast improvement over that based on data collected only every three months. This is supported by the observation that when only quarterly data are used to calculate the MeHg mass budget, and the data set includes the anomalous MeHg event in Cell 5, the estimate of MeHg export increases to approximately 70g from the approximately 40g based on the more frequent monitoring. This is because the linear interpolation of the daily MeHg concentrations leading up to and following the anomaly are biased high throughout the quarter, rather than reflecting the steep rise and fall of the MeHg concentrations on either side of the anomaly and return rapidly to more typical concentrations before and after. Conversely, if the Cell 5 MeHg mass budget is based on quarterly monitoring that missed that anomalous MeHg event, the evidence for net export of MeHg on an annual basis is weakened substantially.

The above caveats withstanding, the most significant input pathway of MeHg load to STA-6 was the inflow, while the inflow and wet and dry atmospheric deposition made roughly equal contributions to the $Hg(II)^{+2}$ load. Based on the mass budget calculations, both Cell 3 and Cell 5 removed about 50 percent of the THg load from the inflow (net importer), but Cell 5 was likely to have been a substantial net exporter of MeHg (125 to 150 percent). The most significant removal pathway for both THg and MeHg was the outflow, followed by seepage. Interestingly, seepage makes a much greater contribution to THg and MeHg removal in Cell 3 (19 percent and 31 percent of the total inputs, respectively) than in Cell 5 (7 percent and 9 percent of the total inputs, respectively). This is apparently because the rate of seepage per unit area from Cell 3 is much greater than from Cell 5. The fraction of MeHg removed via seepage is greater than that for THg, because the average MeHg concentration increases across both cells, while THg decreases. This may contribute to a more rapid response of Cell 3 to a fresh influx of bioavailable Hg(II) via inflow or rainfall and, concomitantly, to a more rapid recovery from a first-flush pulse of MeHg production. Cell 3 and Cell 5 can be calculated to have converted roughly 15 percent and 30 percent, respectively, of the $Hg(II)^{+2}$ from inputs plus change in storage into MeHg. This suggests that the anomalous MeHg event in Cell 5 was the result of conditions more favorable to maximum MeHg production, albeit over a very short period of time.

The most likely mechanism of short-term removal of $Hg(II)^{+2}$ and MeHg from the water column is sorption to settling particles, floc, unconsolidated detritus, and live, dying, and dead plant biomass in the treatment wetland, while that for long-term removal is most likely sorption to and burial with accreting peat. However, where seepage from surface water to groundwater through the accreting peat is occurring at a substantial rate, seepage can deliver bioavailable $Hg(II)^{+2}$ to the surficial peat, where MeHg is most likely being produced (Gilmour et al., 1998a,b; 1999) at a higher rate than via diffusive exchange or particle deposition. Seepage can also reduce the diffusive fluxes of $Hg(II)^{+2}$ and MeHg out of the surficial peat soil porewater, and, in extreme cases, reverse them (King, 2000). There is some evidence that this is occurring in Cell 3, because several conservative constituents were lost from surficial soil storage between the first and last sampling event. However, Cell 3 exhibited net storage of these constituents, and conservation of mass requires that they go somewhere. The most likely explanation is that they were leached below the 4-cm sampling horizon. This could also be the case for Cell 3 soil MeHg, the mass of which was calculated to have decreased more than was subsequently exported from Cell 3 in outflow at G-393B. However, MeHg is not a conservative substance, so decomposition by sunlight to $Hg(II)^{+2}$ or Hg(0) or microbial decomposition to $Hg(II)^{+2}$ cannot be ruled out as an explanation for the discrepancy between the magnitude of the mass of MeHg lost from soil storage and the magnitude of the mass of MeHg exported from Cell 3 in outflow at G-393B.

The rate of THg removal from the Cell 5 water column was greater than that calculated for flow dilution, change in storage, and seepage alone. Other removal processes must have been at work, such as transport to another compartment (e.g., soil/sediment or plant biomass). When the soil/sediment uptake pathway is added to the mass budget calculation, the fit between observed and calculated THg concentrations improved substantially, albeit in the low concentration range encountered during the last six months of the study completed during the reporting period (see **Figures 6A** through **C**). The rate of MeHg removal from the Cell 5 water column was also greater than that calculated for flow dilution, seepage, and change in storage alone. However, contrary to the experience with THg, the addition of transfer to the soil/sediment compartment to the mass budget had no discernable effect on the calculated MeHg concentrations, suggesting that internal processes of particle settling and decomposition – and not diffusive exchange – were the predominant MeHg removal processes in Cell 5 (see **Figures 6D** through **6G**).

The discrepancy between the THg concentration calculated from simple dilution and the observed outflow THg concentration strongly suggests that Hg(II)$^{+2}$ and the MeHg produced from the bioavailable fraction of Hg(II)$^{+2}$ are being taken up rapidly by other compartments in the wetland, most likely the surficial soil and plant biomass (Tetra Tech, 2003). The most rapid uptake is likely to occur by the surficial peat soil floc and microscopic plant biomass compartments on the order of 1-4 days. However, the storage capacity of these compartments is likely to be small, so the effect during peak loading events is minimal, while the subsequent release during low-flow or standing water conditions could be discernable from background noise.

Transfer of THg and MeHg to and from the Soil Reservoir

Both Cell 3 and Cell 5 appear to be importing rather than exporting a wide range of constituents with the exception of MeHg. Equally important, there is a concurrent apparent loss of constituent masses from the top layer of soil, including MeHg, suggesting that these constituents are being transported outside of the monitoring domain. The most likely explanation is that the high seepage rate in both cells is leaching these soil constituents to deeper layers of the strata and thence the underlying aquifer for subsequent subsurface transport. Yet, unlike THg and MeHg, the greater percent decrease across the gamut of soil constituents occurs in Cell 5, but the greater seepage flux rate occurs in Cell 3, so something other than the seepage flux rate alone must be governing the rate of leaching of these soil constituents. The redox potential of the soil horizon may hold part of the answer, because reduced species tend to be more labile and mobile than oxidized species in the subsurface environment, and the greater seepage flux rate in Cell 3 may be accompanied by deeper penetration of the oxic horizon, resulting in a lower fraction of constituents that can be readily solubilized and leached from the soil. If that is in fact the case, then a redox-sensitive species such as Mn should behave very differently in Cell 3 and Cell 5 surficial soils. In fact, Mn decreases by only about 7.5 percent in Cell 3 soils and about 22 percent in Cell 5 soils between the first and latest soil sampling events, while Fe, another redox sensitive species, exhibits no such difference (-23% in Cell 3 versus -24% in Cell 5). Only further study of the effect of surface water seepage chemistry and rate on the leaching rates of various constituents from the surficial soil horizon as a function of soil depth can begin to resolve the cause and effect of these differences with the required accuracy, precision, and confidence level. However, the required studies are not currently planned.

If the annual THg mass residuals for Cells 3 and 5 are divided by the respective peat accretion rate for each cell, the steady state soil THg concentration can be calculated for this set of conditions. The average soil THg concentrations in the top 4 cm of soil at the end of the last soil sampling event were 28 µg/kg and 48 µg/kg wet weight, respectively, for Cells 3 and 5. For Cell 3 and 5 soil bulk densities are 113 kg/M^3 and 295 kg/M^3, respectively. These are equivalent to annual peat accretion rates of 7 mm and 3.3 mm in Cells 3 and 5, respectively, based on the Cell 3 and 5 THg residuals. (Note that the ratio of the estimated Cell 3 and Cell 5 peat accretion rates is 2.1, which is approximately the ratio of their seepage rates.) However, there are a number of mechanisms by which Hg(II)$^{+2}$ and MeHg are transferred to and removed from the soil, several of which would complicate this otherwise straightforward analysis. For example, if accurately quantified, seepage should deliver a flux to the soil equal to the average water column concentration multiplied by the seepage depth. However, if the seepage also leaches THg from the surficial soil to deeper soil horizons, then seepage could be a net sink for rather than a net source of THg.

The ratio of the seepage fluxes between Cells 3 and 5 (13 m/yr/5.7 m/yr = 2.2x) is greater than the ratio of their THg soil load losses (234/158 = 1.5x). There are other potential loss mechanisms from the soil, however. In studies conducted for the SFWMD at the ENR Project, Lindberg and co-workers measured Hg(0) evasion rates over sawgrass and cattail canopies about 10 and 20 times the rate measured over open water under the same conditions of wind and insolation (approximately 1-2 ng/m^2-hr peak rate)(Lindberg et al., 1999; Lindberg et al., 2002). The most likely source of Hg(0) is the soil in the vicinity of the plants' roots, because an uprooted, floating cattail stand did not exhibit the effect (Lindberg et al., 2002). If rooted macrophytes are mining out some of the THg in surficial soil by converting it to Hg(0) and evading it from the wetland, this could exacerbate or ameliorate the discrepancy between the observed differences in the change in surficial soil storage of THg and the expected effect of seepage on leaching and transport of soluble mercury species below the 4-cm monitoring horizon.

To carry out the required calculations, several reasonable assumptions had to be made. First, in the absence of an update measurement of plant coverages based on photogrammetry, a reasonable estimate of rooted macrophyte cover in STA-6 Cells 3 and 5 is about 40 percent. Second, this rooted macrophyte is assumed to evade Hg(0) at a sawgrass-like rate. Third, appropriate assumptions are made to adjust the peak summer and winter evasion fluxes to corresponding daily average values. An annual average Hg(0) loss can then be calculated for the area covered by rooted macrophytes. When that is done, the values are about 0.025 kg THg for Cell 3 and 0.07 kg THg for Cell 5. These losses were then subtracted from the corresponding losses calculated from the change in soil storage between the first and last soil sampling events to estimate the loss by seepage alone. The difference in the remaining change in storage between Cells 3 and 5 now increases, because Cell 3 loses less THg via plant-mediated evasion than Cell 5, and, correspondingly, less of the loss in Cell 5 needs to be attributed to seepage. Correspondingly, the ratio of the residual change in soil storage between Cells 3 and 5 increases to 2.3, which is close to the ratio of their respective seepage fluxes of 2.2. Thus, for THg, the seepage explanation for the observed differences in the loss of THg from the surficial soils between Cells 3 and 5 is not contraindicated by the data.

For MeHg, the analysis, integration, and synthesis of the data to infer the cause of the discrepancy between Cell 3 and Cell 5 soil loss rates cannot be so straightforward. This is because, in addition to its ability to move from one compartment to another, MeHg can also be synthesized and broken down by soil bacteria. It is the difference between the sum of the gross rates of production and destruction that determines whether there was net production or destruction of MeHg in the surficial soil between the first and last soil sampling events. MeHg concentrations and loads decreased both in Cell 3 (-74 percent and -81 percent, respectively) and Cell 5 (-29 percent and -55 percent, respectively). Perhaps surprisingly, the decrease was greater in the cell that did not experience the MeHg anomaly, Cell 3, than in the one that did, Cell 5. The absolute change in soil storage of MeHg in Cell 5 was about 6.6 g, with a calculated net export of about 8 g. By contrast, the absolute soil storage loss of MeHg in Cell 3 was calculated to be about 33 g, while the annual net export of MeHg calculated for Cell 3 was only about 1 g. Clearly most of the MeHg lost from the surficial soil storage in Cell 3 was lost without being exported from Cell 3, requiring that it had some other fate. Mass balance considerations require that it was either transferred to another, unsampled compartment (e.g., plant biomass); transported out of the system (e.g., by leaching below the monitored soil horizon); decomposed by the action of sunlight (Krabbenhoft et al., 2001; Orem et al., 2002); or degraded to Hg(II)$^{+2}$ by microbial activity (Marvin-DiPasquale and Oremland, 1998; Marvin-DiPasquale et al., 1999, 2001). Conversely, virtually all of the MeHg apparently lost from the Cell 5 surficial soil would had to have been transported to the Cell 5 outflow to account for the magnitude of the net export of MeHg from Cell 5.

However, it is likely that net MeHg production in the surficial soil continued in the Cell 5 following the first-flush production of the excess MeHg, so not all of the MeHg lost between the first and last sampling events from the surficial soil would have to be released back into the overlying water column and thence through the outflow. Some of it could leach into the underlying soil horizon without violating mass balance requirements. The production of MeHg also likely continued in Cell 3, however, indicating that even more MeHg had to be decomposed or leached from the surficial soil horizon to make up the difference. Without an independent measurement of the net MeHg production rate at several junctures during the course of the study, or a measurement of the transfer of the MeHg to plants and seepage to infer the net production rate by difference, one cannot calculate the average net MeHg production rate in Cell 3 or Cell 5 using the existing data. Nevertheless, one must infer that the MeHg production rate in Cell 3 is higher, on average, than in Cell 5, if the uncertainty in the calculated loss of MeHg mass from surficial soil storage based on the two sampling sites in Cell 3 has not resulted in a spurious calculation. That Cell 3 is likely to be producing MeHg at a higher rate in its soils than Cell 5 is consistent with the observation that Cell 3 had a higher average outflow concentration than Cell 5 in the two years preceding the Cell 5 MeHg anomaly (0.99 ng/L versus 0.58 ng/L, or a ratio of 1.7/1).

More Detailed Mass Budget Analysis of the Significance of Various Pathways for THg and MeHg Removal from the Water Column

The rapid increase in the stage and the rapid onset of outflow following reflooding of STA-6 Cells 3 and 5 could have removed some, perhaps most, of the first-flush THg released from the reflooded soil and the first-flush excess MeHg produced without having to invoke transfer to other compartments not accounted for in the mass budget analysis. To obtain a better understanding of the fate of the first-flush THg and MeHg in STA-6 Cell 5, an uncomplicated water quality model was developed. The differential equation to be solved was:

$$\frac{dC(t)}{dt} = [QI(t) \times CI(t) + A \times WF(t) + A \times DF(t) + A \times SPF(t) + WPK \times CHg(II)^{+2}(t) - Q(t) \times C(t) - A \times EF(t) - V(t) \times Ks \times C(t) - A \times Kx \times (C(t) - CP(t)) - V(t) \times Kr \times C(t) - C(t) \times \frac{dV(t)}{dt}] \times V(t)^{-1}$$

where:

C(t) = concentration of constituent in interior and outflow at time t
V(t) = cell volume at time t
A = cell area (constant)
QI(t) = inflow at time t
Q(t) = outflow at time t
CI(t) = inflow concentration at time t
$CHg(II)^{+2}(t)$ = interior concentration of inorganic mercury at time t
CP(t) = concentration of constituent in porewater; CS(t)/Kp
CS(t) = concentration of constituent in surficial soil at time t
WF(t) = wet deposition flux at time t;
(rain concentration at time t) x (rain depth at time t)

DF(t) = dry deposition flux at time t;
22 $\mu g/m^2$-yr x 0.5 per USEPA (1997) and R. Stevens, FDEP, personal communication
SPF(t) = soil release/production flux at time t (estimated via calibration)
EF(t) = evasion flux of dissolved rate constant for elemental mercury, Hg(0) at time t (used here as a constant based as an annual average rate coefficient); 1-2 ng/m^2-hr (Lindberg et al., 2002)
WPK = water production rate constant for conversion of Hg(II)$^{+2}$ to MeHg
Kx = diffusive exchange rate constant for transfer of dissolved constituent between soil porewater and the overlying water column;
0.3/day obtained through calibration to the Cell 5 outflow THg data
Ks = water column removal rate constant by particle settling (day^{-1})
Kr = water column removal rate constant by reaction/decomposition (day^{-1})

To simplify the model, Cell 5 was treated as one well-stirred reactor. The differential equation was then approximated as a finite difference equation, and the solution was obtained using a one-day time step with a 5th-order Runge-Kutta solution algorithm. The 5th order Runge-Kutta solution with a one-day time step produced results that were inconsistent with the observed outflow concentration profile.

At that point, three options presented themselves. The first was to use a shorter time step, but the problem was most likely with the assumption of instantaneous mixing of the wetland. Shortening the time-step in the model solution algorithm would not address the discrepancy between the physical reality of finite transport and mixing rates and the model assumption of instantaneous transport and mixing. The second option was to discretize Cell 5 into a series of well-stirred reactors that overflowed from one to the other until the observed outflow value and modeled outflow value agreed to within some arbitrary tolerance. This would result in a model complexity and level of effort not supported by the data or the exploratory purpose to which the model was being put. The third option was to achieve the same effect as the second option by lagging and averaging the conditions in Cell 5 such that the solution to the model equation represented what was being discharged from Cell 5, while the internal process and transport rates were a function of the average of the conditions across the wetland. Lag and averaging schemes involving 14 days and 21 days (the long-term annual average HRT) were rejected in favor of the 7-day averaging period, which produced a better fit to the measured outflow THg and MeHg concentrations.

The model also intentionally omitted a potentially important temporary storage compartment, that of plant biomass. This was done because (1) a recent photogrammetric estimate of plant coverages was not available, (2) the plant/water bioconcentration factors are generally low relative to those of dissolved organic carbon (DOC), suspended solids, and surficial soil, and (3) plant uptake is expected to be only a temporary storage compartment, since both Hg(II)$^{+2}$ and MeHg are expected to be released back to the water column as the plant biomass decomposes. However, future and more rigorous modeling analyses should include this compartment to test the hypothesis that its inclusion is only a second-order correction. This issue is taken up in some greater detail in the next section.

For Cell 5 THg in the outflow, after incorporating transfer to the soil/sediment via diffusive exchange and adjusting the rate coefficient to 0.3/day independent of stage to match the observed THg concentrations, with the exception of the first two sampling events, the remaining events compared well with the measured values. This indicates that the mass budget was accounting for all of the significant inputs, outputs, and change in storage. To better approximate the first two measured values, an initial release of inorganic mercury from the recently reflooded soil was invoked to close the initial mass gap. This required that approximately 40 g of THg be released during the week immediately preceding the first measurement of outflow THg. The results of the Cell 5 THg modeling are depicted in **Figure 6A** through **6C**.

For Cell 5 MeHg, with internal production in the surficial soil, there was insufficient MeHg mass to compensate for the MeHg lost through the outflow and stored in the filling cell water column. Traditionally, in simplified models of mercury transport and transformation, MeHg production in soil/sediment is modeled by multiplying the dissolved porewater $Hg(II)^{+2}$ concentration by a rate constant. However, the concentration of soil THg was relatively constant throughout the study, so the initial spike in MeHg production could not be produced by a constant rate constant and a MeHg production flux formulated in this way, without then overestimating MeHg production at a later time. No constant rate constant could match the observed pattern of MeHg production. This was also true of the production of MeHg from the first-flush flux of $Hg(II)^{+2}$, because the rate constant required to produce the initial pulse of excess MeHg would then overestimate the MeHg production rate from water column $Hg(II)^{+2}$ at a later time. Since there was no way to predict the rate of MeHg production from first principles, it was decided to calibrate the soil MeHg production rate to the observed MeHg water column concentration and then evaluate the relative importance of the various transport and transformation processes in explaining the observed MeHg concentration trajectory in the Cell 5 outflow. However, later in the study year, even a soil/sediment production rate of 0 overestimated the water column MeHg concentration. To correct this problem, the settling and decomposition rates were adjusted until the model did not systematically overestimate these later MeHg values. The daily soil production rate then had to be recalculated to reproduce the MeHg concentrations observed early in the study.

The results of the MeHg modeling exercise are depicted in **Figures 7A** through **7F**. Based on these results, the internal production of MeHg in surficial soil is the primary source of the MeHg in the Cell 5 outflow, and most of the MeHg exported from Cell 5 was produced during the first-flush event. Thereafter, there was a second MeHg production peak nearly nine months later in spring 2003. However, it is not clear whether this was produced in response to the unseasonable rainfall that occurred in March 2003 or whether MeHg was produced from $Hg(II)^{+2}$ released from a short-term storage reservoir (e.g., plant biomass) or from MeHg release from that same short-term storage reservoir.

INTERPRETATION OF THE EXPLORATORY DATA ANALYSIS

Figures 8A and **8B** depict the results of the linear, univariate correlation analysis for all cells combined for each of the soil sampling events, while **Figures 9A** through **9D** and **Figures 10A** through **10D** illustrate the lag-correlation results for Lag-0, Lag-12, Lag-24, and Lag-36 weeks for Cells 3 and 5, respectively. There was a limited number of data with which to carry out the exploratory analyses of rain versus surface water, surface water versus surface water, soil versus soil, and surface water versus soils (and vice versa) using univariate linear correlation analysis. The soils data set included only two sampling sites in Cell 3 and four sampling sites in Cell 5 for four sampling events, while the inflow and outflow data sets included 12 sampling events between June 20, 2002, and April 30, 2003. As a consequence, the confidence levels in the explanatory power of the univariate linear correlation analyses are limited. These same limitations virtually precluded the development of multivariate linear regression models for these data sets. The results of the exploratory data analysis must thus be considered suggestive rather than compelling.

With the above limitations in mind, the production of MeHg in Cells 3 and 5 appears to have responded similarly to rain inputs of $Hg(II)^{+2}$ but differently to the influences of inflow constituent concentrations and loads. These similarities and differences are reflected in the intra-correlations and inter-correlations between potentially influential hydrologic factors (e.g., stage, hydraulic residence time), input factors (e.g., inflow and rainfall concentrations and loads), and soil constituent factors (e.g., bulk density, moisture, and chemistry).

The results of the exploratory data analysis of surface water chemistry intra-correlations and inter-correlations suggest that $Hg(II)^{+2}$ and MeHg, both of which have high affinities for particles, are transported through G-600 into STA-6 primarily in association with suspended particles. These mercury species also have a high affinity for DOC, and the effect of DOC is to weaken the association with particles and thus the transport of THg and MeHg. High DOC may also be associated with the production of the short-chain sugars that the sulfate-reducing bacteria require for metabolism, stimulating MeHg production. High DOC may also inhibit the formation of iron+sulfur complexes (Fe_xS_y), which could stimulate or suppress MeHg production depending on the role of Fe_xS_y in tying up otherwise bioavailable $Hg(II)^{+2}$. HARD (as Ca and Mg), pH, and ALK mediate the surface charge on TSS and DOC and thus the affinity of these surfaces for positively charged cations such as $Hg(II)^{+2}$ (inorganic mercury) and CH_3Hg^{+1} (methylmercury) and, consequently, their transport and bioavailability for MeHg production or decomposition (G. Aiken, USGS, personal communication).

The moderate inverse relationship between $SO_4^=$ in the inflow water and the concentration of MeHg and %MeHg in both cell outflows suggests that $SO_4^=$ is being converted to sulfide in sufficient concentrations to inhibit MeHg production. However, the expected inverse relationship with soil AVS was only evident in Cell 5. The inverse relationship between inflow NO_x concentration and outflow MeHg and %MeHg in Cell 3 (r = -0.54 and -0.43, respectively) and Cell 5 (r = -0.33 and -0.45) might suggest that anaerobic nitrate-reducing bacteria can outcompete sulfate-reducing bacteria for carbon substrate when NO_x is in excess, thereby reducing SRB metabolic activity and the inadvertent production of MeHg from bioavailable $Hg(II)^{+2}$. The ability of some anaerobic dentrifiers (e.g., *Thiobacillus denitrificans* and *Thiomicrospira denitrificans*) to strip sulfur from surficial soil in the presence of an inorganic source of carbon has been quantified with the following stoichiometric relationship (Bezbaruah and Zhang, 2003):

$$55S + 20CO_2 + 50NO_3^- + 38H_20 + 4NH_4^+ \rightarrow 25N_2 + 4C_5H_7O_2N + 55SO_4^{2-} + 64H^+$$

The production of sulfate from soil sulfur via this process could stimulate MeHg production up to a point and inhibit it thereafter with the build-up of porewater sulfide. In Cell 3, sulfate and nitrate are moderately positively correlated for Lag-0 pairs (r = 0.66), but they are weakly inversely correlated for Cell 5 Lag-0 outflow pairs (r = -0.27). For Cell 3, the strongest positive correlations between outflow MeHg and %MeHg and Lag-12 week soil constituents were with TS (r = 0.75 and 0.67, respectively) and AVS (r = 0.75 and 0.68, respectively). The strongest inverse relationships were with TN (r = -0.95 for both) and THg (r = -0.86 for MeHg only). For Cell 5, the strongest positive correlations were with TMn (r = 0.84 and 0.86) and AVS (r = 0.87 and 0.89), but there is now an inverse relationship with TS (r = -0.46 and -0.37, respectively) and a moderately positive relationship with soil TN (r = 0.52 and 0.53, respectively).

The results of the lag-correlation analysis between inflow and outflow water chemistries and outflow THg, MeHg, and %MeHg suggest that Cell 3 water column MeHg is primarily being supplied by the inflow when TP inflow and outflow concentrations are high. This is not the case for Cell 5, which has a much longer average annual hydraulic retention time (HRT) than Cell 3 (approximately 21 days versus approximately 5 days). Conversely, one might speculate that, under more quiescent conditions, as time passes and the water column TP is consumed by floating and rooted plants, the MeHg produced in the surficial soil begins to build up in the overlying water and that an inverse relationship begins to develop between water column TP and surface water MeHg. This effect is more pronounced in Cell 5 than in Cell 3, because the water spends more time traversing Cell 5, even under flowing water conditions. By contrast, the moderate inverse correlation with $TDPO_4$, which persists across all time lags, is consistent with the hypothesis that unfiltered MeHg is high where $TDPO_4$ is low (and vice versa). This suggests that the transport in and out of the treatment cells is mediated by organic particles and that where organic particle concentrations are high, $TDPO_4$ is low. Unfortunately, only filtered samples of inflow and outflow were collected, so it is not possible to test this hypothesis with the available data.

For Cell 3, this is consistent with the results of the soil correlation analysis, which found a positive relationship between soil TP and MeHg and %MeHg (r = 0.41 and 0.44, respectively). This decreased to r = 0.31 and r = 0.17 for Lag-12 weeks and Lag-24 weeks but increased again to r = 0.44 at Lag-36 weeks. However, an inverse relationship was observed in Cell 5 between soil MeHg or %MeHg and soil TP for the same sampling event (r = -0.57 or -0.67, respectively), which exhibited little variability when the Lag-0 data were paired with data collected in the preceding three sampling events.

The most important differences between Cell 3 and Cell 5 soil chemistries occur for total sulfur (TS) and acid volatile sulfide (AVS). The former includes all organic and inorganic sulfur, sulfates, and sulfides (W. Orem, USGS, personal communication), while the latter is comprised primarily of iron sulfide and related complexes (C. Gilmour, ANSERC, personal communication). A weak to moderate inverse relationship between AVS and MeHg or %MeHg was observed by Gilmour et al. (1999) in the top 4 cm of peat soil collected at nine sites from 1995–1998 in the Everglades (r = -0.45 or -0.37 for log-transformed data, respectively). By comparison, the inverse correlations with Everglades porewater sulfide were much stronger (r = -0.79 or -0.69, respectively). However, the expected inverse relationship between soil MeHg and AVS was weak in Cell 3 soils at Lag-0 weeks, and it became increasingly positive at Lag-12 weeks, -24 weeks, and -36 weeks. A moderate inverse relationship with TS was observed at Lag-0 weeks and Lag-12 weeks (r = -0.56 and -0.66, respectively), but it became strongly positive at Lag-24 and Lag-36 weeks (r = 0.90 and 0.78, respectively). Conversely, in Cell 5 soils the correlation between AVS and MeHg was initially weakly to moderately positive (r = 0.49), but it became moderately to strongly inverse at Lag-24 weeks (r = -0.69), while the correlation with TS was initially weakly positive with all lag pairings, albeit with varying magnitudes. There were no soil AVS data collected during the first sampling event, so the Lag-36 week correlation could not be obtained for either cell.

Interestingly, the correlation between AVS and soil moisture content increased across soil sampling events. From this, one might speculate that AVS is building up in the soil as the dried soil rehydrates and becomes sufficiently anoxic to support sulfide production by SRB and Fe_xS_y formation with the iron already present in the soil or the iron present in inflow water. Consistent with this speculation, the AVS in the soils increased almost 19 times and about 5.5 times from the second to the fourth sampling events in Cell 3 and 5, respectively. For closure, the co-correlation between Fe and AVS is much more strongly positive for Cell 3 for all sampling events (r = 0.70) than for Cell 5 (r = 0.34), but neither the reason for this nor its effect on net MeHg production is clear. To complicate matters, there were differences in the apparent influences of Fe on the MeHg soil concentration and load in Cell 3 versus Cell 5 that disappeared when considering the influence on change in MeHg soil load and percent change in MeHg soil load. In Cell 3 the correlation between soil MeHg concentration and soil Fe concentration varied from moderately positive to weakly negative across all soil sampling events. Cell 5 exhibited a shift from weakly positive at Lag-0 (r = 0.04) to progressively more negative at Lag-12 weeks, -24 weeks, and -36 weeks (r = -0.14, -0.40, and -0.95, respectively). These results are iterated in **Tables 13A** through **13D**, **Tables 14A** through **14D**, and **Tables 15A** and **15B**.

As noted in the preceding sections, the routes and rates at which $Hg(II)^{+2}$ and MeHg are transported, transformed, and stored differ within cells, and the longer the HRT, the more these differences can disconnect the relationships between the inflow and outflow concentrations and between THg, MeHg, and %MeHg. They also complicate the interpretation of the lag-correlation analysis. Nevertheless, Cell 3 and Cell 5 soil chemistries clearly differ substantially in the way they process sulfur, nitrogen, and iron. They also differ in the way those biogeochemical cycles influence MeHg production in surficial soil, as evidenced by the pattern of lag-correlations between inflow and soil chemistry in each cell and between soil chemistry and outflow chemistry in each cell concurrently (Lag-0) and with each preceding sampling event. Ultimately however, correlation is not causation, and only controlled experiments can systematically discriminate the factors that are likely to be causing or mediating the transport and fate of $Hg(II)^{+2}$ and MeHg in water and soil from those that are the product of mere association. Thus, while the exploratory correlation analyses can be suggestive of cause-and-effect relationships and can aid in the formulation of hypotheses regarding such relationships, the testing of such hypotheses must occur under more controlled conditions in laboratory microcosms and field mesocosms. Such studies are not now planned for STA-6, however.

ENVIRONMENTAL SIGNIFICANCE OF THE MEHG EXPORT FROM STA-6

It is not clear whether there are any significant environmental consequences from the export of 40 g/yr of MeHg by STA-6. Of this amount, according to the screening-level mass budget, 31.5 g is supplied by upstream sources, 8 g is produced internally, and 0.5 g is supplied in wet atmospheric deposition. There are a number of ways to put this export load into perspective. For example, the approximate 40 g/yr exported by STA-6 (calculated by multiplying the inflow and outflow concentrations measured every four weeks by the corresponding flow volumes for the same periods) amounts to about 5 to 10 percent of the total when the MeHg loads to the Everglades are summed from all of the pumps, structures, and STAs monitored by the SFWMD on a quarterly basis. These MeHg loads are calculated by multiplying the annual average MeHg concentration by the annual total flow from that source. For reference, STA-2 accounts for almost 50 percent of the total. Whatever the perspective, the high annual average flow in the L-3 canal is likely to dilute the excess MeHg exported from STA-6 annually following a rewetting event. Therefore, the influence of the annual export of 40 g of MeHg from U.S. Sugar Corporation and STA-6 on MeHg bioaccumulation is likely to be localized to the discharge collection canal. So, in terms of guiding adaptive management decision making for allocating limited monitoring, research, modeling, and mitigation resources to understanding and solving a mercury problem, the primary focus and priority must remain STA-2.

The above notwithstanding, efforts to reduce the magnitude and duration of dryout of STA-6, including use of auxiliary pumps to maintain at least 10 cm water over the soil/sediment at all times, should have a salutary effect on the magnitude of MeHg exported from STA-6.

SUMMARY OF KEY FINDINGS

The MeHg anomaly dissipated rapidly from the Cell 5 water column, returning to near baseline conditions by the third cycle of enhanced surface water monitoring.

Based on the mass budget calculations, both Cell 3 and Cell 5 were net importers of THg and net exporters of MeHg, but Cell 5 was calculated to have exported substantially more MeHg than Cell 3.

However, due to its much shorter hydraulic retention time, Cell 3 could have experienced a first-flush MeHg pulse of even greater magnitude than Cell 5 that was missed due to the timing of the post-reflood sampling event at STA-6.

Further, all such mass budget calculations must be used with caution, because the daily MeHg concentration data must be interpolated between four-week monitoring events. Nevertheless, the accuracy of the mass budget calculations using data collected every four weeks is a vast improvement over those based on data collected every three months.

With the above caveats in mind, based on the mass budget calculations, Cells 3 and 5 converted roughly 15 percent and 30 percent of the $Hg(II)^{+2}$ from inputs plus change in storage into MeHg, respectively. This suggests that the anomalous MeHg event in Cell 5 was the result of conditions more favorable to maximum MeHg production, albeit over a very short period of time.

The fraction of THg converted to MeHg in surficial soils, expressed as %MeHg, is an indicator of the net MeHg production rate occurring there. The %MeHg in Cell 3 and Cell 5 surficial soils declined progressively (monotonically) over time, with Cell 3 peaking initially at 6.3 percent in August 2002 and then declining to 2.5, 2, and 1.75 percent in October 2002 and January and February 2003, respectively, while for those same soil sampling events the corresponding Cell 5 values were 1.8, 1.2, 1.1, and 1 percent, respectively.

Even though no MeHg was detected in Cell 3 in this reporting year, on a spatial and annual average basis, the %MeHg in Cell 3 soils was 3.5 times that in Cell 5 soils at the onset of the Cell 5 anomaly. It declined to 1.7 times for the last sampling event in April 2003, suggesting that Cell 3 is more efficient at producing MeHg than Cell 5, both in the short term and, perhaps, for the long term.

The most significant input pathway of MeHg load to STA-6 was the inflow, while the inflow and wet and dry atmospheric deposition made roughly equal contributions to the $Hg(II)^{+2}$ load.

Seepage in both cells was high relative to inflow, which likely accelerated transfer of both mercury species from the water column to the sediment, and may also have leached soluble constituents from the surficial soil, including but not limited to $Hg(II)^{+2}$ and MeHg, into the deeper soil horizon and thence the surficial aquifer.

The rate of THg removal from the Cell 5 water column was greater than that calculated for flow dilution, change in storage, and seepage alone, so other removal processes must have been at work, such as transport to another compartment (e.g., soil/sediment or plant biomass). When the soil/sediment uptake pathway was added to the mass budget calculation, the fit between observed and calculated THg concentrations improved substantially, albeit in the low concentration range encountered during the latter months of the study.

The rate of MeHg removal from the Cell 5 water column was also greater than that calculated for flow dilution, seepage, and change in storage alone. However, contrary to the experience with THg, the addition of transfer to the soil/sediment compartment had no discernable effect on the calculated MeHg mass budget or concentrations, suggesting that internal processes of particle settling and decomposition – and not diffusive exchange with the underlying sediment – were the predominant MeHg removal processes in Cell 5.

The production of MeHg in Cells 3 and 5 appears to have responded similarly to rain inputs of $Hg(II)^{+2}$ but differently to the influences of inflow constituent concentrations and loads.

These similarities and differences are reflected in the intra-correlations and inter-correlations between potentially influential hydrologic factors (e.g., stage, hydraulic residence time), input factors (e.g., inflow and rainfall concentrations and loads), and soil constituent factors (e.g., bulk density, moisture, and chemistry).

The most important differences between Cell 3 and Cell 5 soil chemistries occur for acid volatile sulfide (AVS). Soil AVS increased almost 19 times and about 5.5 times from the second to the fourth sampling events in Cells 3 and 5, respectively. However, the expected inverse relationship between soil MeHg and AVS was weak in Cell 3 soils at Lag-0 weeks and became increasingly positive for each preceding soil sampling event. In Cell 5 the correlation between soil AVS and MeHg was initially weakly to moderately positive but became moderately to strongly inverse by the second preceding soil sampling event.

While the above exploratory data analysis via linear correlation analysis cannot be considered definitive due to the small number of soil samples collected to date within cells and over time, Cells 3 and 5 soil chemistries clearly differed substantially in their biogeochemistries and in the way their biogeochemical cycles influenced MeHg production in surficial soil. Whether this was due to differences in cell hydrology, chemistry, microbiology, or some combination of these is not yet known and cannot be extracted from the results of the exploratory data analysis.

Ultimately, correlation is not causation, and only controlled laboratory microcosm studies and field mesocosm studies can systematically discriminate the factors that are likely to be causing or mediating the transport and fate of $Hg(II)^{+2}$ and MeHg from those that are the product of mere association. Such studies are not now planned for STA-6.

CONCLUSIONS

There is no statistically significant difference between G-254A and G-254C THg or MeHg concentrations. Monitoring of either one of the two will produce the same results whether analyzing the data for compliance with the Florida Class III water quality standard (WQS) for THg of 12 ng/L or calculating the annual export of THg or MeHg loads.

Based on almost one full year of more frequent surface water sampling (every four weeks versus quarterly), STA-6 is not a significant exporter of THg but is a net exporter of MeHg on an annual basis. On a seasonal basis the export of MeHg can be exacerbated, especially following first flooding after an extended period of drawdown and dryout.

The differences between the mass budgets for THg and MeHg based on quarterly and every other biweekly sampling are significant. If the uncertainty in the magnitude of the exported annual MeHg load is considered problematic, retaining the more frequent monitoring of surface water would appear to be appropriate.

The cause of the excess MeHg production is most likely the reflooding following dryout, as evidenced by the strong correlation of the peak outflow MeHg concentration with antecedent soil moisture content. However, MeHg export is also correlated with antecedent rainfall, suggesting that MeHg is also being produced from the fresh supply of $Hg(II)^{+2}$ in wet deposition, albeit at a much slower rate when continuously inundated than immediately following reflooding.

The gross export of approximately 35 to 40 g/yr of MeHg, of which between 5 and 10 g was likely produced internally, is unlikely to have a significant downstream environmental impact.

However, the combined effect of inflow and internally produced MeHg is likely to be the localized buildup of MeHg to concentrations that approach or exceed the Florida fish consumption advisory threshold of 0.5 ppm in the flesh of age class 3 year largemouth bass residing within the treatment cells and the discharge collection canal.

The high seepage rates in both treatment cells may change the absolute and relative concentrations of key influential factors in surficial soils over time via leaching in such a way that MeHg production and transport may be increased or decreased.

RECOMMENDATIONS

Return to monitoring G-354C only, as G-354A and G-354C are statistically indistinguishable in terms of average annual THg and MeHg concentrations and are only occasionally distinguishable on a sampling event basis.

Post the discharge collection canal to limit top-predator fish consumption by sport and subsistence fishers.

Limit the area and duration of dryout in both treatment cells to reduce the magnitude and frequency of occurrence of anomalous MeHg events in STA-6.

Conduct leaching studies on the STA-6 soils to better characterize the long-term effect of high seepage rates with inflow water and inflow-rainwater mixtures on soil chemistry and MeHg production potential.

If resolving the influences of soil chemistry on net MeHg production via univariate and multivariate regression analysis is of interest, continuing the STA-6 soil monitoring should be a priority. This is because the patterns of the intra-correlations and inter-correlations with soil and outflow MeHg concentrations and %MeHg are very different than in STA-2 soils.

If the uncertainty in the quantity of MeHg exported annually from STA-6 is a concern, then the increased frequency of mercury monitoring of inflows and outflows should continue.

Otherwise, a return to quarterly monitoring should be premised on the commitment to time sampling to capture the first-flush excess MeHg production following reflooding after extended periods of dryout. If the first-flush production of excess MeHg persists through the next quarterly sampling event, then more frequent mercury monitoring should be reinstituted as an appropriate adaptive management response.

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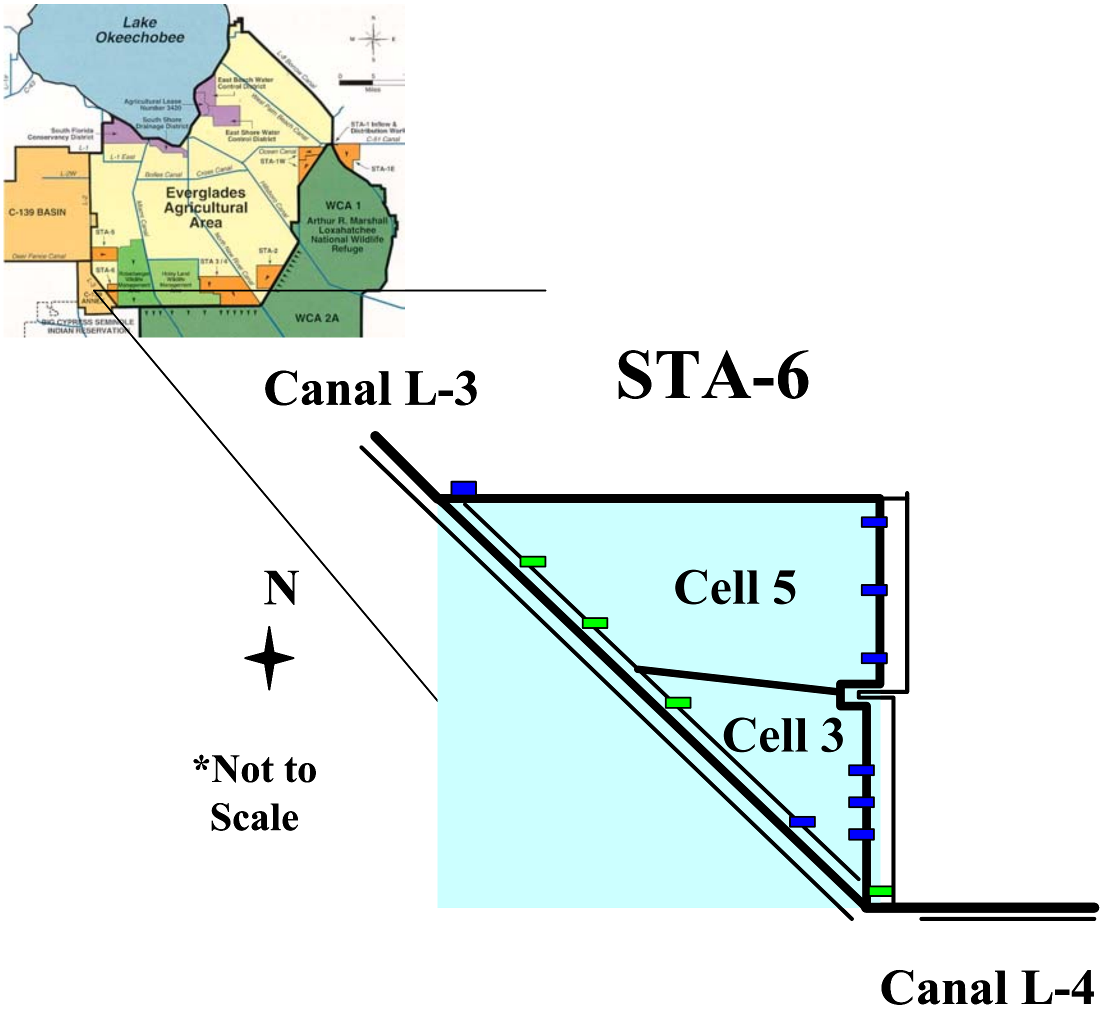

Figure 1. Geographic location and diagram of STA-6 project footprint.

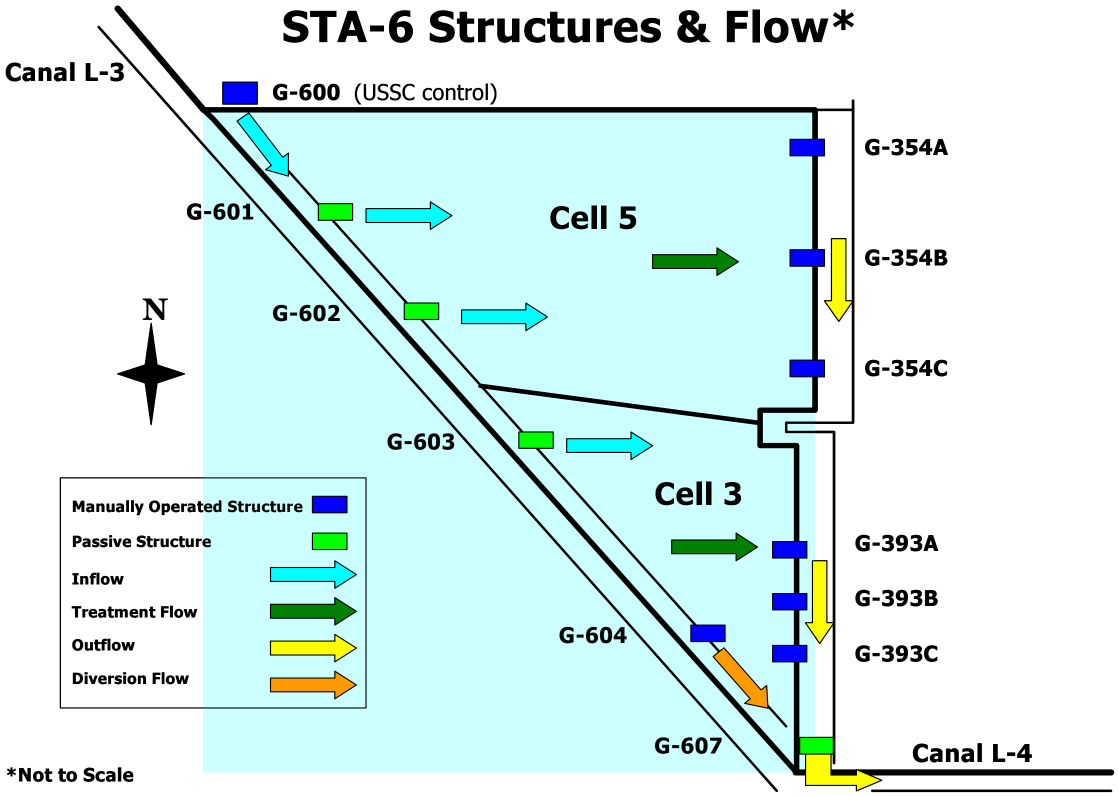

Figure 2. STA-6 structures and operation for flow and depth management.

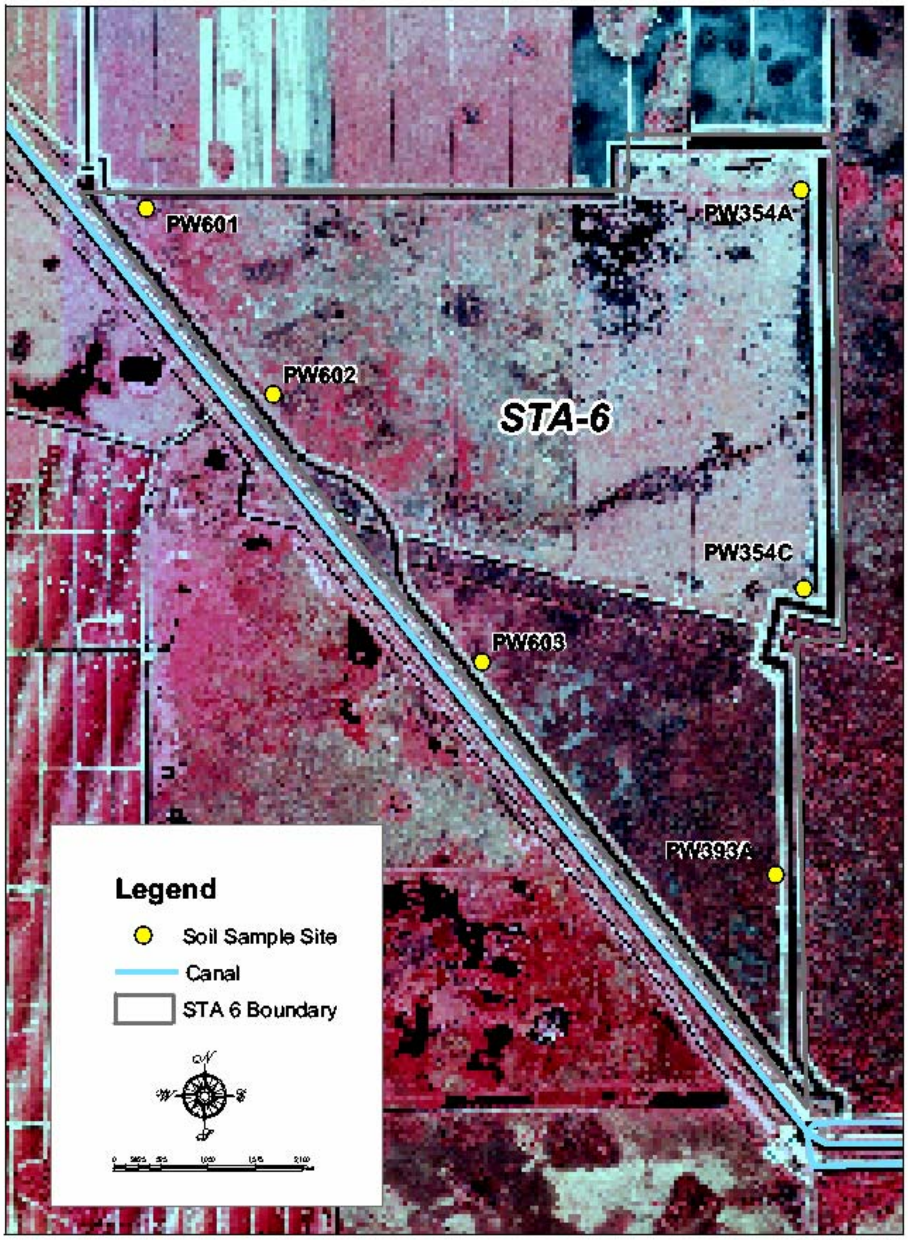

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Figure 3. Georeferenced map of STA-6 Mercury Special Studies soil sampling sites.

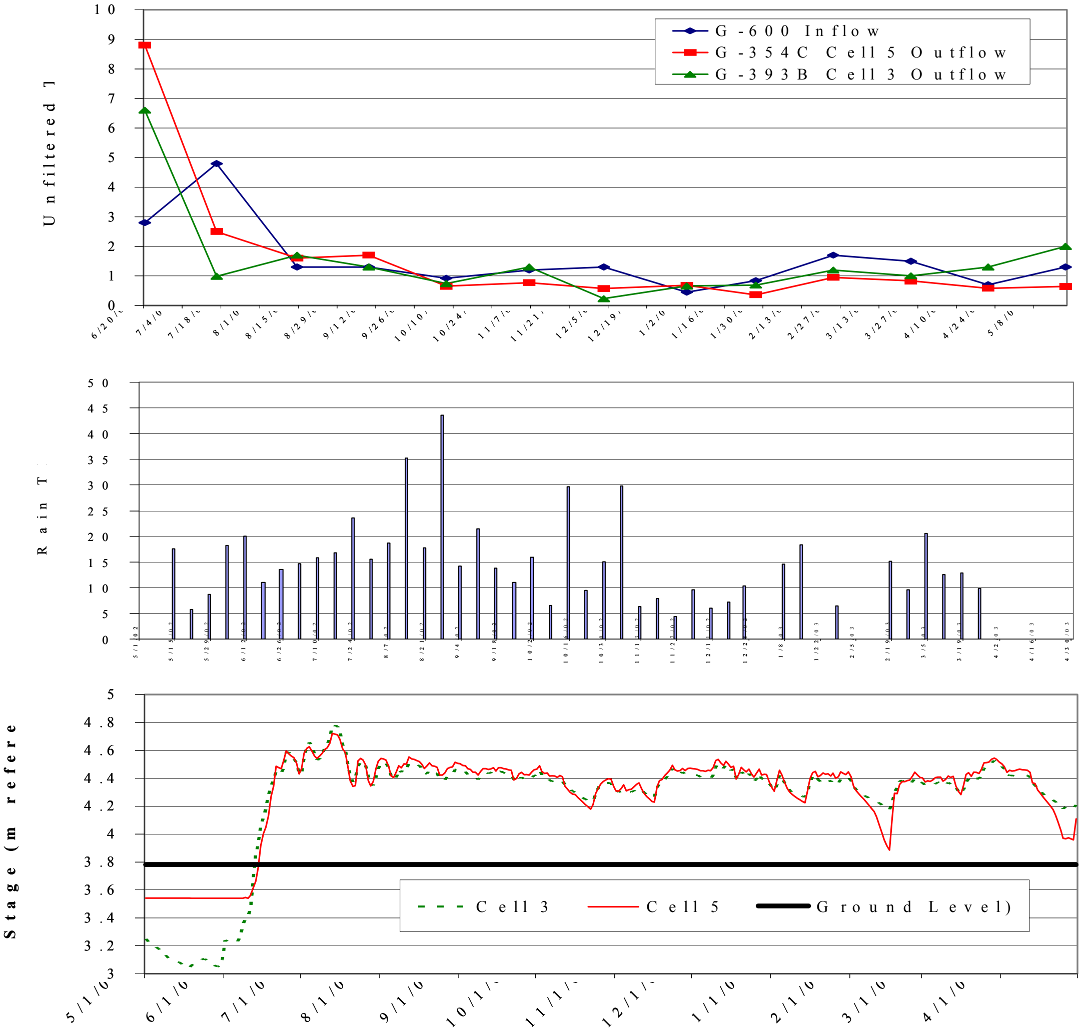

Figure 4A. Surface water THg concentration in the STA-6 common inflow (G-600) and the Cell 3 (G-393B) and Cell 5 (G-354C) post-reflooding compared to corresponding rainfall THg concentration (ng/L) and Cell 3 and 5 interior average depths (stage minus average ground elevation) for the period from May 1, 2002 through April 30, 2003.

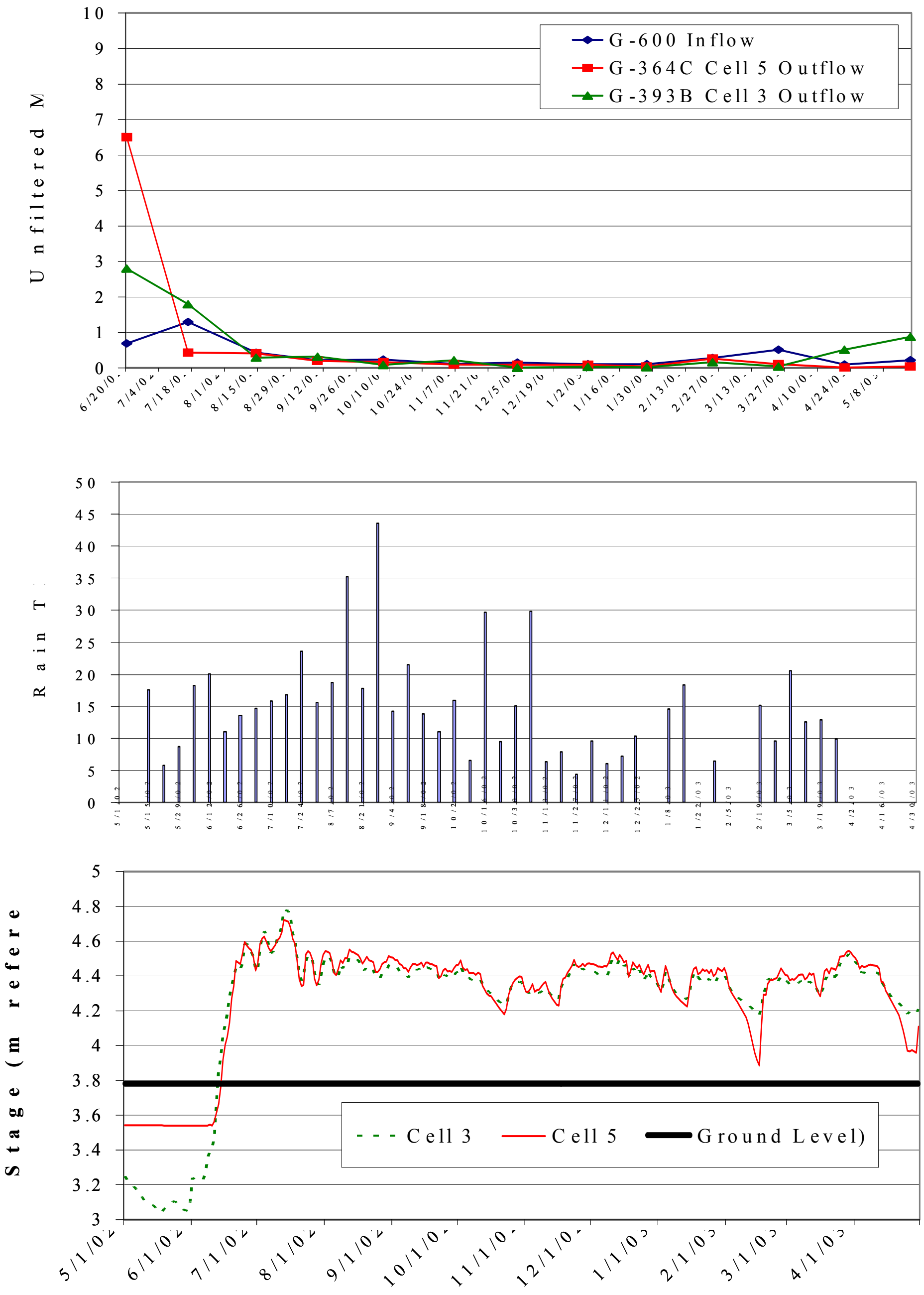

Figure 4B. Surface water MeHg in the STA-6 common inflow (G-600) and the Cell 3 (G-393B) and Cell 5 (G-354C) post-reflooding compared to corresponding rainfall THg concentration (ng/L) and Cell 3 and 5 interior average depths (stage minus average ground elevation) for the period from May 1, 2002 through April 30, 2003.

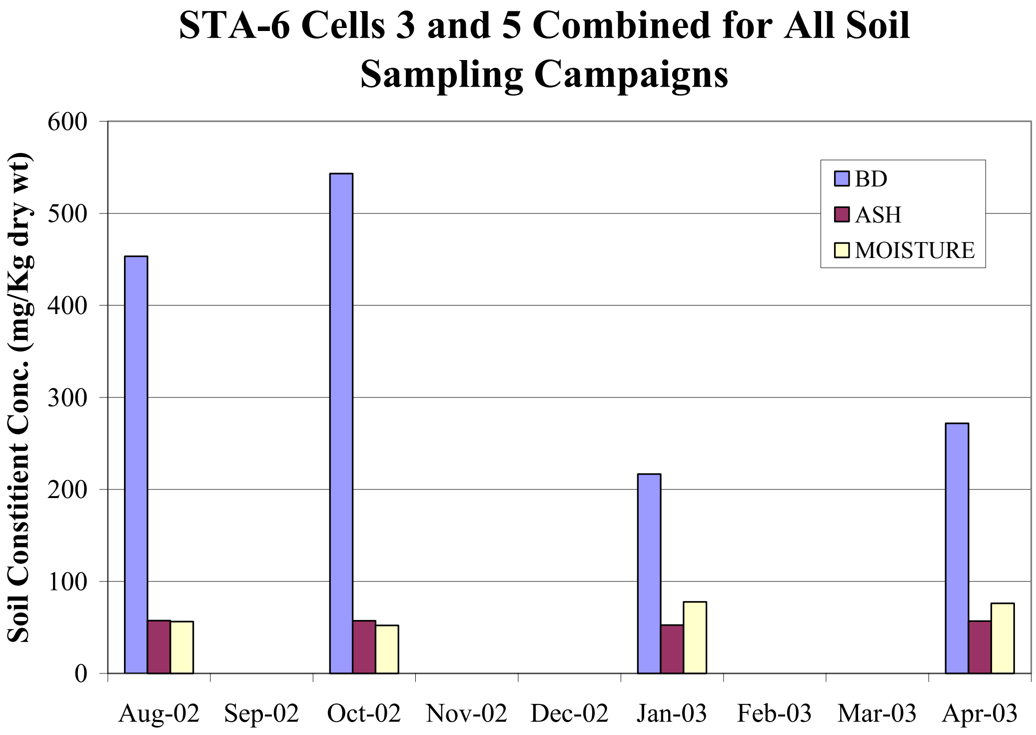

Figure 5A. Average surficial soil (4-cm cores) concentrations of constituents of interest in Cells 3 and 5 for each of the sour sampling events completed to date in August and October 2002 and January and April 2003.

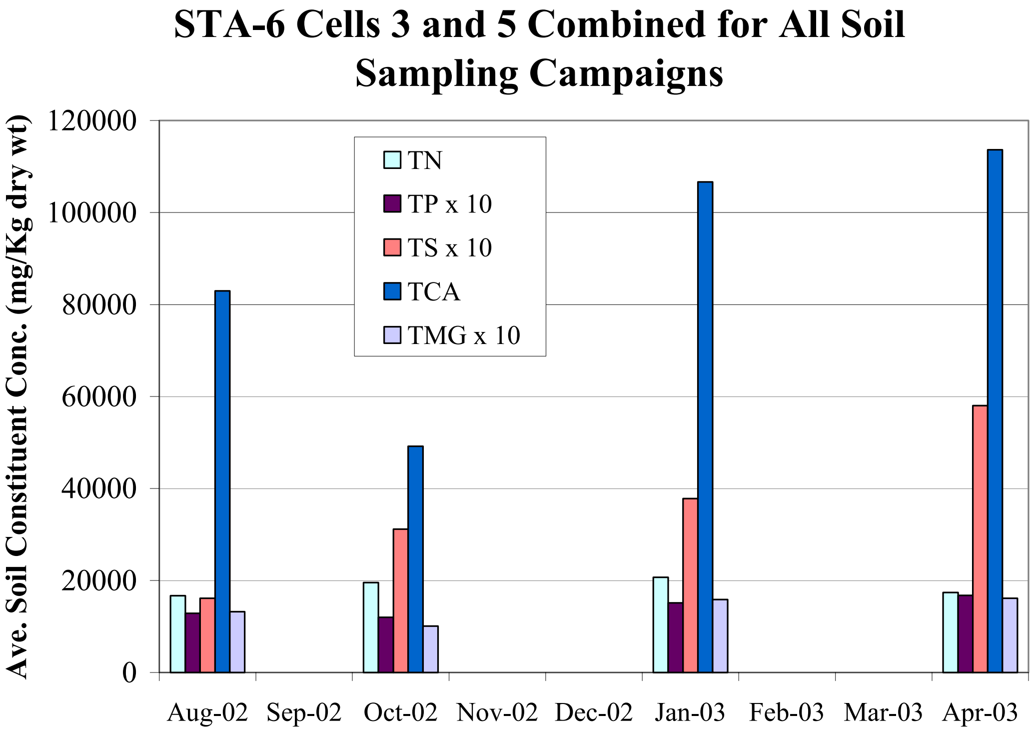

Figure 5B. Average surficial soil (4-cm cores) concentrations of constituents of interest in Cells 3 and 5 combined for each of the four sampling events completed to date in August and October 2002 and January and April 2003.

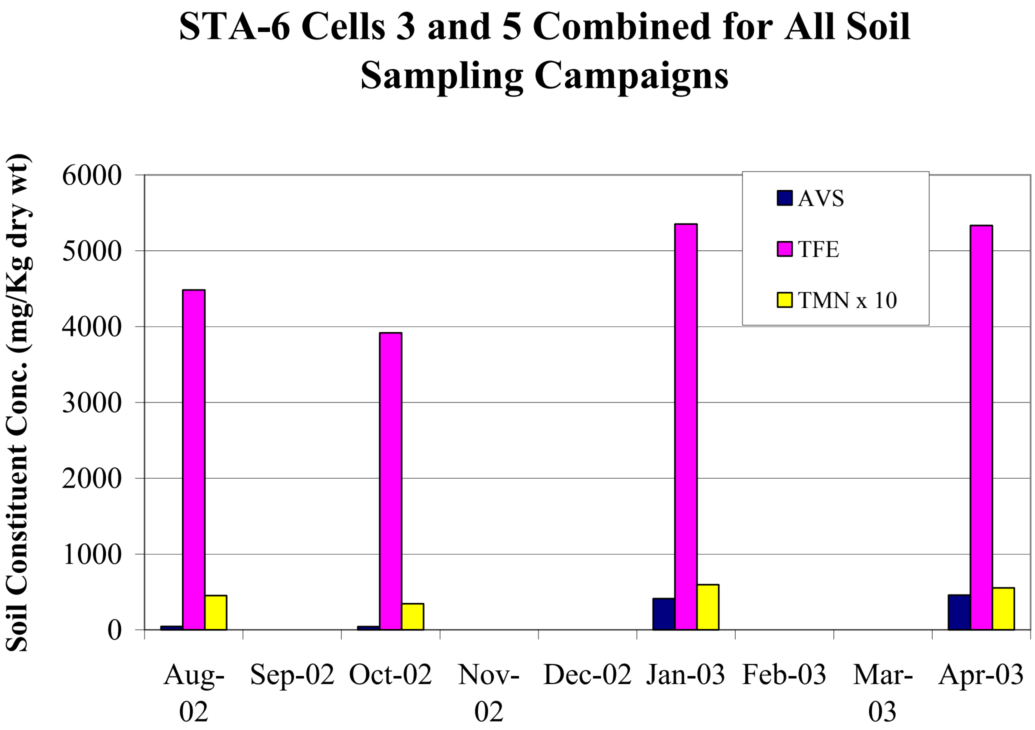

Figure 5C. Average surficial soil (4-cm cores) concentrations of constituents of interest in Cells 3 and 5 combined for each of the four sampling events completed to date in August and October 2002 and January and April 2003.

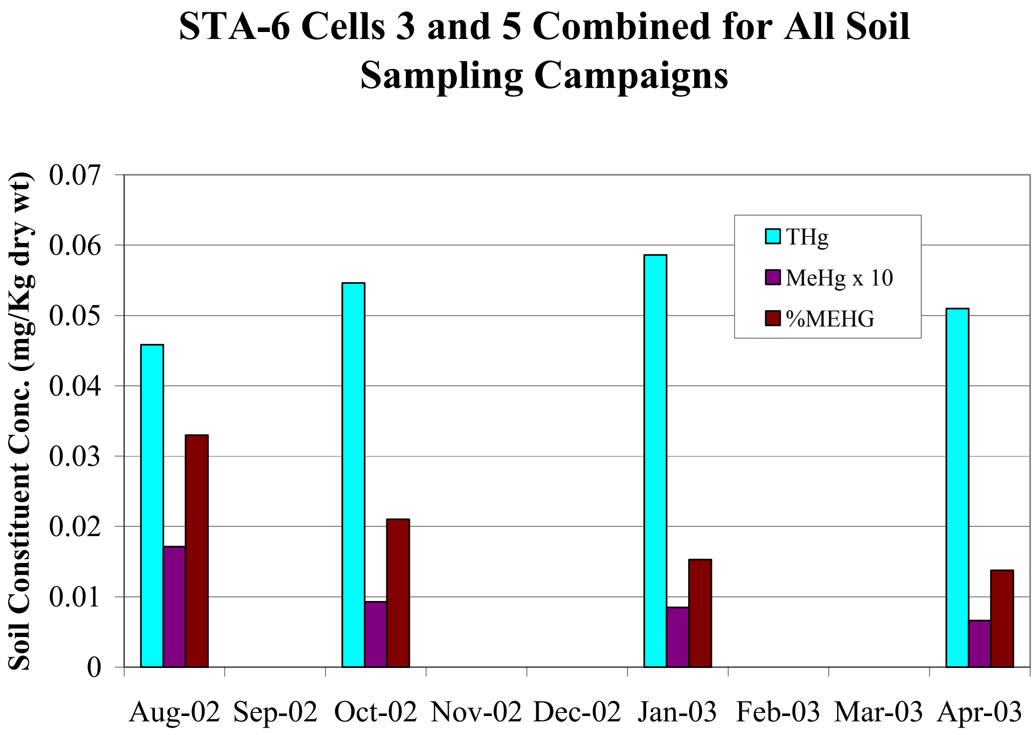

Figure 5D. Average surficial soil (4-cm cores) concentrations of constituents of interest in Cells 3 and 5 combined for each of the four sampling events completed to date in August and October 2002 and January and April 2003.

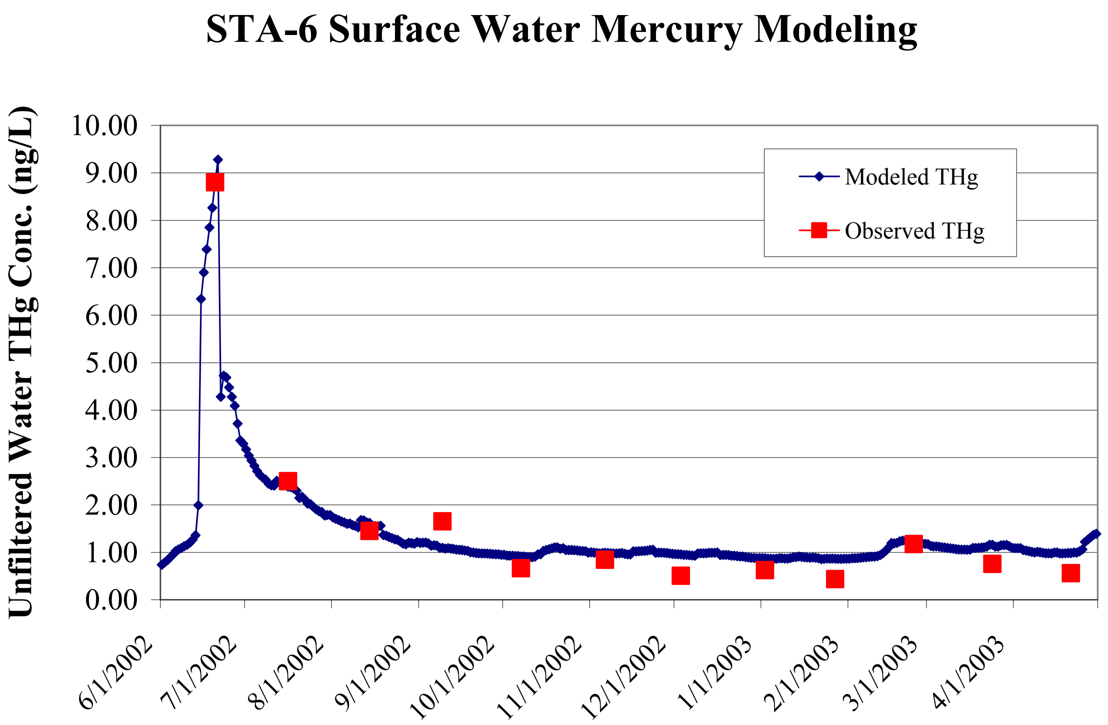

Figure 6A. Modeled STA-6 Cell 5 THg surface water concentration with post-reflooding release of about 7.5 g of THg from soil/sediment and with diffusive exchange between surface water and soil/sediment (Kx = 0.3/day independent of water depth, ACME mean Kp for Hg(II)$^{+2}$ [86,650 L/Kg] and linear interpolation of the four observed soil THg concentrations in the surficial soil/sediment [this study]).

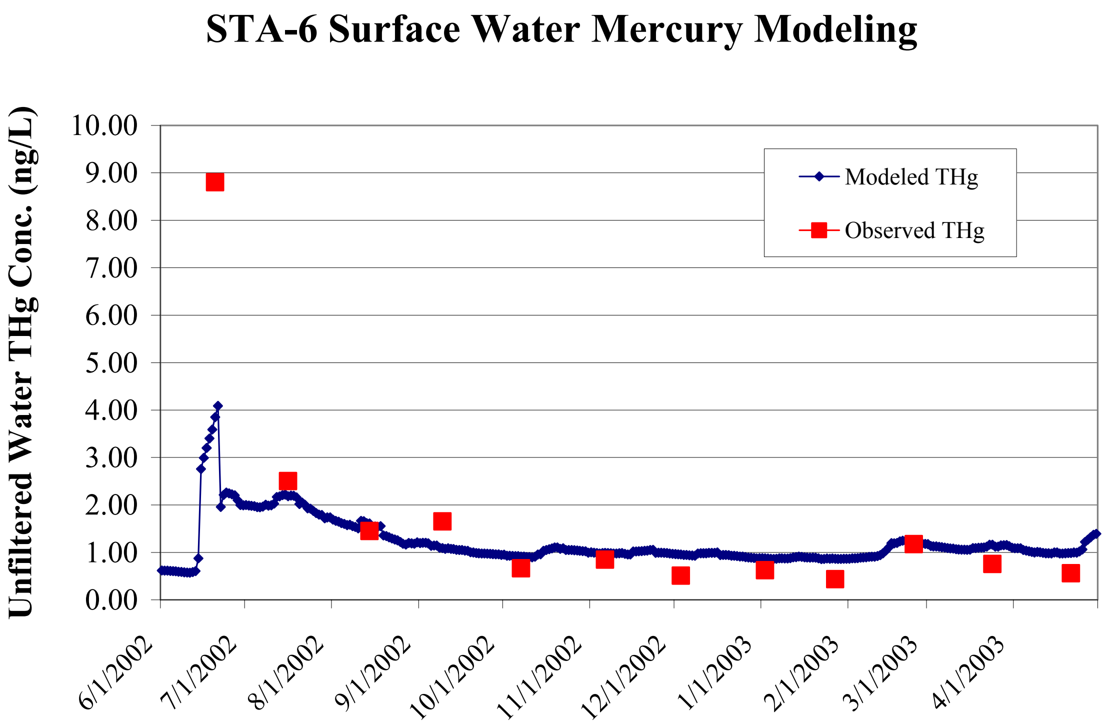

Figure 6B. Modeled THg concentration with soil/water diffusive exchange but without post-reflooding initial release of about 7.5 g of THg from soil/sediment.

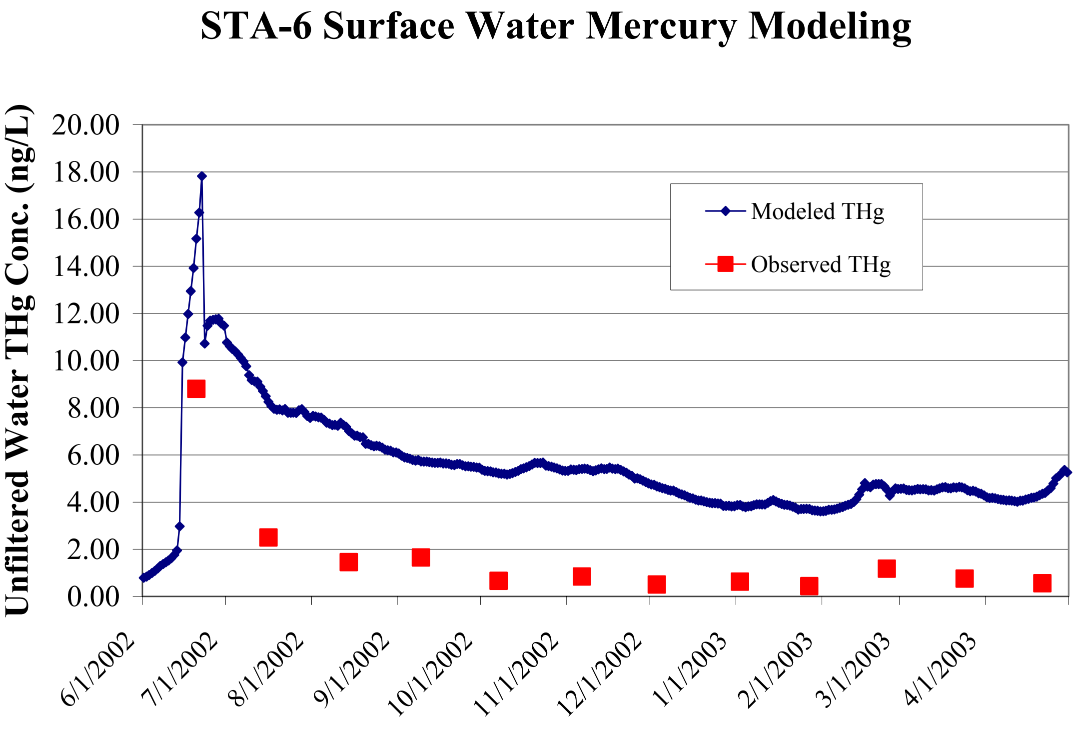

Figure 6C. Modeled STA-6 Cell 5 THg surface water concentration with post-reflooding release of about 7.5 g of THg from soil/sediment but without diffusive exchange between surface water and soil/sediment.

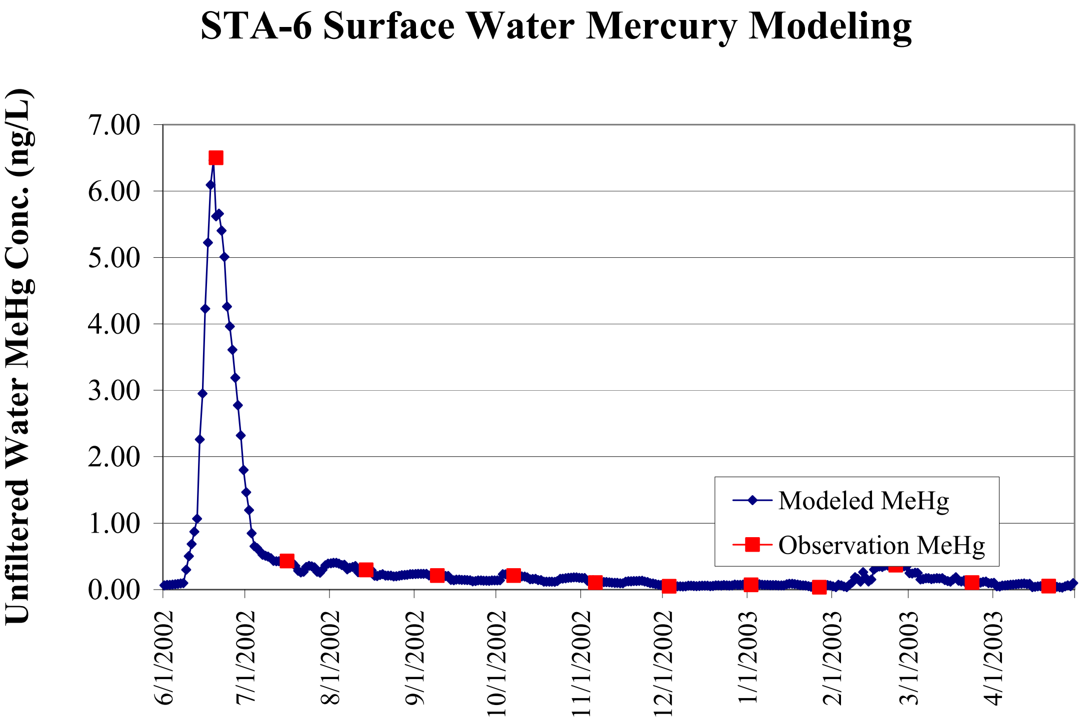

Figure 7A. Modeled STA-6 Cell 5 MeHg in surface water with diffusive exchange between soil/sediment and surface water (Kx = 0.3/day independent of water depth, ACME average MeHg soil/porewater partition coefficient Kd = 12,950 L/Kg), internal production from surface water Hg(II)$^{+2}$ (K = 1/day) and soil/sediment Hg(II)$^{+2}$ (variable and obtained by calibration), removal from the water column by particle settling (Ks = 5/day) and decomposition (Kr = 5/day).

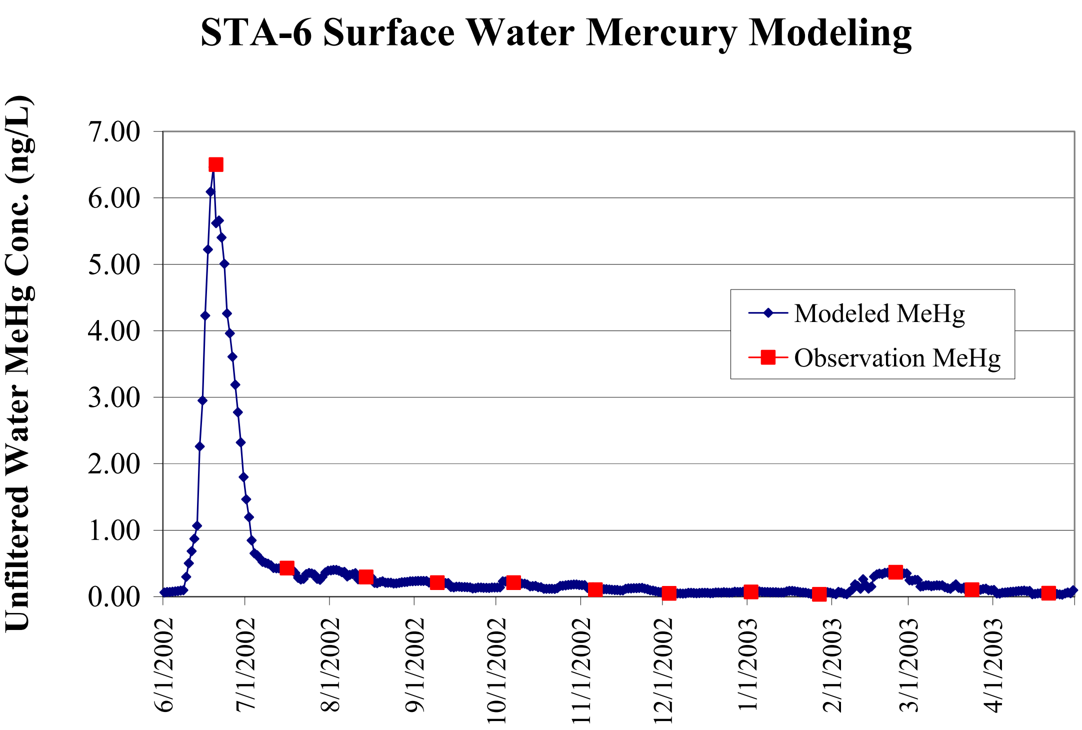

Figure 7B. Modeled STA-6 Cell 5 MeHg in surface water *without* diffusive exchange between soil/sediment and surface water but with internal production from surface water Hg(II)$^{+2}$ and soil/sediment Hg(II)$^{+2}$, and MeHg removal from the water column by particle settling and decomposition.

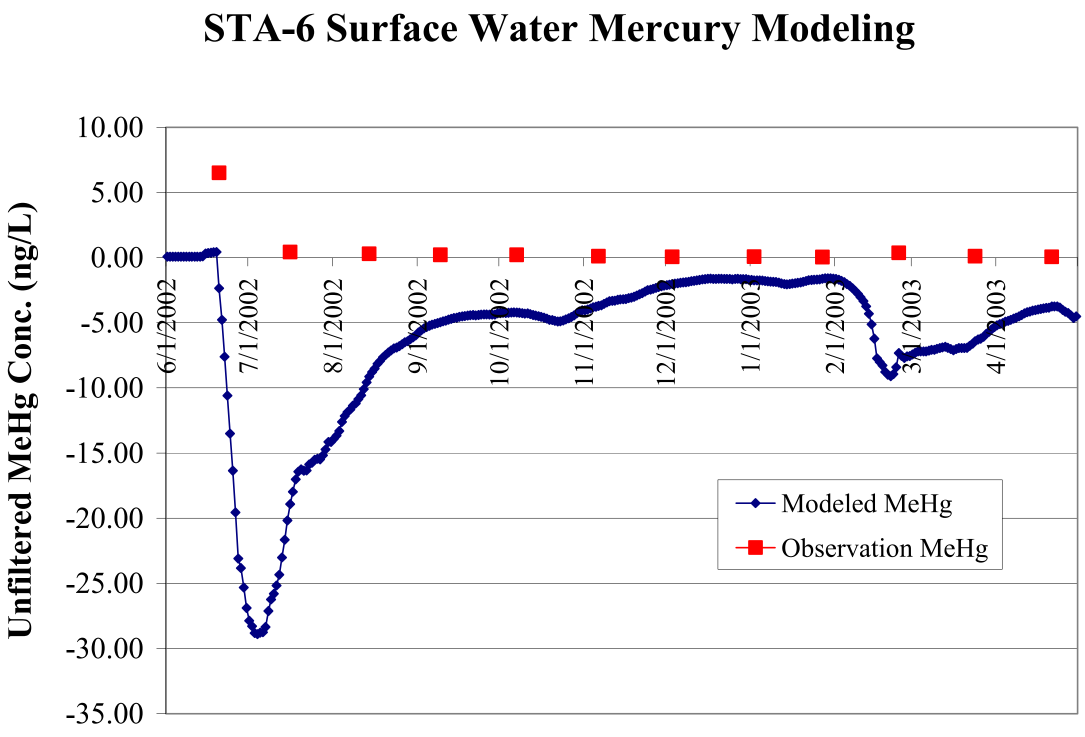

Figure 7C. Modeled STA-6 Cell 5 MeHg concentration with soil/water diffusive exchange but without internal production from water column $Hg(II)^{+2}$ and soil/sediment production (variable) and without MeHg removal by particle settling or decomposition.

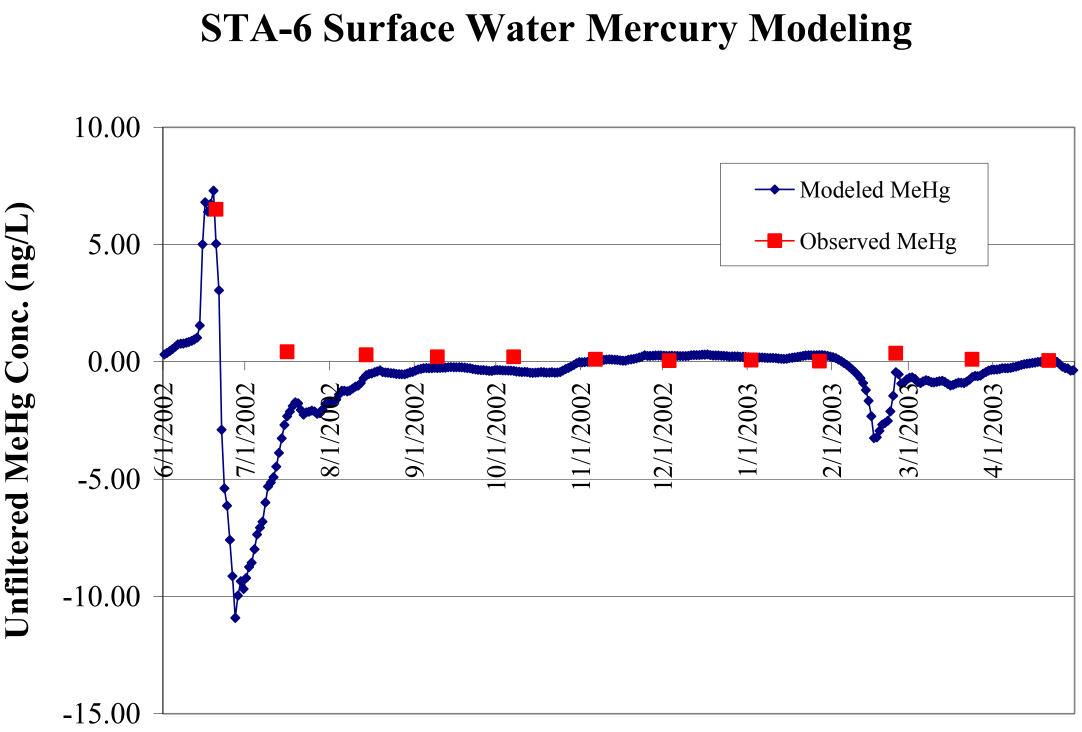

Figure 7D. Modeled STA-6 Cell 5 MeHg concentration with internal production from water column $Hg(II)^{+2}$ and soil/water diffusive exchange but without soil/sediment production and without removal by particle settling and decomposition.

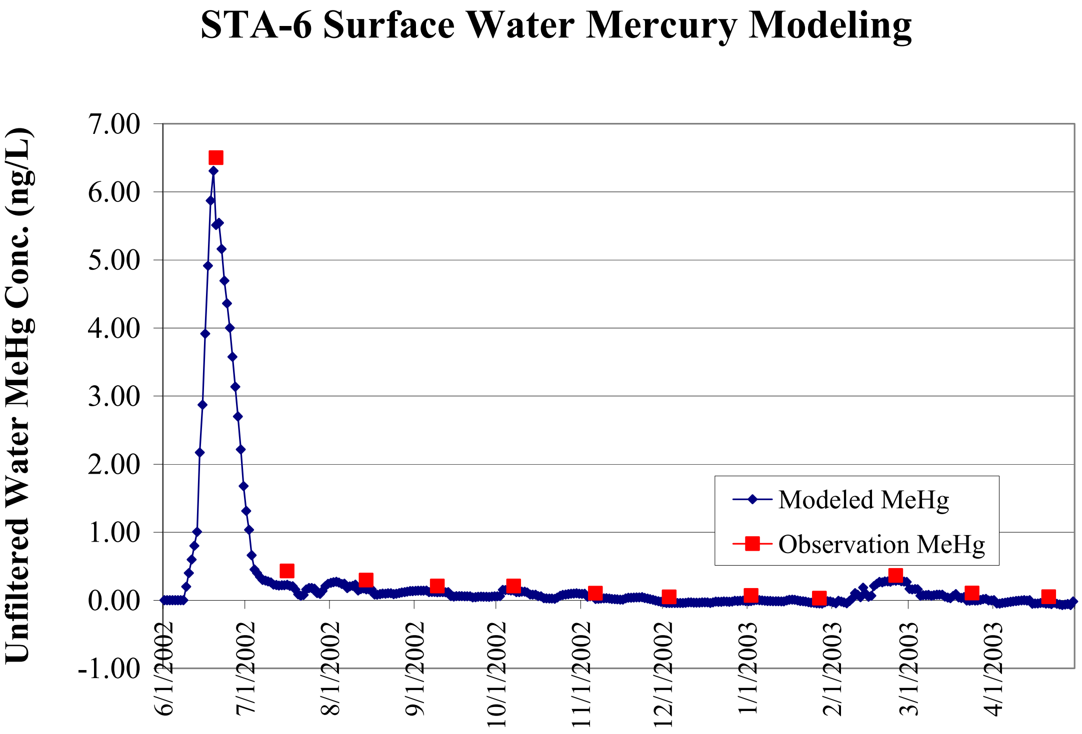

Figure 7E. Modeled STA-6 Cell 5 MeHg surface water concentration with diffusive exchange between surface water and soil/sediment but without internal production from surface water $Hg(II)^{+2}$ but with internal production from soil/sediment $Hg(II)^{+2}$ and with removal by particle settling and decomposition.

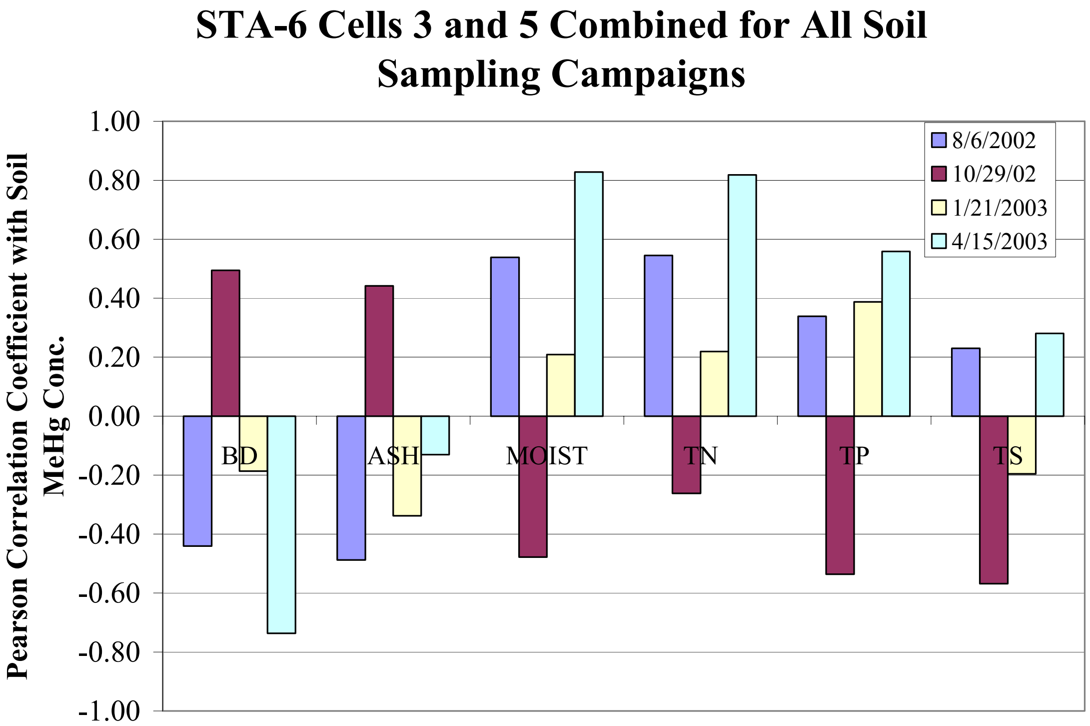

Figure 8a. The Pearson correlation coefficient between soil MeHg concentration and other soil constituent concentrations (bulk density, ash, moisture, total nitrogen, total phosphorus, and total sulfur) average for both STA-2 treatment cells and all sampling events.

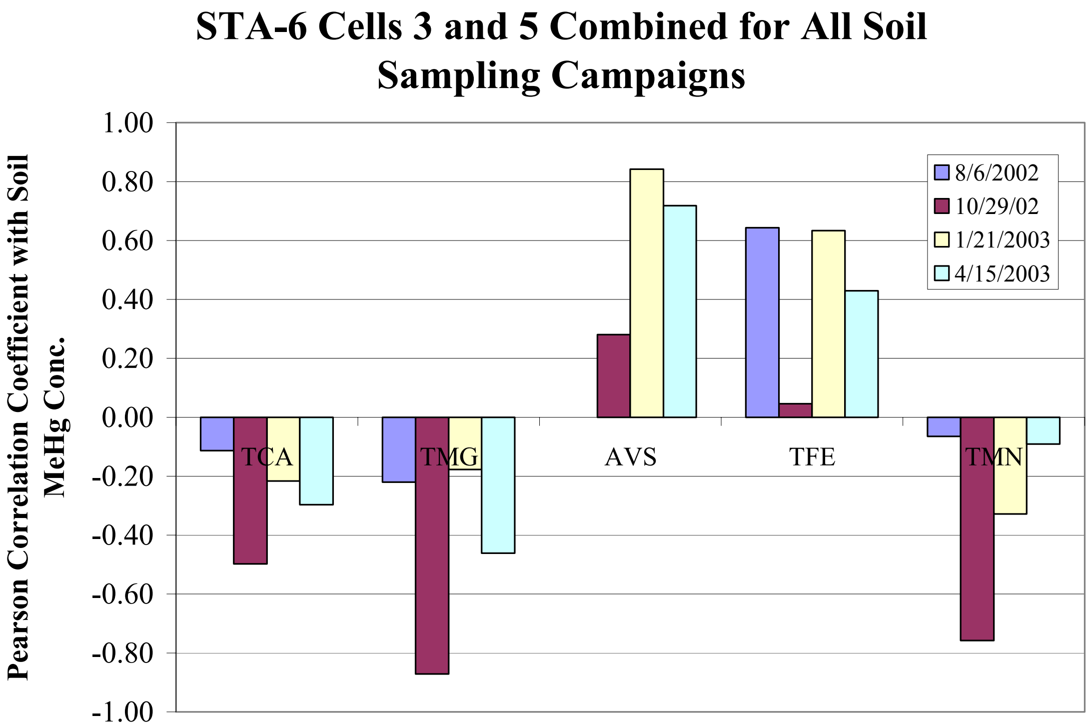

Figure 8b. The Pearson correlation coefficient between soil MeHg concentration and other soil constituent concentrations (total calcium, total magnesium, acid volatile sulfide, total iron, and total manganese) average for both STA-2 treatment cells and all sampling events.

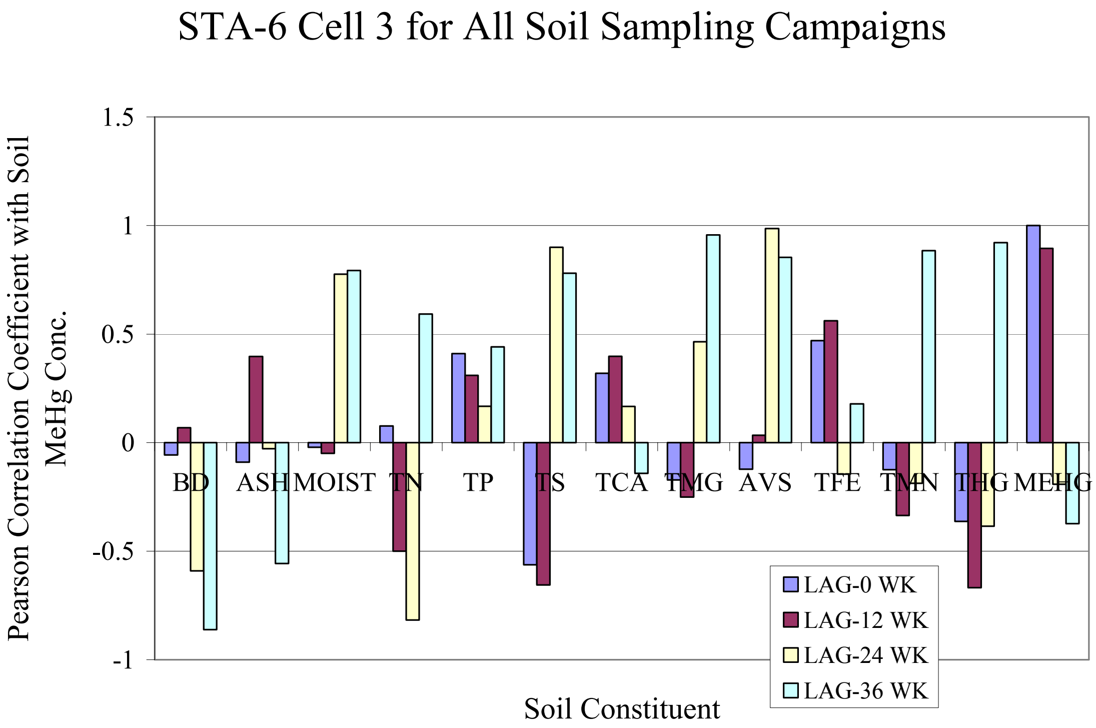

Figure 9A. The Pearson correlation coefficient between soil MeHg concentration and other soil constituent concentrations average for STA-2 Cell 3 paired concurrently (Lag-0), with the preceding sampling event (Lag-12 weeks), with the preceding two sampling events (Lag-24 weeks), and the preceding three sampling events (Lag-36 weeks).

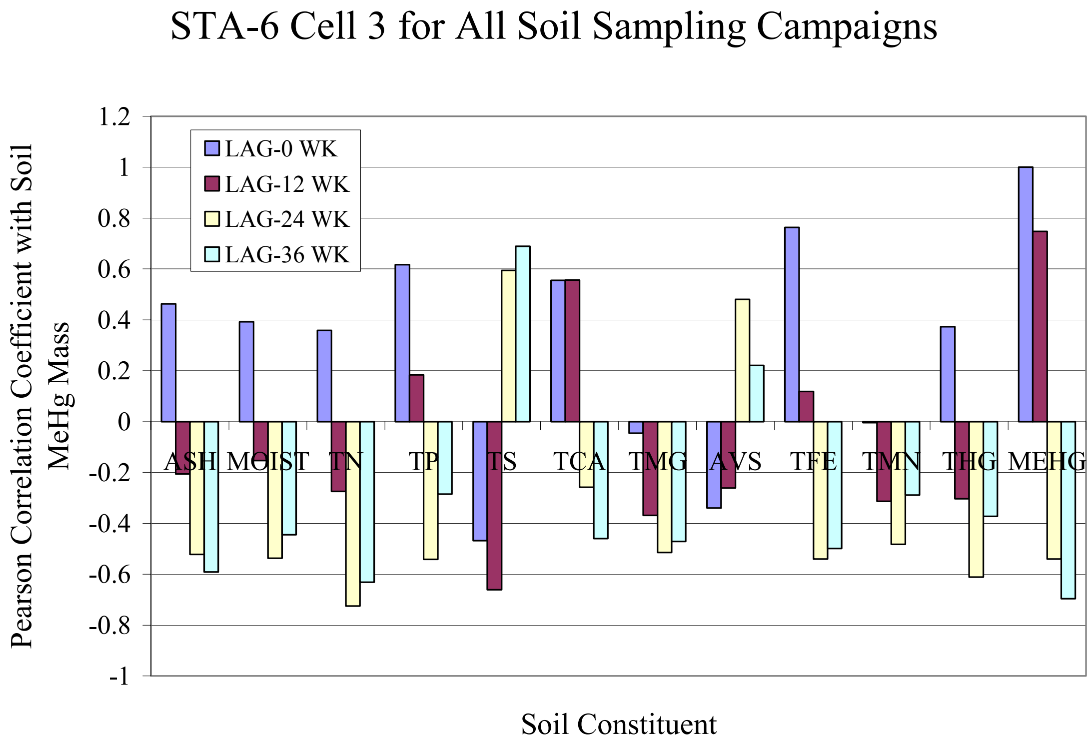

Figure 9B. The Pearson correlation coefficient between soil MeHg mass and other soil constituent masses for STA-2 Cell 3 paired concurrently (Lag-0), with the preceding sampling event (Lag-12 weeks), with the preceding two sampling events (Lag-24 weeks), and the preceding three sampling events (Lag-36 weeks).

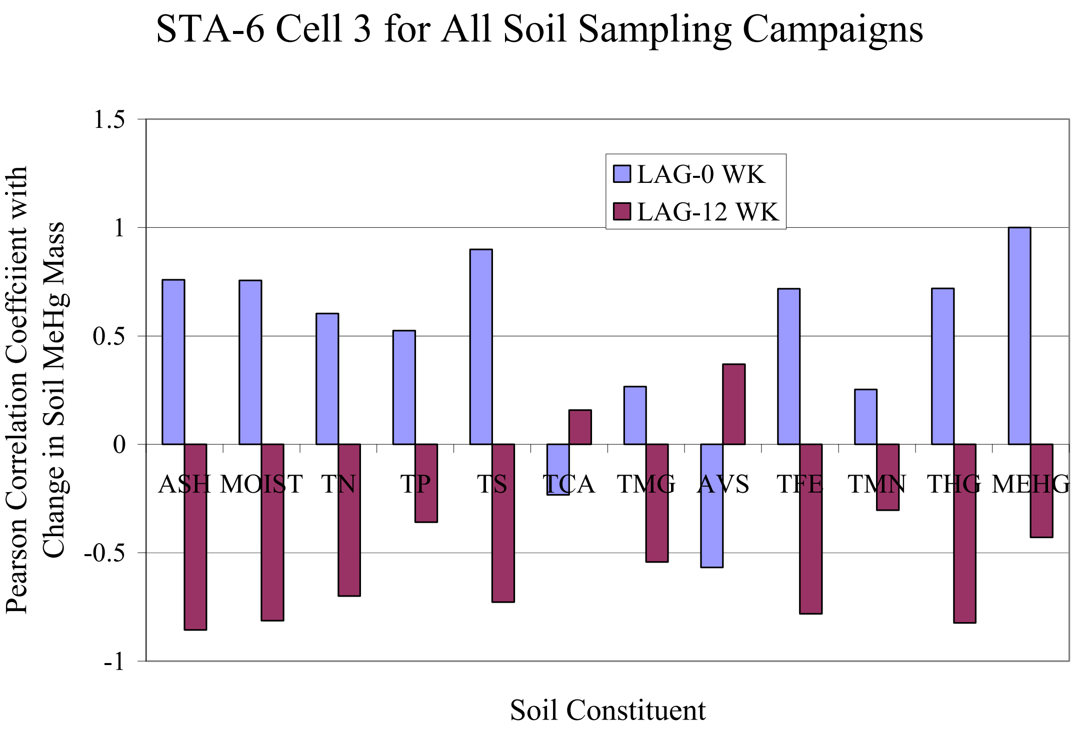

Figure 9C. The Pearson correlation coefficient between change in soil MeHg mass and other soil constituent masses for both STA-2 treatment cells paired concurrently (Lag-0) and with the preceding sampling event (Lag-12 weeks).

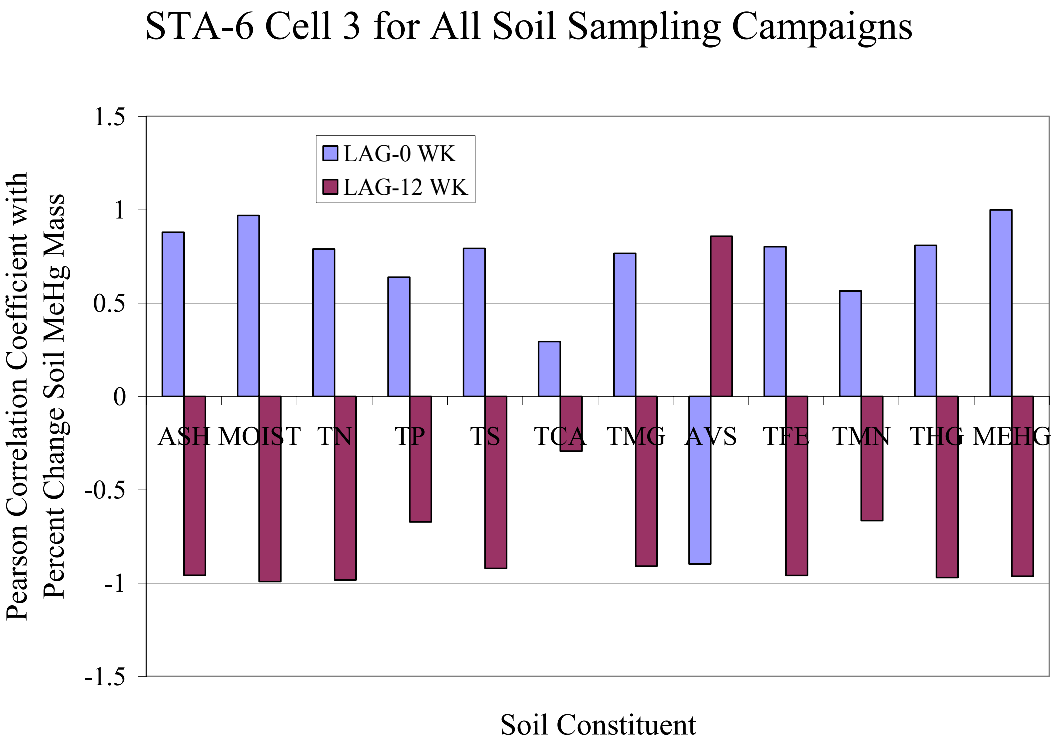

Figure 9D. The Pearson correlation coefficient between percent change soil MeHg mass and percent change other soil constituent masses for STA-2 Cell 3 paired concurrently (Lag-0) and with the preceding sampling event (Lag-12 weeks).

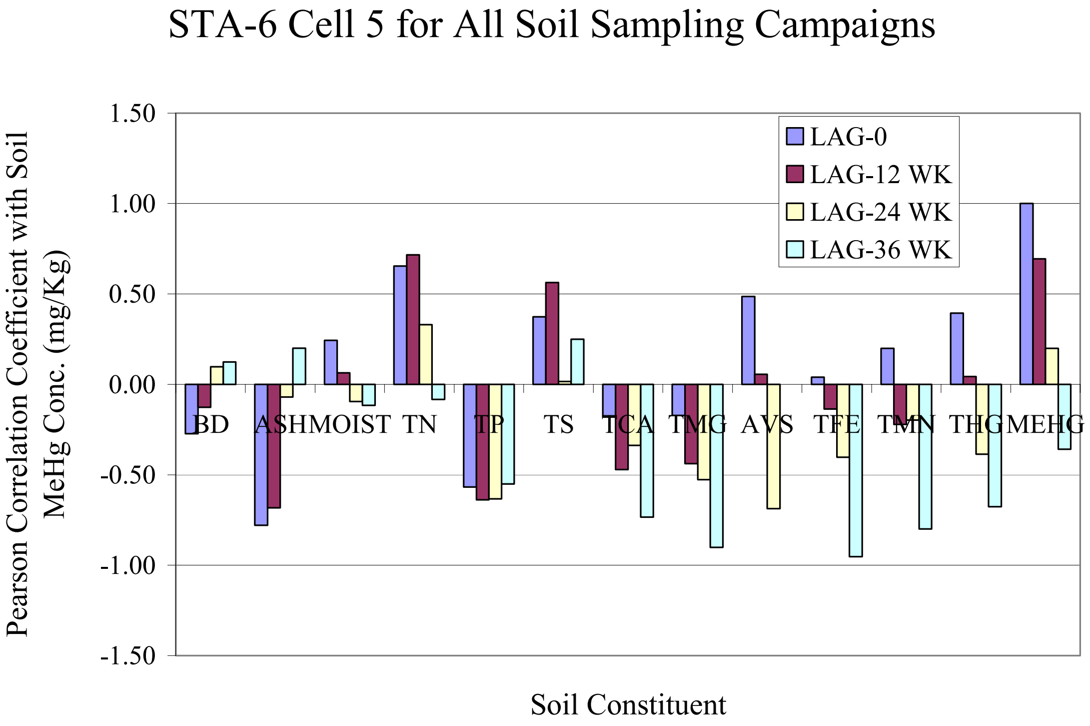

Figure 10A. The Pearson correlation coefficient between soil MeHg concentration and other soil constituent concentration spatial averages for STA-2 Cell 5 paired concurrently (Lag-0), with the preceding sampling event (Lag-12 weeks), with the preceding two sampling events (Lag-24 weeks), and the preceding three sampling events (Lag-36 weeks).

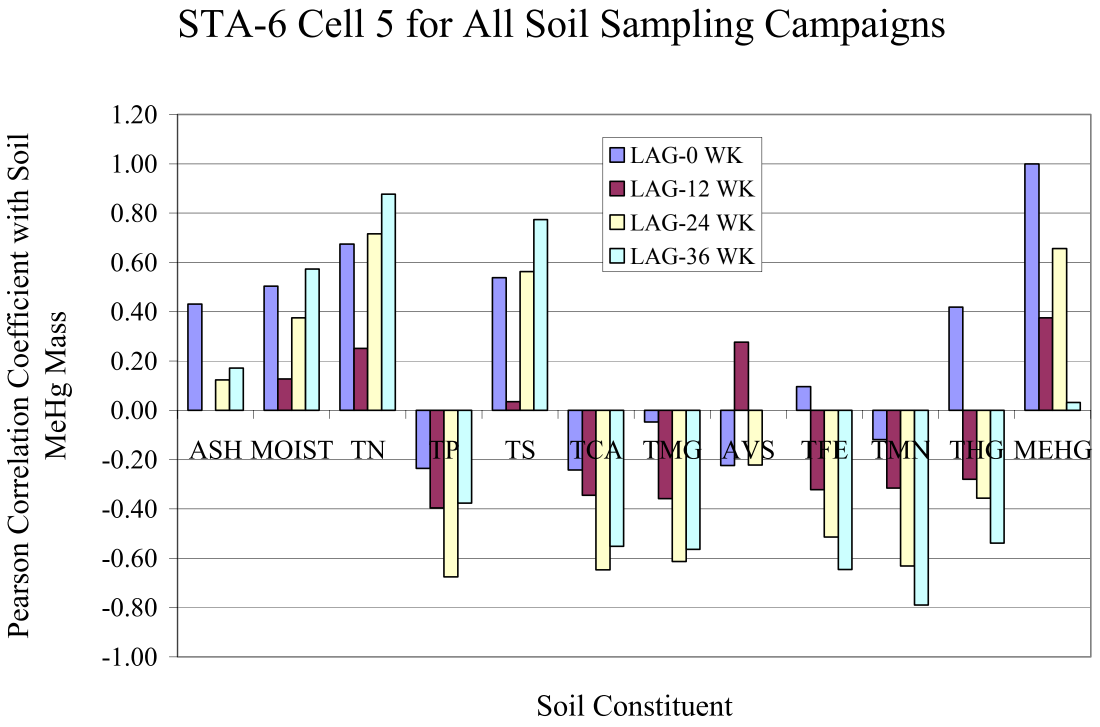

Figure 10B. The Pearson correlation coefficient between soil MeHg mass and other soil constituent masses for STA-2 Cell 5 paired concurrently (Lag-0), with the preceding sampling event (Lag-12 weeks), with the preceding two sampling events (Lag-24 weeks), and the preceding three sampling events (Lag-36 weeks).

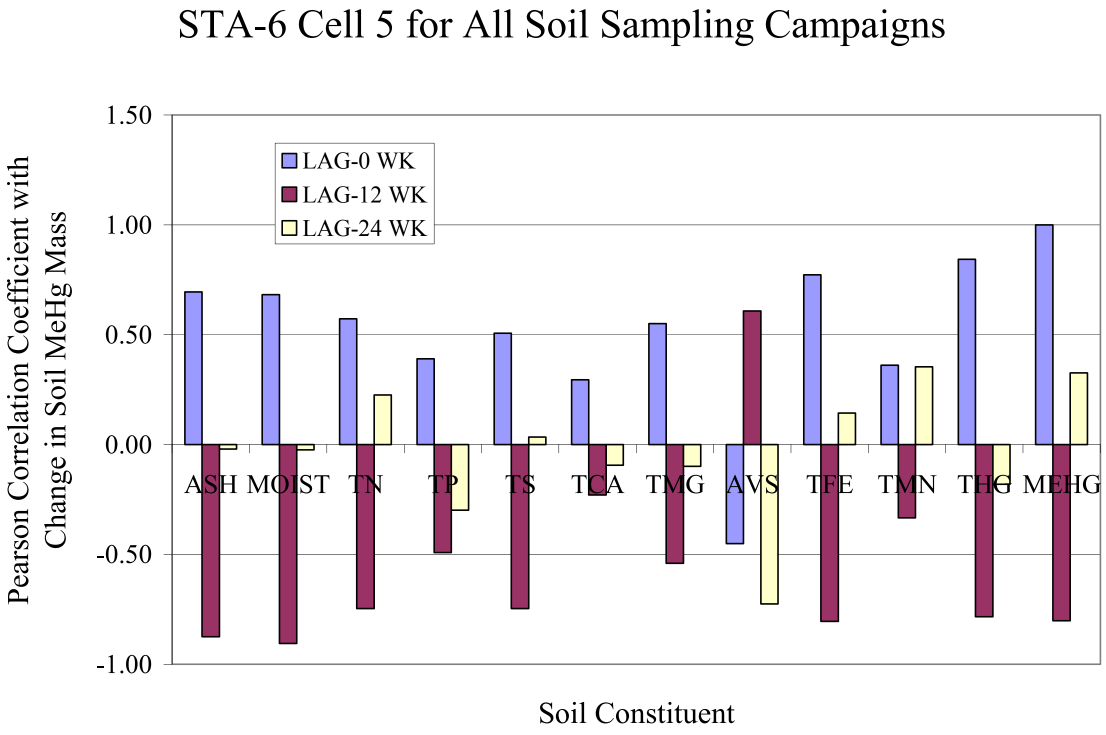

Figure 10C. The Pearson correlation coefficient between change in soil MeHg mass and change in other soil constituent masses for STA-2 Cell 5 paired concurrently (Lag-0), with the preceding sampling event (Lag-12 weeks), and with the second preceding sampling event (Lag-24 weeks).

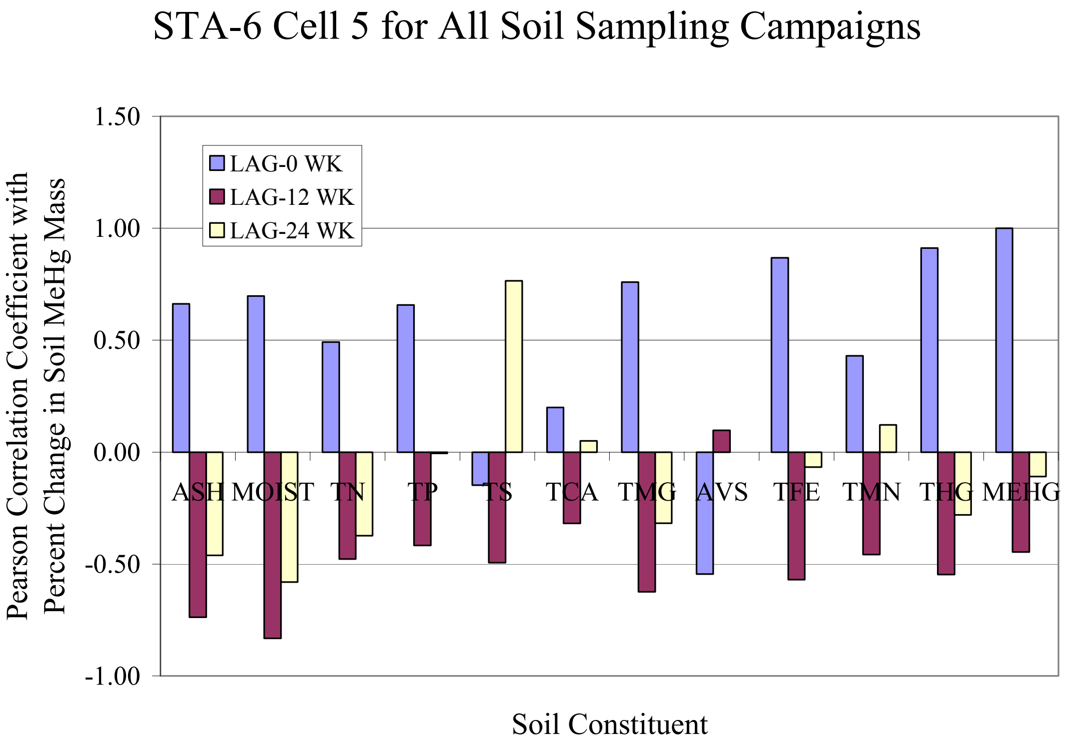

Figure 10D. The Pearson correlation coefficient between percent change in soil MeHg mass and percent change in other soil constituent masses for STA-2 Cell 5 paired concurrently (Lag-0), with the preceding sampling event (Lag-12 weeks), and with the preceding two sampling events (Lag-24 weeks).

Table 1A. Summary of total mercury (THg) concentrations measured in unfiltered surface water samples collected every 4 weeks at the STA-6 common inflow (G-600), STA-6 Cell 3 outflow (G-393B), and STA-6 Cell 5 outflows (G-354A and G-354C).

THg		Inflow (G-600)	Discharge Canal (G606)	Discharge Culvert Cell 3 (G-393B)	Discharge Culvert Cell 5 (G-354A)	Discharge Culvert Cell 5 (G-354C)	Ave. G-354A & G 354C
11/24/1997		1.57					
1/20/1998		0.89					
3/16/1998		0.61					
5/11/1998		1.30					
9/14/1998							
11/19/1998		1.18	1.51				
1/19/1999							
4/26/1999		1.32	0.59				
9/16/1999		1.50	1.00				
12/20/1999		2.00	1.40				
3/13/2000		0.77	0.42				
6/12/2000							
9/13/2000		2.80	3.40				
12/6/2000		2.60	2.30	2.30			2.00
3/14/2001		2.50					
6/20/2001		1.80		7.00			4.60
9/05/01		1.40		2.40			1.60
12/11/2001		1.20		1.10			1.00
2/20/2002		1.00		0.64			0.62
6/20/2002		2.80		6.60	8.80		8.80
7/16/2002		4.80		0.99	2.50		2.50
8/14/2002		1.30		1.70	1.45	1.30	1.60
9/9/2002		1.30		1.30	1.65	1.60	1.70
10/7/2002		0.92		0.74	0.67	0.68	0.65
11/6/2002		1.20		1.30	0.85	0.92	0.77
12/3/2002		1.30		0.23	0.51	0.45	0.57
1/2/2003		0.45		0.66	0.63	0.57	0.68
1/27/2003		0.84		0.69	0.44	0.51	0.36
2/24/2003		1.70		1.20	1.18	1.40	0.95
3/24/2003		1.50		1.00	0.76	0.68	0.83
4/21/2003		0.70		1.30	0.56	0.54	0.58
5/19/2003		1.30		2.00	0.78	0.92	0.64
	AVE	1.12		1.01	0.87	0.87	0.87
	S.D.	0.38		0.43	0.42	0.42	0.44

Table 1B. Summary of methylmercury (MeHg) concentrations measured in unfiltered surface water samples collected every 4 weeks at the STA-6 common inflow (G-600), STA-6 Cell 3 outflow (G-393B), and STA-6 Cell 5 outflows (G-354A and G-354C).

MeHg		Inflow (G-600)	Discharge Canal (G606)	Discharge Culvert Cell 3 (G-393B)	Discharge Culvert Cell 5 (G-354A)	Discharge Culvert Cell 5 (G-354C)	Ave. G-354A & G-354C
11/24/1997							
1/20/1998							
3/16/1998		0.08					
5/11/1998							
9/14/1998							
11/19/1998		0.27	0.23				
1/19/1999		0.21	0.08				
4/26/1999		0.05	0.04				
9/16/1999		0.31	0.07				
12/20/1999		0.15	0.15				
3/13/2000		0.13	0.12				
6/12/2000		0.07	0.06				
9/13/2000		0.90	0.74				
12/6/2000		0.25		0.22			
3/14/2001		0.14					
6/20/2001		0.25		3.40		1.50	
9/05/01				1.10		0.49	
12/11/2001		0.14		0.21		0.26	
2/20/2002		0.15		0.03		0.07	0.07
6/20/2002		0.69		2.80		6.50	6.50
7/16/2002		1.30		1.80		0.43	0.43
8/14/2002		0.43		0.29	0.18	0.41	0.30
9/9/2002		0.22		0.32	0.22	0.20	0.21
10/7/2002		0.24		0.09	0.26	0.16	0.21
11/6/2002		0.12		0.22	0.11	0.10	0.10
12/3/2002		0.15		0.01		0.09	0.04
1/2/2003		0.11		0.04	0.06	0.08	0.07
1/27/2003		0.11		0.02	0.02	0.04	0.03
2/24/2003		0.28		0.16	0.47	0.26	0.37
3/24/2003		0.52		0.05	0.10	0.11	0.11
4/21/2003		0.10		0.52	0.09	0.02	0.05
5/19/2003		0.22		0.88	0.08	0.04	0.06
	AVE	0.35		0.55	0.17	0.15	0.65
	S.D.	0.34		0.84	0.14	0.12	0.12

Table 2B. Summary statistics of STA-6 inflow and outflow surface water constituent concentrations for the period of record (12/97-4/03).

		TEMP (oC)	D.O. (mg/L)	SP CON (uS/cm)	PH	TSS (mg/L)	NOX (mg/L)	NH4 (mg/L)	TKN (mg/L)	TPO4 (mg/L)	TDPO4 (mg/L)	SIO2 (mg/L)	NA (mg/L)	K (mg/L)	CA (mg/L)	MG (mg/L)	CL (mg/L)	SO4 (mg/L)	HARD (mg/L)	TFE (mg/L)	TAL (mg/L)	ALK (mg/L)	DOC (mg/L)
G-600	AVE	24.8	3.5	778.3	7.3	5.4	0.16	0.19	1.7	0.061	0.015	8.7	59.5	4.1	105.3	9.3	84.7	26.6	295.9	244.7	88.4	273.1	25.3
	S.D.	3.4	1.8	140.2	0.3	6.5	0.15	0.15	0.3	0.042	0.009	1.7	16.0	0.7	19.4	1.3	21.9	6.9	50.8	93.8	66.3	53.1	2.2
G-393B	AVE	22.2	2.3	762.7	7.3	1.1	0.01	0.01	1.4	0.025	0.009	8.2	62.6	4.6	96.6	8.9	90.4	23.9	273.3	70.6	9.7	256.0	25.5
	S.D.	4.3	1.8	134.9	0.2	0.7	0.02	0.02	0.4	0.023	0.003	3.0	17.8	1.3	12.5	1.4	22.0	8.7	31.7	49.9	4.5	37.5	1.8
G-354C	AVE	23.7	3.8	727.0	7.5	-0.8	0.01	0.07	1.7	0.021	0.007	8.6	64.5	4.2	87.0	9.0	91.6	21.8	252.6	68.8	9.2	234.2	26.1
	S.D.	4.4	2.6	133.5	0.3	2.7	0.00	0.25	0.5	0.021	0.001	4.1	17.7	1.0	18.7	1.3	22.0	4.8	44.2	58.4	3.0	41.7	1.9

Table 2A. Rainfall THg at the ENR Project (FL34), Andytown (FL04), and Average.

	ENR (FL34) THg (ng/L)	ANDYTOWN (FL04) THg (ng/L)	AVE THg (ng/L)
01/02/02	8.62	5.48	7.05
01/08/02	4.70	10.29	7.50
01/15/02	17.28	18.43	17.85
01/22/02	20.24	0.00	10.12
01/29/02	0.00	0.00	0.00
02/05/02	6.28	18.09	12.19
02/12/02	6.66	11.18	8.92
02/19/02	11.01	12.28	11.65
02/26/02	7.29	5.79	6.54
03/05/02	28.09	16.69	22.39
03/12/02	5.94	12.47	9.21
03/19/02	0.00	0.00	0.00
03/26/02	0.00	0.00	0.00
04/02/02	25.67	34.62	30.14
04/09/02		28.14	28.14
04/16/02	21.74	27.67	24.70
04/23/02	34.33	0.00	17.16
04/30/02	0.00	0.00	0.00
05/07/02	0.00	0.00	0.00
05/14/02	35.11	0.00	17.56
05/21/02	4.41	7.04	5.73
05/28/02	0.00	17.44	8.72
06/04/02	25.57	10.82	18.19
06/11/02	10.09	30.01	20.05
06/18/02	14.93	7.20	11.07
06/25/02	11.79	15.18	13.49
07/02/02	9.17	20.14	14.65
07/09/02	16.25	15.41	15.83
07/16/02	10.45	23.19	16.82
07/23/02	19.29	27.91	23.60
07/30/02	0.00	31.00	15.50
08/06/02	15.39	22.02	18.71
08/13/02	36.82	33.71	35.27
08/20/02	14.80	20.78	17.79
08/27/02	66.81	20.24	43.52

Table 2A. Continued.

	ENR (FL34) THg (ng/L)	ANDYTOWN (FL04) THg (ng/L)	AVE THg (ng/L)
09/03/02	17.07	11.27	14.17
09/10/02	20.36	22.64	21.50
09/17/02	13.48	14.09	13.78
09/24/02	12.79	9.31	11.05
10/01/02	14.00	17.80	15.90
10/08/02	6.50		6.50
10/15/02	36.50	22.90	29.70
10/22/02	8.30	10.70	9.50
10/29/02	15.30	14.90	15.10
11/05/02	17.90	41.80	29.85
11/12/02	4.30	8.30	6.30
11/19/02	9.40	6.30	7.85
11/26/02	4.70	4.10	4.40
12/03/02	7.50	11.60	9.55
12/10/02	7.70	4.30	6.00
12/17/02		7.20	7.20
12/23/02	10.40		10.40
12/31/02			0.00
01/07/03	15.30	13.80	14.55
01/14/03	17.40	19.30	18.35
01/21/03			0.00
01/28/03		6.40	6.40
02/04/03			0.00
02/10/03			0.00
02/18/03	16.80	13.60	15.20
02/25/03	8.70	10.50	9.60
03/04/03		20.50	20.50
03/11/03	8.30	16.80	12.55
03/18/03	11.80	13.90	12.85
03/25/03	7.40	12.40	9.90

Table 2B. Rainfall MeHg at ENR Project (FL34), Andytown (FL04), and Average.

	ENR (FL34)	Andytown (FL04)	Average
Comp Period	**MMHg Conc (ng/L)**	**MMHg Conc (ng/L)**	**MMHg Conc (ng/L)**
07/10 - 07/31/01	0.10	0.20	0.15
07/31 - 08/28/01	0.67	0.01	0.34
08/28 - 09/25/01	0.61	0.01	0.31
10/02 - 10/23/01	0.03	0.00	0.01
10/23 - 11/20/01	0.41	0.01	0.21
11/20 - 12/18/01	0.22	0.00	0.11
12/18 - 01/15/02	0.10	0.03	0.06
01/15 - 02/12/02	0.05	0.01	0.03
02/12 - 03/12/02	0.01	0.01	0.01
03/12 - 04/09/02	0.09	0.00	0.05
04/09 - 05/07/02	0.12	0.04	0.08
05/07 - 06/04/02	0.12	0.02	0.07
06/04 - 07/02/02	0.12	0.00	0.06
07/02 - 07/30/02	0.08	0.02	0.05
07/30 - 08/27/02	0.69	0.03	0.36
08/27 - 09/24/02	0.96	0.02	0.49
09/24 - 10/22/02	0.11	0.01	0.06
10/22 - 11/19/02	0.18	0.00	0.09
11/19 - 12/17/02	0.21	0.00	0.11

Table 3. STA-6 soil constituent concentrations (mg/Kg dry wt) for four sampling events in August and October 2002 and January and April 2003.

Station Id	Date YYYYMMDD	BULK D G/CC	ASH %	MOIST %	TN (mg/Kg)	TP (mg/Kg)	TS (mg/Kg)	TCA (mg/Kg)	TMG (mg/Kg)	AVS (mg/Kg)	TFE (mg/Kg)	TMN (mg/Kg)	THG (mg/Kg)	MEHG (mg/Kg)	% MEHG
PW354A	20020806	0.72	83.3	37.35	6610	3160	1000	180000	2600		5800	58	0.0355	0.0003	0.911042
PW354A	20021029														
PW354A	20021029	0.4	76.4	62.81	9920	4130	1700	140000	1900	35.5	5500	59	0.052	0.0002	0.379923
PW354A	20030121														
PW354A	20030121	0.19	67.6	79.42	15100	3790	1600	150000	2100	222	6100	62	0.056	0.0002	0.339286
PW354A	20030415														
PW354A	20030415	0.38	74.5	67.47	10900	4940		160000	2500	84.5	6600	60	0.0548	0.0002	0.369708
PW354C	20020806	0.26	42.7	71.27	22400	855	1900	110000	1800		6500	90	0.064	0.0015	2.296875
PW354C	20021029														
PW354C	20021029	0.31	35.1	66.12	24200	564	5000	38000	1200	81.3	4000	38	0.0793	0.001	1.201412
PW354C	20030121														
PW354C	20030121	0.24	66.1	77.2	13000	682	1400	200000	2200	299	4600	110	0.0749	0.0007	0.927316
PW354C	20030415														
PW354C	20030415	0.28	60	74.48	15200	768	2800	150000	1900	123	5700	73	0.0453	0.0003	0.555629
PW393A	20020806	0.37	38.8	58.92	21100	420	3000	25000	890	20.4	2700	26	0.0612	0.0013	2.156863
PW393A	20021029														
PW393A	20021029	0.53	43.5	52.06	29100	656	3700	20000	830	25	3400	50	0.0679	0.0008	1.196392
PW393A	20030121														
PW393A	20030121	0.2	35.3	78.28	29200	954	9300	32000	1100	220	4800	51	0.0785	0.0008	0.999873
PW393A	20030415														
PW393A	20030415	0.27	42.8	75.98	15300	674	9000	30000	1000	196	3000	31	0.0609	0.0005	0.791954
PW601	20020806	0.43	69.5	55.37	15600	1180	1400	110000	1200		3200	44	0.0307	0.0004	1.332215
PW601	20021029														
PW601	20021029	0.65	63.8	43.8	14500	972	2700	61000	1100	17.1	4000	27	0.048	0.0007	1.419
PW601	20030121														
PW601	20030121	0.15	46.3	83.6	22500	1550	3500	140000	1900	564	5900	60	0.0583	0.0009	1.596141
PW601	20030415														
PW601	20030415	0.25	61.1	78.13	17000	1360	4500	200000	2000	501	5400	62	0.0607	0.0008	1.274465
PW602	20020806	0.68	72	44.46	10100	965	1100	14000	550		1900	13	0.0266	0.0006	2.35297
PW602	20021029														
PW602	20021029	0.79	71.9	40.12	17600	346	2700	13000	530	28.1	1600	12	0.015	0.0004	2.914667
PW602	20030121														
PW602	20030121	0.35	60.4	64.01	20200	918	3200	29000	720	173	2100	17	0.0252	0.0005	1.870437
PW602	20030415														
PW602	20030415	0.27	49	77.14	25600	1270	3200	62000	1100	189	3900	50	0.0328	0.0008	2.385061
PW603	20020806	0.26	38.6	71.06	24300	1120	2200	59000	890	70.5	6800	39	0.0571	0.0061	10.75306
PW603	20021029														
PW603	20021029	0.58	52	48.52	21900	540	2900	23000	500	74.3	5000	21	0.0656	0.0025	3.780488
PW603	20030121														
PW603	20030121	0.17	39.4	83.18	24100	1190	3700	89000	1500	982	8600	57	0.0586	0.002	3.447099
PW603	20030415														
PW603	20030415	0.18	53.6	84.21	20400	1060	9500	80000	1200	1660	7400	55	0.0515	0.0015	2.873786

Table 4A. Summary of mercury mass budget calculations for Cell 3 and Cell 5.

		STA-6							
		Change Storage (g/yr)	Inflow (g/yr)	Outflow (g/yr)	Seepage (g/yr)	Wet Deposit (g/yr)	Dry Deposit (g/yr)	Evasion (g/yr)	Residual (g/yr)
Cell 3	THg	-15	58	29	17	13	19	3	57
	MeHg	-6	14	15	5	0	0	0	1
Pathway Tot. Inputs	THg	-0.17	0.65	0.32	0.19	0.14	0.21	0.03	0.63
	MeHg	-0.41	0.99	1.06	0.31	0.01	0.00	0.00	0.04
Cell 5	THg	-56	70	56	11	32	48	7	132
	MeHg	-39	17	25	2	0	0	0	30
Ratio Pathway Tot. Inputs	THg	-0.38	0.46	0.38	0.07	0.21	0.32	0.05	0.88
	MeHg	-2.28	1.00	1.44	0.09	0.00	0.00	0.00	1.77
Cell 3 and Cell 5 Combined	THg	-72	128	85	28	45	67	10	189
	MeHg	-45	31	40	6	0	0	0	31
Ratio Pathway Tot. Inputs	THg	-0.30	0.53	0.35	0.12	0.19	0.28	0.04	0.79
	MeHg	-1.42	1.00	1.26	0.19	0.00	0.00	0.00	0.98

Table 4B. Table of mass budgets for STA-6 constituents other than THg and MeHg.

Cell 3

	Inflow		Outflow	Seep	Residual	O/I	S/I	R/I
WATER	3.090E+07	m3/yr	1.773E+07	1.290E+07	0.000E+00	0.574	0.418	0.000
Cl	2.72E+06	Kg/yr	1.47E+06	1.21E+06	0.00E+00	0.542	0.446	0.000
TSS	1.47E+05	Kg/yr	2.04E+04	4.31E+04	8.31E+04	0.139	0.294	0.567
DOC	7.91E+05	Kg/yr	4.39E+05	3.33E+05	1.92E+04	0.555	0.421	0.024
SIO2	3.05E+05	Kg/yr	1.70E+05	1.26E+05	9.20E+03	0.557	0.413	0.030
TP	2.03E+03	Kg/yr	4.69E+02	4.93E+02	1.07E+03	0.230	0.242	0.527
TKN	5.42E+04	Kg/yr	2.47E+04	2.08E+04	8.70E+03	0.456	0.383	0.160
NH4	8.84E+03	Kg/yr	4.68E+02	2.14E+03	6.23E+03	0.053	0.242	0.705
NOX	4.43E+03	Kg/yr	1.31E+02	9.82E+02	3.32E+03	0.030	0.222	0.749
SO4	8.14E+05	Kg/yr	3.91E+05	3.27E+05	9.54E+04	0.480	0.402	0.117
FE	8.84E+03	Kg/yr	1.17E+03	2.31E+03	5.37E+03	0.132	0.261	0.607

Cell 5

	Inflow	Outflow	Seep	Residual	O/I	S/I	R/I
WATER	3.47E+07	2.26E+07	1.45E+07	0.00E+00	0.652	0.418	0.000
Cl	3.02E+06	1.82E+06	1.38E+06	-4.26E+05	0.602	0.458	-0.141
TSS	1.56E+05	2.03E+04	6.13E+04	1.73E+05	0.130	0.393	1.109
DOC	8.86E+05	5.77E+05	3.73E+05	-6.37E+04	0.651	0.421	-0.072
SIO2	3.43E+05	2.17E+05	1.38E+05	-1.29E+04	0.635	0.403	-0.038
TP	2.36E+03	4.06E+02	4.99E+02	1.45E+03	0.172	0.212	0.616
TKN	6.06E+04	3.29E+04	2.36E+04	8.30E+03	0.543	0.390	0.137
NH4	9.95E+03	7.33E+02	2.04E+03	9.92E+03	0.074	0.205	0.997
NOX	4.98E+03	1.46E+02	9.94E+02	3.84E+03	0.029	0.200	0.771
SO4	8.92E+05	4.92E+05	3.69E+05	3.11E+04	0.552	0.413	0.035
FE	9.94E+03	1.44E+03	2.42E+03	6.08E+03	0.145	0.243	0.611

Table 4B. Continued.

	Combined Inflow	Outflow	Seep	Residual	O/I	S/I	R/I
WATER	6.56E+07	4.03E+07	2.74E+07	0.00E+00	0.615	0.418	0.000
Cl	5.74E+06	3.29E+06	2.60E+06	-4.26E+05	0.574	0.452	-0.074
TSS	3.03E+05	4.08E+04	1.04E+05	2.56E+05	0.135	0.345	0.846
DOC	1.68E+06	1.02E+06	7.06E+05	-4.45E+04	0.606	0.421	-0.027
SIO2	6.47E+05	3.87E+05	2.64E+05	-3.66E+03	0.598	0.408	-0.006
TP	4.39E+03	8.75E+02	9.92E+02	2.53E+03	0.199	0.226	0.575
TKN	1.15E+05	5.77E+04	4.44E+04	1.70E+04	0.502	0.387	0.148
NH4	1.88E+04	1.20E+03	4.18E+03	1.62E+04	0.064	0.223	0.860
NOX	9.41E+03	2.77E+02	1.98E+03	7.16E+03	0.029	0.210	0.761
SO4	1.71E+06	8.83E+05	6.96E+05	1.27E+05	0.518	0.408	0.074
FE	1.88E+04	2.61E+03	4.73E+03	1.14E+04	0.139	0.252	0.610

Table 4C. Percent change in soil concentration and stored mass load.

Cell 3	BD	ASH	MOIST	TN	TP	TS	TCA	TMG	AVS	TFE	TMN	THG	MEHG
Change in Soil Concentratio	-28.57	24.55	23.24	-21.37	12.60	255.77	30.95	23.60	1941.80	9.47	32.31	-4.99	-73.70
Change in Soil Load		-13.07	-11.43	-44.76	-16.53	146.14	-8.50	-13.32	1259.15	-22.59	-7.54	-31.41	-80.98

100%(Last-First)/First*

Cell 5	BD	ASH	MOIST	TN	TP	TS	TCA	TMG	AVS*	TFE	TMN	THG	MEHG
Change in Soil Concentration	-43.54	-8.56	42.59	25.57	35.36	133.33	38.16	21.95	454.01	24.14	19.51	23.47	-28.93
Change in Soil Load		-50.90	-12.68	-19.04	-24.20	44.73	-21.15	-29.44	233.94	-23.75	-22.26	-21.70	-54.62

100%(Last-First)/First*

* No AVS analyses for first sampling campaign. Used second campaign.

Table 5A. Pearson Correlation Coefficient between Cell 3 outflow THg, MeHg, and %MeHg and the average of Cell 3 Stage from Lag-0 days through Lag-14 days, Lag-21 days, Lag-28 days, Lag-56 days, and Lag-84 days.

Stage

Cell 3	Average Lag-0	Average Lag-1	Average Lag-2	Average Lag-3	Average Lag-4	Average Lag-5	Average Lag-6	Average Lag-7	Average Lag-8	Average Lag-9
THg	0.01	0.01	0.00	-0.03	-0.05	-0.07	-0.07	-0.09	-0.11	-0.12
MeHg	0.70	0.70	0.74	0.76	0.77	0.77	0.77	0.77	0.77	0.77
%MeHg	0.73	0.73	0.77	0.79	0.80	0.80	0.80	0.80	0.80	0.80

	Average Lag-10	Average Lag-11	Average Lag-12	Average Lag-13	Average Lag-14	Average Lag-21	Average Lag-28	Average Lag-56	Average Lag-84
THg	-0.12	-0.11	-0.11	-0.09	-0.08	-0.02	0.11	0.48	-0.41
MeHg	0.76	0.76	0.76	0.77	0.77	0.76	0.75	0.36	-0.12
%MeHg	0.80	0.79	0.79	0.79	0.79	0.77	0.75	0.27	0.03

Table 5B. Pearson Correlation Coefficient between Cell 5 outflow THg, MeHg, and %MeHg and the average of Cell 5 Stage from Lag-0 days through Lag-14 days, Lag-21 days, Lag-28 days, Lag-56 days, and Lag-84 days.

Cell 5	Average Lag-0	Average Lag-1	Average Lag-2	Average Lag-3	Average Lag-4	Average Lag-5	Average Lag-6	Average Lag-7	Average Lag-8	Average Lag-9
THg	0.68	0.68	0.72	0.73	0.73	0.73	0.73	0.72	0.72	0.71
MeHg	0.60	0.60	0.61	0.62	0.61	0.60	0.59	0.57	0.55	0.49
%MeHg	0.13	0.13	0.11	0.10	0.09	0.08	0.07	0.05	0.02	-0.05

	Average Lag-10	Average Lag-11	Average Lag-12	Average Lag-13	Average Lag-14	Average Lag-21	Average Lag-28	Average Lag-56	Average Lag-84
THg	0.68	0.66	0.64	0.63	0.63	0.64	0.64	0.51	-0.71
MeHg	0.40	0.33	0.28	0.25	0.24	0.24	0.26	0.16	-0.61
%MeHg	-0.15	-0.24	-0.30	-0.33	-0.34	-0.32	-0.29	-0.10	-0.02

Table 6A. Pearson Correlation Coefficient between Cell 3 outflow THg, MeHg, and %MeHg and the average of Cell 3 HRT from Lag-0 days through Lag-14 days, Lag-28 days, Lag-56 days, and Lag-84 days.

HRT

Cell 3	Average Lag-0	Average Lag-1	Average Lag-2	Average Lag-3	Average Lag-4	Average Lag-5	Average Lag-6	Average Lag-7	Average Lag-8	Average Lag-9
THg	0.06	0.06	0.09	0.13	0.13	0.13	0.21	0.26	0.26	0.25
MeHg	-0.31	-0.31	-0.29	-0.25	-0.24	-0.26	-0.25	-0.26	-0.27	-0.30
%MeHg	-0.30	-0.30	-0.29	-0.25	-0.24	-0.26	-0.27	-0.29	-0.30	-0.33

	Average Lag-10	Average Lag-11	Average Lag-12	Average Lag-13	Average Lag-14	Average Lag-21	Average Lag-28	Average Lag-56	Average Lag-84
THg	0.22	0.20	0.19	0.16	0.15	-0.10	-0.37	-0.57	-0.51
MeHg	-0.33	-0.34	-0.33	-0.35	-0.36	-0.51	-0.52	-0.42	-0.64
%MeHg	-0.35	-0.35	-0.34	-0.36	-0.37	-0.50	-0.49	-0.37	-0.60

Table 6B. Pearson Correlation Coefficient between Cell 3 outflow THg, MeHg, and %MeHg and the average of Cell 5 HRT from Lag-0 days through Lag-14 days, Lag-28 days, Lag-56 days, and Lag-84 days.

HRT

Cell 5	Average Lag-0	Average Lag-1	Average Lag-2	Average Lag-3	Average Lag-4	Average Lag-5	Average Lag-6	Average Lag-7	Average Lag-8	Average Lag-9
THg	-0.40	-0.40	-0.38	-0.34	-0.38	-0.40	-0.47	-0.51	-0.53	-0.73
MeHg	0.15	0.15	0.16	0.20	0.12	0.06	-0.05	-0.13	-0.19	-0.43
%MeHg	0.71	0.71	0.70	0.71	0.65	0.58	0.50	0.42	0.36	0.18

	Average Lag-10	Average Lag-11	Average Lag-12	Average Lag-13	Average Lag-14	Average Lag-21	Average Lag-28	Average Lag-56	Average Lag-84
THg	-0.77	-0.79	-0.83	-0.86	-0.89	-0.40	-0.45	-0.46	-0.74
MeHg	-0.48	-0.51	-0.59	-0.65	-0.70	-0.40	-0.31	-0.28	-0.60
%MeHg	0.16	0.15	0.06	0.01	-0.04	-0.11	0.08	-0.02	-0.08

Table 7. Pearson Correlation Coefficient between rainfall THg concentration (average of ENR Project and Andytown site values) and Cell 3 or Cell 5 outflow THg, MeHg, and fraction MeHg (conc. MeHg/conc. THg).

	Cell 3 THg	Cell 5 THg	Cell 3 MeHg	Cell 5 MeHg	Cell 3 frac MeHg	Cell 5 frac MeHg
LAG-0	0.09	0.02	0.05	-0.08	0.15	-0.09
LAG-7	0.54	0.52	0.51	0.44	0.31	0.60
LG-14	0.17	0.20	0.17	0.11	0.10	-0.04
LAG-21	-0.08	-0.17	-0.14	-0.21	-0.01	-0.30
LAG-28	-0.25	-0.18	-0.23	-0.23	-0.08	-0.19
LAG-35	0.25	0.32	0.43	0.23	0.43	0.09
LAG-42	-0.36	-0.32	-0.23	-0.34	0.11	-0.03
LAG-56	0.04	0.03	-0.09	0.08	-0.25	0.16
LAG-84	-0.43	-0.38	-0.31	-0.37	0.00	-0.39

Table 8A. Pearson Correlation Coefficients for rain THg load versus Cell 3 outflow surface water THg, MeHg, and %MeHg concentrations.

Rain THg Load vs Outflow THg, MeHg, and %MeHg Concentrations

Cell 3	Lag-0	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5	Lag-6	Lag-7	Lag-8	Lag-9
THg	0.05	0.05	0.14	0.09	0.88	0.54	-0.09	0.23	0.93	-0.10
MeHg	-0.11	-0.11	0.63	-0.06	0.68	0.91	0.46	0.27	0.93	0.23
%MeHg	-0.13	-0.13	0.95	-0.10	-0.02	0.85	0.96	0.27	0.34	0.65

	Lag-10	Lag-11	Lag-12	Lag-13	Lag-14	Lag-21	Lag-28	Lag-56	Lag-84
THg	-0.11	0.11	0.96	-0.20	-0.03	0.02	-0.25	0.28	-0.65
MeHg	0.41	0.04	0.81	0.23	0.02	-0.11	-0.11	-0.14	-0.27
%MeHg	0.91	-0.03	0.06	0.70	0.15	-0.10	0.07	-0.16	-0.23

Rain THg Load vs Outflow THg, MeHg, and %MeHg Concentrations

Cell 3	Sum Lag-0	Sum Lag-1	Sum Lag-2	Sum Lag-3	Sum Lag-4	Sum Lag-5	Sum Lag-6	Sum Lag-7	Sum Lag-8	Sum Lag-9
THg	0.05	0.05	0.16	0.10	0.33	0.60	0.53	0.50	0.60	0.54
MeHg	-0.11	-0.11	0.52	-0.02	0.16	0.72	0.73	0.68	0.77	0.73
%MeHg	-0.13	-0.13	0.81	-0.04	-0.05	0.53	0.64	0.60	0.60	0.63

	Sum Lag-10	Sum Lag-11	Sum Lag-12	Sum Lag-13	Sum Lag-14	Sum Lag-21	Sum Lag-28	Sum Lag-56	Sum Lag-84
THg	0.51	0.52	0.64	0.64	0.64	0.65	0.57	0.59	0.50
MeHg	0.73	0.74	0.81	0.81	0.82	0.83	0.81	0.40	0.46
%MeHg	0.67	0.67	0.62	0.63	0.65	0.64	0.71	0.28	0.42

Table 8B. Pearson Correlation Coefficient for rain THg load versus Cell 5 outflow surface water THg, MeHg, and %MeHg.

Rain THg Load vs Outflow THg, MeHg, and %MeHg Concentrations

Cell 5	Lag-0	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5	Lag-6	Lag-7	Lag-8	Lag-9
THg	-0.05	-0.05	0.35	0.03	0.85	0.71	0.12	0.25	0.96	0.03
MeHg	-0.09	-0.09	0.18	-0.02	0.89	0.59	-0.05	0.14	0.96	-0.13
%MeHg	-0.11	-0.11	0.10	-0.01	0.86	0.49	-0.06	0.13	0.84	-0.11

	Lag-10	Lag-11	Lag-12	Lag-13	Lag-14	Lag-21	Lag-28	Lag-56	Lag-84
THg	0.08	0.15	0.96	0.00	-0.03	-0.02	-0.16	-0.11	-0.26
MeHg	-0.07	0.06	0.99	-0.18	-0.12	-0.09	-0.14	-0.16	-0.42
%MeHg	-0.07	-0.02	0.85	-0.28	-0.23	-0.08	0.07	-0.11	-0.41

Rain THg Load vs Outflow THg, MeHg, and %MeHg Concentrations

Cell 5	Sum Lag-0	Sum Lag-1	Sum Lag-2	Sum Lag-3	Sum Lag-4	Sum Lag-5	Sum Lag-6	Sum Lag-7	Sum Lag-8	Sum Lag-9
THg	-0.05	-0.05	0.29	0.06	0.28	0.67	0.64	0.59	0.69	0.64
MeHg	-0.09	-0.09	0.11	-0.02	0.22	0.56	0.50	0.46	0.57	0.51
%MeHg	-0.11	-0.11	0.03	-0.01	0.22	0.49	0.44	0.40	0.50	0.44

	Sum Lag-10	Sum Lag-11	Sum Lag-12	Sum Lag-13	Sum Lag-14	Sum Lag-21	Sum Lag-28	Sum Lag-56	Sum Lag-84
THg	0.62	0.63	0.74	0.74	0.74	0.76	0.69	0.84	0.85
MeHg	0.48	0.49	0.61	0.61	0.60	0.62	0.54	0.44	0.49
%MeHg	0.42	0.42	0.53	0.53	0.51	0.50	0.43	-0.04	0.07

Table 9A. Pearson Correlation Coefficient for inflow THg load versus Cell 3 outflow THg, MeHg, and %MeHg.

Inflow THg vs Outflow THg, MeHg, and %MeHg Concentrations

Cell 3	Lag-0	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5	Lag-6	Lag-7	Lag-8	Lag-9
THg	0.05	0.05	0.08	0.06	0.09	0.04	0.05	0.05	0.11	0.08
MeHg	0.89	0.89	0.89	0.86	0.91	0.93	0.91	0.90	0.88	0.91
%MeHg	0.91	0.91	0.91	0.88	0.92	0.95	0.93	0.92	0.90	0.93

	Lag-10	Lag-11	Lag-12	Lag-13	Lag-14	Lag-21	Lag-28	Lag-56	Lag-84
THg	-0.01	-0.01	0.10	0.25	0.29	0.32	0.33	0.36	0.34
MeHg	0.89	0.93	0.89	0.80	0.77	0.85	0.95	0.38	0.34
%MeHg	0.93	0.96	0.90	0.78	0.75	0.84	0.92	0.41	0.35

Inflow THg Load vs Outflow THg, MeHg, and %MeHg Concentrations

Cell 3	Sum Lag-0	Sum Lag-1	Sum Lag-2	Sum Lag-3	Sum Lag-4	Sum Lag-5	Sum Lag-6	Sum Lag-7	Sum Lag-8	Sum Lag-9
THg	0.05	0.05	0.06	0.06	0.07	0.06	0.06	0.06	0.06	0.07
MeHg	0.89	0.89	0.89	0.88	0.89	0.90	0.90	0.90	0.90	0.90
%MeHg	0.91	0.91	0.91	0.90	0.91	0.92	0.92	0.92	0.92	0.92

	Sum Lag-10	Sum Lag-11	Sum Lag-12	Sum Lag-13	Sum Lag-14	Sum Lag-21	Sum Lag-28	Sum Lag-56	Sum Lag-84
THg	0.06	0.05	0.06	0.07	0.08	0.12	0.19	0.63	0.54
MeHg	0.90	0.91	0.91	0.91	0.91	0.92	0.91	0.38	0.42
%MeHg	0.92	0.93	0.93	0.93	0.93	0.93	0.91	0.23	0.34

Table 9B. Pearson Correlation Coefficient for inflow MeHg versus Cell 3 outflow THg, MeHg, and %MeHg.

MeHg Inflow Load vs Outflow THg, MeHg, and %MeHg Concentrations

Cell 3	Lag-0	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5	Lag-6	Lag-7	Lag-8	Lag-9	Lag-10	Lag-11	Lag-12	Lag-13	Lag-14	Lag-21	Lag-28	Lag-56	Lag-84
THg	0.33	0.12	0.14	0.13	0.15	0.10	0.12	0.12	0.18	0.14	0.04	0.04	0.18	0.36	0.40	0.38	0.44	0.56	0.11
MeHg	0.72	0.87	0.87	0.84	0.89	0.92	0.91	0.90	0.89	0.91	0.90	0.94	0.90	0.79	0.76	0.85	0.89	-0.16	-0.18
%MeHg	0.87	0.89	0.89	0.86	0.90	0.94	0.92	0.91	0.90	0.92	0.93	0.97	0.90	0.77	0.73	0.83	0.85	-0.22	-0.20

Inflow MeHg Load vs Outflow THg, MeHg, and %MeHg Concentrations

Cell 3	Sum Lag-0	Sum Lag-1	Sum Lag-2	Sum Lag-3	Sum Lag-4	Sum Lag-5	Sum Lag-6	Sum Lag-7	Sum Lag-8	Sum Lag-9	Sum Lag-10	Sum Lag-11	Sum Lag-12	Sum Lag-13	Sum Lag-14	Sum Lag-21	Sum Lag-28	Sum Lag-56	Sum Lag-84
THg	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.12	0.13	0.13	0.12	0.12	0.12	0.14	0.16	0.20	0.27	0.67	0.55
MeHg	0.87	0.87	0.87	0.86	0.87	0.89	0.89	0.89	0.89	0.90	0.90	0.90	0.91	0.91	0.91	0.91	0.90	0.44	0.37
%MeHg	0.89	0.89	0.89	0.88	0.89	0.90	0.91	0.91	0.91	0.91	0.91	0.92	0.92	0.92	0.92	0.91	0.89	0.30	0.32

Table 9C. Pearson Correlation Coefficient for inflow THg versus Cell 5 outflow THg, MeHg, and %MeHg.

Inflow THg vs Outflow THg, MeHg, and %MeHg Concentrations

Cell 5	Lag-0	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5	Lag-6	Lag-7	Lag-8	Lag-9	Lag-10	Lag-11	Lag-12	Lag-13	Lag-14	Lag-21	Lag-28	Lag-56	Lag-84
THg	0.13	0.13	0.86	0.29	-0.09	0.78	0.79	0.57	0.54	0.75	0.74	0.36	0.01	0.77	0.34	0.31	-0.07	0.02	-0.21
MeHg	0.05	0.05	0.62	0.27	0.19	0.62	0.64	0.50	0.47	0.62	0.62	0.10	-0.22	0.41	0.02	0.27	0.12	-0.07	-0.40
%MeHg	-0.06	-0.06	-0.02	0.06	0.41	0.02	0.05	0.07	0.11	0.07	0.06	-0.13	-0.26	-0.22	-0.25	0.03	0.41	-0.11	-0.41

THg Inflow Load vs Outflow THg, MeHg, and %MeHg Concentrations

Cell 5	Sum Lag-0	Sum Lag-1	Sum Lag-2	Sum Lag-3	Sum Lag-4	Sum Lag-5	Sum Lag-6	Sum Lag-7	Sum Lag-8	Sum Lag-9	Sum Lag-10	Sum Lag-11	Sum Lag-12	Sum Lag-13	Sum Lag-14	Sum Lag-21	Sum Lag-28	Sum Lag-56	Sum Lag-84
THg	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.83	0.83	0.84	0.85	0.86	0.74	0.79
MeHg	0.69	0.69	0.71	0.70	0.69	0.69	0.69	0.69	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.69	0.69	0.48	0.55
%MeHg	0.08	0.08	0.10	0.10	0.08	0.07	0.07	0.07	0.08	0.08	0.09	0.09	0.08	0.08	0.07	0.04	0.03	0.03	0.04

Table 9D. Pearson Correlation Coefficient for inflow MeHg versus Cell 5 outflow THg, MeHg, and %MeHg.

Inflow MeHg Load vs Outflow THg, MeHg, and %MeHg Concentrations

Cell 5	Lag-0	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5	Lag-6	Lag-7	Lag-8	Lag-9
THg	0.83	0.83	0.81	0.83	0.82	0.83	0.84	0.86	0.84	0.80
MeHg	0.71	0.71	0.68	0.68	0.67	0.69	0.69	0.74	0.73	0.69
%MeHg	0.10	0.10	0.07	0.05	0.05	0.06	0.06	0.11	0.11	0.11

	Lag-10	Lag-11	Lag-12	Lag-13	Lag-14	Lag-21	Lag-28	Lag-56	Lag-84
THg	0.83	0.88	0.87	0.88	0.87	0.87	0.30	0.56	-0.25
MeHg	0.68	0.70	0.69	0.68	0.68	0.68	0.23	0.15	0.12
%MeHg	0.07	0.05	0.01	-0.01	0.00	0.03	0.01	-0.07	0.50

Inflow MeHg Load vs Outflow THg, MeHg, and %MeHg Concentrations

Cell 5	Sum Lag-0	Sum Lag-1	Sum Lag-2	Sum Lag-3	Sum Lag-4	Sum Lag-5	Sum Lag-6	Sum Lag-7	Sum Lag-8	Sum Lag-9
THg	0.83	0.83	0.83	0.82	0.83	0.83	0.83	0.83	0.83	0.83
MeHg	0.69	0.69	0.70	0.69	0.69	0.69	0.69	0.69	0.69	0.70
%MeHg	0.08	0.08	0.09	0.08	0.07	0.07	0.07	0.07	0.07	0.08

	Sum Lag-10	Sum Lag-11	Sum Lag-12	Sum Lag-13	Sum Lag-14	Sum Lag-21	Sum Lag-28	Sum Lag-56	Sum Lag-84
THg	0.83	0.83	0.84	0.84	0.85	0.86	0.87	0.76	0.79
MeHg	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.49	0.56
%MeHg	0.08	0.08	0.08	0.07	0.07	0.05	0.04	0.04	0.05

Table 10A. Pearson Correlation Coefficients for G-600 other water constituents versus G-600 THg, MeHg, and %MeHg.

LAG-0 G-600

G-600	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
THg	0.40	-0.62	-0.88	-0.60	0.07	0.91	0.08	-0.49	-0.27	-0.20	0.94	0.96	-0.45	-0.55
MeHg	0.40	-0.60	-0.88	-0.61	0.07	0.91	0.02	-0.28	-0.27	-0.29	0.94	0.95	-0.35	-0.58
% MeHg	0.19	-0.33	-0.32	-0.38	0.15	0.41	-0.01	0.48	-0.01	-0.24	0.35	0.33	0.21	-0.32

LAG-0 G-600

G-600	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	DOC	THg	MeHg	%MeHg
THg	-0.53	-0.56	-0.89	-0.57	-0.72	-0.32	-0.57	-0.44	-0.68	-0.14	1.00	0.95	0.29
MeHg	-0.57	-0.57	-0.87	-0.62	-0.70	-0.32	-0.62	-0.46	-0.68	-0.18	0.95	1.00	0.55
% MeHg	-0.33	-0.26	-0.34	-0.41	-0.27	-0.13	-0.39	-0.16	-0.33	-0.23	0.29	0.55	1.00

LAG-1 G-600

G-600	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
THg	0.25	-0.01	-0.38	0.27	0.59	0.17	0.56	-0.56	-0.49	0.45	0.13	0.30	-0.48	-0.57
MeHg	0.27	-0.09	-0.44	0.17	0.59	0.28	0.61	-0.63	-0.43	0.49	0.27	0.44	-0.51	-0.60
% MeHg	0.20	-0.21	-0.43	-0.11	0.25	0.39	0.39	-0.56	-0.07	0.32	0.52	0.60	-0.29	-0.32

LAG-1 G-600

G-600	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	TOC	THg	MeHg	%MeHg
THg	-0.55	-0.56	-0.71	-0.53	-0.80	-0.62	-0.54	-0.54	-0.83	-0.64	0.35	0.30	0.08
MeHg	-0.57	-0.60	-0.76	-0.57	-0.80	-0.59	-0.57	-0.54	-0.83	-0.61	0.52	0.44	0.08
% MeHg	-0.26	-0.32	-0.49	-0.28	-0.40	-0.13	-0.28	-0.19	-0.36	-0.11	0.68	0.53	-0.10

LAG-2 G-600

G-600	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
THg	0.11	0.63	-0.32	0.87	0.72	-0.42	0.51	-0.44	-0.76	-0.02	-0.15	0.07	-0.51	-0.61
MeHg	0.05	0.64	-0.33	0.88	0.76	-0.41	0.54	-0.47	-0.76	0.06	-0.15	0.07	-0.52	-0.60
% MeHg	-0.16	0.27	-0.23	0.39	0.35	-0.10	0.16	-0.25	-0.42	0.04	-0.04	0.05	-0.28	-0.35

LAG-2

G-600	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	TOC	THg	MeHg	%MeHg
THg	-0.58	-0.60	-0.60	-0.59	-0.64	-0.61	-0.60	-0.57	-0.69	-0.67	0.01	0.17	0.42
MeHg	-0.56	-0.58	-0.63	-0.57	-0.69	-0.61	-0.57	-0.59	-0.74	-0.66	0.05	0.12	0.14
% MeHg	-0.33	-0.32	-0.40	-0.32	-0.49	-0.39	-0.30	-0.45	-0.50	-0.38	0.06	0.06	-0.04

LAG-3 G-600

G-600	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
THg	-0.01	0.09	0.05	0.25	-0.02	-0.24	-0.06	-0.37	-0.46	-0.24	-0.20	-0.13	-0.31	-0.40
MeHg	-0.05	0.23	-0.05	0.40	0.07	-0.27	-0.03	-0.45	-0.58	-0.33	-0.16	-0.08	-0.46	-0.58
% MeHg	-0.07	0.40	-0.32	0.51	0.32	-0.13	0.17	-0.45	-0.52	-0.26	0.09	0.19	-0.61	-0.75

LAG-3 G-600

G-600	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	DOC	THg	MeHg	%MeHg
THg	-0.39	-0.40	-0.41	-0.42	-0.46	-0.44	-0.41	-0.38	-0.50	-0.51	-0.05	-0.10	-0.09
MeHg	-0.56	-0.58	-0.49	-0.58	-0.52	-0.62	-0.58	-0.56	-0.57	-0.67	-0.02	0.01	0.13
% MeHg	-0.72	-0.76	-0.45	-0.70	-0.41	-0.73	-0.74	-0.69	-0.44	-0.71	0.12	0.20	0.32

Table 10B. Pearson Correlation Coefficients for G-393B other water constituents versus G-393B THg, MeHg, and %MeHg.

LAG-0 G-393B	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
G-393B														
THg	0.34	-0.12	-0.22	-0.45	0.91	0.78	-0.49	-0.42	0.95	0.88	0.96	0.98	-0.41	-0.36
MeHg	0.48	-0.29	-0.57	-0.64	0.80	0.83	-0.62	-0.57	0.81	0.65	0.85	0.87	-0.67	-0.59
%MeHg	0.52	-0.46	-0.77	-0.50	0.18	0.48	-0.51	-0.46	0.09	-0.08	0.18	0.18	-0.55	-0.46

LAG-0 G-393B	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	DOC	THg	MeHg	%MeHg
G-393B													
THg	-0.26	-0.26	-0.42	-0.28	-0.80	-0.58	-0.47	-0.19	-0.95	-0.56	1.00	0.83	0.11
MeHg	-0.48	-0.52	-0.69	-0.51	-0.83	-0.47	-0.69	-0.37	-0.92	-0.49	0.83	1.00	0.63
%MeHg	-0.37	-0.40	-0.55	-0.40	-0.37	0.02	-0.55	-0.27	-0.31	-0.04	0.11	0.63	1.00

LAG-1 G-393B	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
G-393B														
THg	0.10	-0.13	-0.04	-0.16	0.02	0.06	0.07	-0.04	-0.05	0.00	-0.05	0.02	0.09	0.09
MeHg	0.19	-0.14	-0.08	-0.42	0.52	0.42	-0.12	-0.22	0.47	0.50	0.46	0.54	-0.19	-0.08
%MeHg	0.28	-0.09	-0.16	-0.55	0.89	0.71	-0.41	-0.43	0.94	0.85	0.93	0.97	-0.55	-0.34

LAG-1 G-393B	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	DOC	THg	MeHg	%MeHg
G-393B													
THg	0.25	0.20	0.15	0.24	0.10	0.23	0.15	0.04	0.07	0.18	-0.02	0.22	0.46
MeHg	0.05	-0.01	-0.11	0.02	-0.34	-0.15	-0.10	-0.09	-0.44	-0.18	0.89	0.79	0.16
%MeHg	-0.28	-0.31	-0.44	-0.29	-0.79	-0.52	-0.43	-0.27	-0.92	-0.56	0.96	0.82	0.10

LAG-2 G-398B	TEMP	D.O.	SP CONI	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
G-393B														
THg	0.09	-0.29	-0.34	0.09	0.69	0.08	0.27	-0.31	0.74	0.71	0.08	0.33	-0.57	-0.45
MeHg	0.12	-0.32	-0.24	0.01	0.53	0.06	0.36	-0.24	0.55	0.58	-0.03	0.22	-0.34	-0.23
%MeHg	0.08	-0.11	0.03	-0.14	0.06	0.07	0.14	0.03	0.02	0.10	-0.04	0.04	0.09	0.09

LAG-2 G-393B	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	DOC	THg	MeHg	%MeHg
G-393B													
THg	-0.37	-0.39	-0.45	-0.39	-0.65	-0.57	-0.51	-0.39	-0.71	-0.58	0.41	0.41	0.18
MeHg	-0.11	-0.15	-0.26	-0.14	-0.42	-0.35	-0.28	-0.24	-0.51	-0.35	0.11	0.11	0.10
%MeHg	0.25	0.21	0.14	0.22	0.08	0.10	0.11	0.02	0.02	0.09	0.07	0.11	0.18

LAG-3 G-393B	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
G-393B														
THg	-0.40	0.37	0.45	0.13	-0.10	-0.17	0.25	-0.22	0.02	0.10	0.12	0.11	0.12	-0.16
MeHg	-0.10	-0.06	-0.07	0.25	0.53	-0.08	0.43	-0.39	0.64	0.65	0.02	0.23	-0.39	-0.41
%MeHg	-0.03	-0.18	-0.24	0.22	0.61	-0.04	0.40	-0.40	0.70	0.68	0.01	0.25	-0.48	-0.44

LAG-3 G-393B	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	DOC	THg	MeHg	%MeHg
G-393B													
THg	0.21	0.19	0.08	0.13	0.18	0.08	0.16	-0.42	0.06	0.02	0.17	0.01	-0.24
MeHg	-0.11	-0.14	-0.31	-0.16	-0.45	-0.34	-0.25	-0.41	-0.55	-0.39	0.13	-0.02	-0.18
%MeHg	-0.25	-0.27	-0.39	-0.27	-0.58	-0.43	-0.36	-0.39	-0.64	-0.47	0.18	0.07	-0.12

Table 10C. Pearson Correlation Coefficients for G-354C other water constituents versus G-354C THg, MeHg, and %MeHg.

LAG-0 G-354C

G-354C	TEMP	D.O.	SP COND	PH	TURB	COLOR	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
THg	0.21	-0.37	-0.07	-0.52	0.20	0.45	-0.43	0.36	0.27	0.42	0.38	-0.10	0.05
MeHg	0.28	0.04	-0.28	0.01	0.85	0.70	-0.39	0.55	0.85	0.75	0.98	-0.60	-0.40
%MeHg	0.38	-0.05	-0.26	0.03	0.87	0.75	-0.35	0.43	0.80	0.72	0.95	-0.53	-0.33

LAG-0 G-354C

G-354C	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	DOC	THg	MeHg	%MeHg
THg	-0.24	-0.17	-0.13	-0.16	-0.38	-0.32	-0.10	0.11	-0.21	-0.25	1.00	0.34	0.17
MeHg	-0.52	-0.53	-0.63	-0.54	-0.86	-0.60	-0.51	-0.29	-0.85	-0.66	0.34	1.00	0.94
%MeHg	-0.44	-0.44	-0.62	-0.47	-0.79	-0.45	-0.44	-0.18	-0.79	-0.55	0.17	0.94	1.00

LAG-1 G-354C

G-354C	TEMP	D.O.	SP COND	PH	TURB	COLOR	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
THg	-0.05	-0.66	-0.34	-0.37	-0.02	-0.13	0.11	-0.43	-0.28	0.18	-0.06	-0.02	0.24
MeHg	-0.77	-0.42	-0.93	-1.00	-0.37	-0.77	-0.38	-0.32	-0.87	0.01	-0.23	-0.53	-0.38
%MeHg	-0.73	-0.25	-0.88	-0.91	-0.30	-0.71	-0.43	-0.19	-0.81	0.14	-0.17	-0.57	-0.51

LAG-1 G-354C

G-354C	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	DOC	THg	MeHg	%MeHg
THg	-0.09	0.00	-0.09	-0.03	-0.29	-0.12	0.02	0.11	-0.17	0.01	0.05	-0.01	0.07
MeHg	-0.44	-0.46	-0.53	-0.45	-0.65	-0.50	-0.44	-0.30	-0.66	-0.54	0.06	0.63	0.65
%MeHg	-0.43	-0.46	-0.55	-0.44	-0.65	-0.38	-0.41	-0.30	-0.65	-0.51	-0.23	0.23	0.27

LAG-2 G-354C

G-354C	TEMP	D.O.	SP COND	PH	TURB	COLOR	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
THg	0.26	-0.45	-0.01	0.06	0.39	0.24	-0.29	0.32	0.30	0.34	0.31	0.07	0.17
MeHg	0.11	-0.16	0.14	0.07	0.94	0.29	-0.35	1.00	0.88	0.72	0.83	-0.46	-0.37
%MeHg	0.01	-0.05	0.08	0.03	0.86	0.23	-0.31	0.93	0.80	0.70	0.78	-0.62	-0.61

LAG-2 G-354C

G-354C	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	DOC	THg	MeHg	%MeHg
THg	-0.09	0.11	-0.05	-0.01	-0.25	-0.05	0.04	0.65	-0.14	0.18	-0.08	-0.08	0.01
MeHg	-0.42	-0.42	-0.46	-0.42	-0.54	-0.46	-0.42	-0.29	-0.55	-0.90	-0.03	0.46	0.41
%MeHg	-0.61	-0.66	-0.54	-0.64	-0.58	-0.61	-0.63	-0.52	-0.59	-0.78	-0.10	0.30	0.22

LAG-3 G-354C

G-354C	TEMP	D.O.	SP COND	PH	TURB	COLOR	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
THg	0.42	-0.09	-0.19	0.09	-0.06	0.30	-0.39	-0.02	-0.06	0.21	-0.04	-0.37	-0.21
MeHg	-0.18	-0.04	-0.25	-0.29	0.54	-0.05	-0.59	0.60	0.41	0.47	0.52	-0.75	-0.51
%MeHg	-0.39	0.22	-0.12	-0.26	0.22	-0.23	-0.27	0.21	0.15	0.10	0.28	-0.46	-0.38

LAG-3 G-354C

G-354C	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	DOC	THg	MeHg	%MeHg
THg	-0.34	-0.30	-0.41	-0.32	-0.11	0.12	-0.30	-0.07	0.01	0.18	-0.06	-0.12	-0.06
MeHg	-0.55	-0.54	-0.60	-0.54	-0.67	-0.49	-0.51	-0.50	-0.64	-0.40	-0.01	0.28	0.19
%MeHg	-0.28	-0.31	-0.25	-0.29	-0.41	-0.41	-0.27	-0.50	-0.45	-0.49	0.00	0.42	0.32

Table 10D. Pearson Correlation Coefficients for G-600 other water constituents versus G-393B THg, MeHg, and %MeHg.

LAG-0	G-600													
	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
G-393B														
THg	0.33	-0.26	-0.28	-0.09	0.70	0.31	0.55	-0.40	-0.41	0.35	0.15	0.26	-0.32	-0.47
MeHg	0.46	-0.40	-0.72	-0.29	0.42	0.68	0.31	-0.66	-0.58	0.01	0.62	0.71	-0.58	-0.70
% MeHg	0.47	-0.39	-0.93	-0.38	-0.26	0.80	-0.25	-0.57	-0.53	-0.54	0.93	0.94	-0.48	-0.56

LAG-0	G-600												
	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	DOC	THg	MeHg	%MeHg
G-393B													
THg	-0.45	-0.44	-0.66	-0.47	-0.76	-0.55	-0.47	-0.46	-0.87	-0.58	0.33	0.31	0.17
MeHg	-0.67	-0.68	-0.94	-0.69	-0.92	-0.65	-0.69	-0.68	-0.96	-0.52	0.74	0.69	0.20
% MeHg	-0.54	-0.55	-0.77	-0.56	-0.59	-0.36	-0.55	-0.56	-0.50	-0.06	0.88	0.85	0.19

LAG-1	G-600													
	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
G-393B														
THg	0.26	0.52	-0.41	0.83	0.80	-0.32	0.64	-0.38	-0.68	0.11	-0.03	0.19	-0.39	-0.45
MeHg	0.35	0.36	-0.41	0.69	0.90	-0.18	0.79	-0.49	-0.76	0.34	-0.03	0.23	-0.53	-0.58
% MeHg	0.31	-0.12	-0.26	0.01	0.44	0.24	0.48	-0.35	-0.41	0.38	0.13	0.27	-0.41	-0.45

LAG-1	G-600												
	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	TOC	THg	MeHg	%MeHg
G-393B													
THg	-0.41	-0.43	-0.57	-0.43	-0.59	-0.43	-0.43	-0.44	-0.63	-0.46	0.28	0.40	0.38
MeHg	-0.54	-0.56	-0.75	-0.58	-0.79	-0.62	-0.57	-0.59	-0.88	-0.68	0.29	0.33	0.25
% MeHg	-0.41	-0.43	-0.60	-0.46	-0.64	-0.47	-0.45	-0.45	-0.72	-0.54	0.31	0.33	0.25

LAG-2	G-600													
	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
G-393B														
THg	0.06	0.07	-0.03	0.23	-0.04	-0.12	-0.07	-0.32	-0.54	-0.34	-0.08	-0.02	-0.41	-0.44
MeHg	0.18	0.40	-0.16	0.66	0.42	-0.34	0.31	-0.40	-0.74	-0.19	-0.17	0.00	-0.50	-0.51
% MeHg	0.23	0.62	-0.31	0.85	0.87	-0.39	0.74	-0.34	-0.62	0.17	-0.11	0.13	-0.40	-0.42

LAG-2	G-600												
	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	TOC	THg	MeHg	%MeHg
G-393B													
THg	-0.38	-0.44	-0.49	-0.44	-0.48	-0.43	-0.44	-0.42	-0.54	-0.48	0.36	0.42	0.35
MeHg	-0.45	-0.51	-0.63	-0.52	-0.61	-0.52	-0.52	-0.49	-0.70	-0.59	0.27	0.37	0.48
% MeHg	-0.37	-0.42	-0.52	-0.43	-0.50	-0.42	-0.43	-0.40	-0.57	-0.48	0.33	0.41	0.44

LAG-3	G-600													
	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
G-393B														
THg	-0.33	0.53	0.08	0.48	0.56	-0.34	0.57	-0.13	0.05	0.54	-0.19	-0.09	-0.09	-0.16
MeHg	-0.10	0.27	0.12	0.36	0.03	-0.27	0.03	-0.38	-0.35	-0.10	-0.22	-0.15	-0.31	-0.28
% MeHg	-0.03	0.17	0.05	0.30	-0.06	-0.21	-0.10	-0.39	-0.44	-0.26	-0.17	-0.12	-0.34	-0.33

LAG-3	G-600												
	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	DOC	THg	MeHg	%MeHg
G-393B													
THg	-0.05	-0.12	-0.12	-0.08	-0.12	-0.11	-0.08	-0.15	-0.19	-0.26	-0.03	-0.06	-0.02
MeHg	-0.20	-0.27	-0.35	-0.22	-0.38	-0.26	-0.23	-0.25	-0.42	-0.36	0.01	-0.07	-0.19
% MeHg	-0.28	-0.32	-0.41	-0.30	-0.44	-0.33	-0.30	-0.31	-0.48	-0.39	0.07	0.01	-0.17

Table 10E. Pearson Correlation Coefficients for G-600 other water constituents versus G-354C THg, MeHg, and %MeHg.

LAG-0	G-600													
	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
G-354C														
THg	0.25	-0.39	-0.11	-0.21	-0.09	0.31	-0.06	-0.13	0.04	0.19	0.05	0.03	-0.09	-0.10
MeHg	0.19	-0.33	-0.29	-0.23	0.70	0.39	0.58	-0.43	-0.26	0.47	0.21	0.31	-0.40	-0.53
% MeHg	0.26	-0.36	-0.30	-0.27	0.74	0.42	0.66	-0.39	-0.21	0.49	0.26	0.37	-0.27	-0.47

LAG-0	G-600												
	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	DOC	THg	MeHg	%MeHg
G-354C													
THg	-0.23	-0.15	-0.21	-0.07	-0.35	-0.22	-0.15	0.04	-0.31	-0.22	0.03	0.06	0.19
MeHg	-0.53	-0.54	-0.70	-0.53	-0.80	-0.58	-0.54	-0.45	-0.90	-0.66	0.38	0.36	0.18
% MeHg	-0.46	-0.47	-0.68	-0.48	-0.76	-0.46	-0.47	-0.36	-0.84	-0.55	0.46	0.43	0.23

LAG-1	G-600													
	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
G-354C														
THg	0.36	-0.09	-0.03	0.09	0.25	-0.10	0.27	-0.16	-0.17	0.19	-0.12	-0.03	0.06	0.07
MeHg	0.17	0.44	-0.36	0.83	0.86	-0.35	0.69	-0.40	-0.60	0.24	-0.10	0.12	-0.38	-0.46
% MeHg	0.09	0.46	-0.43	0.80	0.80	-0.27	0.60	-0.40	-0.59	0.18	0.01	0.20	-0.35	-0.48

LAG-1	G-600												
	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	TOC	THg	MeHg	%MeHg
G-354C													
THg	-0.02	0.03	-0.08	0.02	-0.19	0.02	0.02	0.20	-0.15	0.01	-0.05	-0.12	-0.18
MeHg	-0.45	-0.45	-0.56	-0.45	-0.62	-0.49	-0.45	-0.41	-0.67	-0.53	0.52	0.49	0.11
% MeHg	-0.46	-0.46	-0.59	-0.45	-0.65	-0.46	-0.44	-0.46	-0.67	-0.48	0.32	0.34	0.13

LAG-2	G-600													
	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
G-354C														
THg	0.28	-0.22	-0.09	0.00	-0.19	0.00	-0.33	0.23	-0.16	-0.26	-0.09	-0.11	0.58	0.06
MeHg	0.07	0.08	-0.05	0.30	-0.09	-0.17	-0.18	-0.37	-0.56	-0.38	-0.14	-0.08	-0.36	-0.42
% MeHg	-0.04	0.14	-0.17	0.32	-0.02	-0.10	-0.14	-0.45	-0.63	-0.43	0.00	0.06	-0.54	-0.65

LAG-2	G-600												
	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	TOC	THg	MeHg	%MeHg
G-354C													
THg	-0.08	0.15	-0.04	-0.01	-0.21	0.03	0.04	0.03	-0.13	0.03	-0.15	-0.03	0.36
MeHg	-0.42	-0.42	-0.47	-0.42	-0.51	-0.46	-0.42	-0.41	-0.54	-0.49	0.22	0.31	0.38
% MeHg	-0.61	-0.65	-0.57	-0.64	-0.58	-0.65	-0.65	-0.64	-0.62	-0.67	0.32	0.39	0.27

LAG-3	G-600													
	TEMP	D.O.	SP COND	PH	TURB	COLOR	TSS	NOX	NH4	TKN	OPO4	TPO4	TDPO4	SIO2
G-354C														
THg	0.44	-0.51	-0.82	-0.36	-0.31	0.81	-0.37	-0.24	-0.24	-0.65	0.93	0.88	-0.17	-0.30
MeHg	0.09	0.03	-0.31	0.28	0.29	-0.06	0.25	-0.57	-0.49	-0.02	0.08	0.20	-0.52	-0.52
% MeHg	-0.23	0.19	0.12	0.25	0.47	-0.30	0.55	-0.40	-0.09	0.56	-0.26	-0.13	-0.40	-0.30

LAG-3	G-600												
	NA	K	CA	MG	CL	SO4	HARD	TFE	ALK	DOC	THg	MeHg	%MeHg
G-354C													
THg	-0.33	-0.27	-0.42	-0.32	-0.26	-0.06	-0.31	-0.28	-0.15	0.16	0.82	0.87	0.46
MeHg	-0.51	-0.51	-0.64	-0.54	-0.64	-0.50	-0.53	-0.50	-0.68	-0.54	0.40	0.35	0.02
% MeHg	-0.25	-0.31	-0.29	-0.29	-0.32	-0.36	-0.30	-0.28	-0.42	-0.51	-0.04	-0.13	-0.27

Table 11A. Inflow other constituent load lag correlations with outflow THg in Cell 3 and Cell 5.

Inflow Constituent Lag Load vs Outflow THg Summary Table

Cell 3	Lag-0	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5	Lag-6	Lag-7	Lag-8	Lag-9	Lag-10	Lag-11	Lag-10	Lag-13	Lag-14	Lag-21	Lag-28	Lag-56	Lag-84
TSS	0.61	-0.04	-0.09	-0.22	-0.29	-0.25	-0.15	-0.13	-0.17	-0.37	-0.26	-0.07	-0.07	0.06	0.14	0.10	0.26	0.33	0.34
CL	0.22	-0.02	0.00	-0.20	-0.31	-0.35	-0.20	-0.21	-0.38	-0.53	-0.25	-0.10	-0.11	0.02	0.08	0.23	0.47	0.02	0.44
DOC	0.44	0.09	0.17	0.01	-0.08	-0.13	-0.03	-0.03	-0.27	-0.28	-0.10	0.07	0.04	0.13	0.17	0.34	0.68	0.12	0.32
TP	0.32	0.07	0.07	0.03	0.03	0.02	0.05	0.04	-0.02	-0.02	0.04	0.16	0.19	0.16	0.18	0.48	0.64	0.35	-0.01
TKN	0.45	0.05	0.11	-0.03	-0.11	-0.16	-0.04	-0.02	-0.27	-0.29	-0.09	0.12	0.10	0.20	0.24	0.35	0.68	0.16	0.32
NOX	0.20	0.21	0.32	0.19	0.11	-0.01	0.01	-0.06	-0.45	-0.54	-0.30	-0.21	-0.28	-0.14	-0.10	0.38	0.63	-0.04	0.34
NH4	0.01	-0.04	-0.01	-0.16	-0.24	-0.28	-0.11	-0.13	-0.42	-0.52	-0.23	-0.03	-0.06	0.10	0.26	0.24	0.52	0.06	0.41
SIO2	0.36	0.04	0.10	-0.04	-0.12	-0.17	-0.07	-0.06	-0.29	-0.31	-0.13	0.04	0.02	0.14	0.17	0.37	0.72	0.16	0.23
CA	0.36	0.03	0.07	-0.05	-0.13	-0.18	-0.07	-0.05	-0.28	-0.30	-0.11	0.09	0.07	0.17	0.22	0.37	0.73	0.20	0.26
FE	0.30	0.04	0.06	-0.07	-0.15	-0.19	-0.07	-0.09	-0.27	-0.32	-0.14	0.01	-0.01	0.11	0.16	0.33	0.72	0.18	0.17
SO4	0.51	0.07	0.14	-0.03	-0.13	-0.19	-0.06	-0.09	-0.34	-0.42	-0.16	0.00	-0.03	0.08	0.16	0.25	0.49	0.01	0.47

Inflow Constituent Lag Load vs Outflow THg Summary Table

Cell 5	Lag-0	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5	Lag-6	Lag-7	Lag-8	Lag-9	Lag-10	Lag-11	Lag-10	Lag-13	Lag-14	Lag-21	Lag-28	Lag-56	Lag-84
TSS	0.19	0.19	0.42	0.57	0.48	0.30	0.25	0.20	0.02	0.12	0.21	0.17	0.08	0.18	0.29	0.43	-0.23	-0.30	-0.47
CL	0.19	0.19	0.38	0.57	0.46	0.38	0.31	0.35	0.13	0.31	0.30	0.28	0.22	0.53	0.64	0.55	-0.15	-0.43	-0.51
DOC	0.67	0.67	0.82	0.83	0.78	0.77	0.71	0.74	0.56	0.68	0.60	0.59	0.55	0.72	0.78	0.75	0.13	0.01	-0.46
TP	0.82	0.82	0.82	0.80	0.81	0.81	0.82	0.81	0.79	0.80	0.83	0.85	0.85	0.84	0.85	0.80	0.31	0.57	-0.24
TKN	0.66	0.66	0.82	0.81	0.77	0.75	0.68	0.72	0.54	0.67	0.59	0.59	0.55	0.73	0.78	0.71	0.12	0.02	-0.44
NOX	0.51	0.51	0.67	0.79	0.75	0.67	0.64	0.65	0.42	0.48	0.39	0.30	0.26	0.52	0.51	0.64	0.15	0.05	-0.35
NH4	0.35	0.35	0.51	0.62	0.52	0.48	0.38	0.47	0.26	0.42	0.40	0.45	0.41	0.63	0.73	0.47	0.01	-0.30	-0.40
SIO2	0.71	0.71	0.84	0.82	0.79	0.77	0.72	0.73	0.55	0.66	0.56	0.55	0.51	0.71	0.76	0.70	0.13	0.10	-0.44
CA	0.70	0.70	0.83	0.81	0.78	0.76	0.69	0.73	0.54	0.66	0.58	0.57	0.51	0.70	0.76	0.69	0.14	0.09	-0.44
FE	0.69	0.69	0.85	0.82	0.78	0.75	0.70	0.68	0.46	0.63	0.53	0.56	0.52	0.73	0.75	0.66	0.09	0.02	-0.45
SO4	0.35	0.35	0.54	0.70	0.59	0.54	0.45	0.50	0.26	0.46	0.41	0.40	0.34	0.60	0.71	0.68	-0.01	-0.32	-0.44

Table 11B. Inflow other constituent load lag correlations with outflow MeHg in Cell 3 and Cell 5.

Inflow Constituent Lag Load vs Outflow MeHg Summary Table

Cell 3	Lag-0	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5	Lag-6	Lag-7	Lag-8	Lag-9	Lag-10	Lag-11	Lag-11	Lag-13	Lag-14	Lag-21	Lag-28	Lag-56	Lag-84
TSS	0.46	-0.13	-0.05	0.15	0.00	-0.07	-0.09	-0.06	-0.15	-0.04	0.06	0.10	-0.02	0.04	0.17	0.40	0.66	0.73	0.37
CL	0.07	-0.22	-0.23	0.01	-0.09	-0.08	-0.08	0.06	-0.05	0.22	0.17	0.21	0.12	0.56	0.64	0.47	0.36	0.33	0.47
DOC	0.46	0.21	0.39	0.62	0.48	0.48	0.41	0.59	0.48	0.65	0.46	0.45	0.35	0.70	0.74	0.58	0.53	0.30	0.33
TP	0.75	0.91	0.93	0.94	0.93	0.93	0.92	0.93	0.92	0.94	0.91	0.91	0.88	0.93	0.92	0.56	0.33	0.40	0.01
TKN	0.49	0.23	0.44	0.64	0.50	0.48	0.40	0.58	0.46	0.66	0.45	0.44	0.34	0.67	0.70	0.52	0.52	0.40	0.32
NOX	0.19	0.11	0.23	0.46	0.36	0.32	0.31	0.43	0.33	0.47	0.28	0.16	0.08	0.43	0.47	0.46	0.35	0.07	0.23
NH4	-0.04	-0.10	-0.05	0.18	0.06	0.06	0.02	0.19	0.10	0.29	0.21	0.20	0.11	0.42	0.55	0.25	0.11	0.32	0.33
SIO2	0.46	0.32	0.53	0.70	0.56	0.53	0.46	0.61	0.49	0.65	0.44	0.42	0.31	0.67	0.68	0.49	0.45	0.36	0.23
CA	0.47	0.32	0.54	0.70	0.56	0.54	0.44	0.61	0.48	0.66	0.46	0.45	0.33	0.67	0.70	0.49	0.44	0.40	0.30
FE	0.39	0.25	0.47	0.66	0.49	0.46	0.39	0.50	0.33	0.53	0.36	0.36	0.25	0.59	0.61	0.42	0.39	0.45	0.20
SO4	0.35	-0.14	-0.08	0.16	0.04	0.03	0.02	0.17	0.05	0.28	0.20	0.22	0.12	0.50	0.61	0.55	0.61	0.23	0.46

Inflow Constituent Lag Load vs Outflow MeHg Summary Table

Cell 5	Lag-0	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5	Lag-6	Lag-7	Lag-8	Lag-9	Lag-10	Lag-11	Lag-11	Lag-13	Lag-14	Lag-21	Lag-28	Lag-56	Lag-84
TSS	0.31	0.31	0.36	0.55	0.48	0.28	0.46	0.36	0.12	0.05	-0.04	-0.19	-0.29	-0.24	0.06	0.21	-0.31	-0.52	0.17
CL	0.26	0.26	0.28	0.51	0.44	0.35	0.49	0.59	0.33	0.27	0.07	-0.09	-0.17	0.09	0.37	0.30	-0.24	-0.51	-0.06
DOC	0.62	0.62	0.64	0.68	0.66	0.63	0.71	0.77	0.61	0.53	0.34	0.25	0.17	0.39	0.54	0.52	0.03	-0.22	-0.01
TP	0.68	0.68	0.66	0.65	0.66	0.66	0.70	0.69	0.66	0.63	0.62	0.61	0.59	0.61	0.66	0.63	0.25	0.13	0.15
TKN	0.65	0.65	0.67	0.69	0.67	0.64	0.73	0.79	0.62	0.54	0.33	0.25	0.17	0.39	0.55	0.48	0.00	-0.24	0.04
NOX	0.41	0.41	0.51	0.62	0.61	0.50	0.54	0.56	0.32	0.25	0.15	0.04	-0.05	0.18	0.29	0.39	-0.05	0.00	-0.04
NH4	0.45	0.45	0.45	0.58	0.51	0.46	0.55	0.68	0.49	0.41	0.19	0.17	0.10	0.32	0.52	0.25	-0.13	-0.39	0.12
SIO2	0.65	0.65	0.66	0.67	0.66	0.63	0.71	0.76	0.59	0.51	0.31	0.22	0.13	0.36	0.52	0.48	0.02	-0.20	0.05
CA	0.66	0.66	0.66	0.67	0.66	0.64	0.71	0.78	0.62	0.54	0.33	0.23	0.13	0.35	0.52	0.47	0.06	-0.21	0.04
FE	0.67	0.67	0.68	0.69	0.67	0.64	0.74	0.76	0.55	0.52	0.31	0.24	0.16	0.36	0.51	0.45	-0.01	-0.27	0.04
SO4	0.37	0.37	0.42	0.60	0.53	0.46	0.58	0.68	0.44	0.38	0.16	0.05	-0.04	0.20	0.44	0.43	-0.13	-0.36	-0.05

Table 11C. Inflow other constituent load lag correlations with outflow %MeHg in Cell 3 and Cell 5.

Inflow Constituent Lag Load vs Outflow %MeHg Summary Table

Cell 3	Lag-0	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5	Lag-6	Lag-7	Lag-8	Lag-9	Lag-10	Lag-11	Lag-12	Lag-13	Lag-14	Lag-21	Lag-28	Lag-56	Lag-84
TSS	-0.04	-0.11	-0.02	0.19	0.05	-0.02	-0.06	-0.02	-0.10	0.02	0.09	0.07	-0.05	0.04	0.15	0.40	0.64	0.74	0.37
CL	-0.17	-0.20	-0.21	0.06	-0.04	-0.03	-0.04	0.11	0.03	0.30	0.20	0.19	0.10	0.54	0.63	0.45	0.30	0.38	0.47
DOC	0.23	0.22	0.40	0.65	0.51	0.51	0.43	0.62	0.55	0.70	0.48	0.43	0.33	0.69	0.73	0.55	0.46	0.35	0.37
TP	0.90	0.93	0.95	0.96	0.95	0.95	0.94	0.95	0.95	0.97	0.93	0.91	0.88	0.94	0.92	0.52	0.26	0.39	0.09
TKN	0.26	0.25	0.45	0.67	0.53	0.52	0.42	0.61	0.53	0.72	0.47	0.41	0.31	0.66	0.68	0.49	0.46	0.45	0.36
NOX	0.12	0.11	0.22	0.47	0.37	0.33	0.32	0.46	0.41	0.54	0.31	0.16	0.09	0.44	0.46	0.42	0.26	0.14	0.24
NH4	-0.08	-0.08	-0.03	0.21	0.09	0.10	0.05	0.23	0.17	0.36	0.23	0.19	0.10	0.41	0.52	0.23	0.05	0.38	0.35
SIO2	0.35	0.34	0.55	0.73	0.60	0.58	0.49	0.65	0.56	0.71	0.46	0.40	0.29	0.65	0.67	0.46	0.37	0.40	0.28
CA	0.35	0.34	0.56	0.73	0.60	0.58	0.47	0.65	0.55	0.72	0.48	0.43	0.31	0.66	0.68	0.46	0.36	0.43	0.35
FE	0.29	0.28	0.49	0.69	0.53	0.50	0.42	0.54	0.40	0.59	0.39	0.35	0.24	0.59	0.61	0.40	0.31	0.49	0.26
SO4	-0.07	-0.13	-0.08	0.18	0.06	0.07	0.04	0.21	0.12	0.35	0.22	0.19	0.10	0.49	0.60	0.53	0.56	0.30	0.46

Inflow Constituent Lag Load vs Outflow %MeHg Summary Table

Cell 5	Lag-0	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5	Lag-6	Lag-7	Lag-8	Lag-9	Lag-10	Lag-11	Lag-12	Lag-13	Lag-14	Lag-21	Lag-28	Lag-56	Lag-84
TSS	0.27	0.27	0.07	0.16	0.17	0.09	0.41	0.36	0.21	0.01	-0.21	-0.51	-0.55	-0.61	-0.24	-0.16	-0.18	-0.40	0.59
CL	0.18	0.18	-0.02	0.09	0.14	0.08	0.36	0.52	0.43	0.12	-0.15	-0.50	-0.57	-0.56	-0.21	-0.13	-0.11	-0.21	0.30
DOC	0.16	0.16	0.01	0.06	0.09	0.06	0.25	0.34	0.34	0.08	-0.09	-0.34	-0.40	-0.31	-0.10	-0.04	-0.01	-0.09	0.40
TP	0.07	0.07	0.04	0.04	0.05	0.04	0.08	0.09	0.09	0.03	-0.01	-0.07	-0.10	-0.06	-0.01	0.02	0.03	-0.10	0.53
TKN	0.21	0.21	0.05	0.08	0.12	0.09	0.29	0.37	0.37	0.09	-0.10	-0.34	-0.41	-0.32	-0.10	-0.07	-0.05	-0.15	0.48
NOX	0.02	0.02	-0.02	0.01	0.03	-0.05	0.03	0.10	0.02	-0.17	-0.20	-0.36	-0.45	-0.42	-0.22	-0.12	-0.17	0.17	0.30
NH4	0.24	0.24	0.05	0.12	0.14	0.11	0.35	0.49	0.48	0.17	-0.11	-0.31	-0.36	-0.31	-0.08	-0.13	-0.11	-0.15	0.49
SIO2	0.16	0.16	0.01	0.05	0.09	0.06	0.23	0.32	0.32	0.07	-0.09	-0.35	-0.42	-0.34	-0.11	-0.04	-0.04	-0.15	0.49
CA	0.17	0.17	0.02	0.06	0.09	0.07	0.26	0.35	0.36	0.09	-0.10	-0.36	-0.43	-0.34	-0.11	-0.06	0.01	-0.16	0.48
FE	0.23	0.23	0.06	0.09	0.14	0.10	0.31	0.41	0.39	0.16	-0.03	-0.30	-0.36	-0.32	-0.08	-0.03	-0.02	-0.20	0.48
SO4	0.16	0.16	0.00	0.09	0.12	0.08	0.34	0.49	0.45	0.14	-0.12	-0.42	-0.49	-0.46	-0.15	-0.08	-0.07	-0.06	0.29

Table 11D. Inflow other constituent load sum lag correlations with outflow THg in Cell 3 and Cell 5.

Inflow Constituent Lag Sum Load vs Outflow THg Summary Table

Cell 3	Sum Lag-0	Sum Lag-1	Sum Lag-2	Sum Lag-3	Sum Lag-4	Sum Lag-5	Sum Lag-6	Sum Lag-7	Sum Lag-8	Sum Lag-9	Sum Lag-10	Sum Lag-11	Sum Lag-12	Sum Lag-13	Sum Lag-14	Sum Lag-21	Sum Lag-28	Sum Lag-56	Sum Lag-84
TSS	-0.04	-0.04	-0.06	-0.10	-0.14	-0.16	-0.17	-0.16	-0.16	-0.18	-0.20	-0.22	-0.23	-0.22	-0.18	-0.13	-0.03	0.33	0.42
CL	-0.02	-0.02	-0.01	-0.06	-0.12	-0.17	-0.19	-0.19	-0.23	-0.27	-0.30	-0.31	-0.34	-0.33	-0.29	-0.16	-0.01	0.37	0.22
DOC	0.09	0.09	0.14	0.10	0.06	0.02	0.01	0.00	-0.03	-0.06	-0.07	-0.06	-0.05	-0.03	0.00	0.05	0.13	0.50	0.37
TP	0.07	0.07	0.07	0.06	0.05	0.05	0.05	0.05	0.04	0.03	0.03	0.04	0.05	0.06	0.06	0.10	0.20	0.62	0.54
TKN	0.05	0.05	0.08	0.05	0.01	-0.03	-0.03	-0.03	-0.06	-0.09	-0.09	-0.07	-0.06	-0.03	0.01	0.07	0.15	0.51	0.39
NOX	0.21	0.21	0.27	0.25	0.23	0.19	0.16	0.14	0.08	0.03	0.00	-0.02	-0.05	-0.06	-0.07	-0.07	0.09	0.34	0.21
NH4	-0.04	-0.04	-0.03	-0.07	-0.11	-0.15	-0.15	-0.15	-0.19	-0.23	-0.25	-0.23	-0.22	-0.19	-0.13	-0.07	0.02	0.31	0.22
SIO2	0.04	0.04	0.07	0.04	-0.01	-0.04	-0.05	-0.05	-0.08	-0.11	-0.12	-0.10	-0.10	-0.07	-0.04	0.02	0.12	0.47	0.33
CA	0.03	0.03	0.05	0.02	-0.02	-0.05	-0.06	-0.06	-0.09	-0.11	-0.12	-0.10	-0.09	-0.06	-0.03	0.05	0.15	0.52	0.40
FE	0.04	0.04	0.05	0.01	-0.03	-0.06	-0.07	-0.07	-0.10	-0.13	-0.13	-0.13	-0.12	-0.10	-0.07	-0.02	0.09	0.49	0.32
SO4	0.07	0.07	0.11	0.08	0.03	-0.02	-0.02	-0.03	-0.08	-0.12	-0.13	-0.13	-0.12	-0.11	-0.07	-0.01	0.08	0.43	0.31

Inflow Constituent Lag Sum Load vs Outflow THg Summary Table

Cell 5	Sum Lag-0	Sum Lag-1	Sum Lag-2	Sum Lag-3	Sum Lag-4	Sum Lag-5	Sum Lag-6	Sum Lag-7	Sum Lag-8	Sum Lag-9	Sum Lag-10	Sum Lag-11	Sum Lag-12	Sum Lag-11	Sum Lag-14	Sum Lag-21	Sum Lag-28	Sum Lag-56	Sum Lag-84
TSS	0.19	0.19	0.29	0.37	0.40	0.39	0.37	0.35	0.30	0.29	0.31	0.34	0.36	0.36	0.37	0.32	0.33	0.01	-0.34
CL	0.19	0.19	0.28	0.38	0.42	0.42	0.42	0.42	0.39	0.40	0.43	0.46	0.48	0.52	0.57	0.69	0.62	0.39	-0.27
DOC	0.67	0.67	0.78	0.82	0.82	0.81	0.81	0.81	0.80	0.80	0.81	0.81	0.81	0.81	0.82	0.85	0.86	0.69	0.39
TP	0.82	0.82	0.82	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.82	0.82	0.82	0.83	0.84	0.87	0.74	0.78
TKN	0.66	0.66	0.77	0.81	0.81	0.80	0.80	0.79	0.78	0.78	0.79	0.80	0.81	0.81	0.82	0.84	0.85	0.69	0.39
NOX	0.51	0.51	0.61	0.68	0.71	0.71	0.71	0.71	0.70	0.70	0.70	0.69	0.67	0.67	0.66	0.68	0.72	0.60	0.20
NH4	0.35	0.35	0.44	0.52	0.53	0.53	0.52	0.52	0.50	0.51	0.52	0.54	0.55	0.57	0.61	0.65	0.63	0.52	-0.03
SIO2	0.71	0.71	0.81	0.83	0.82	0.82	0.82	0.81	0.80	0.80	0.80	0.81	0.81	0.81	0.81	0.84	0.84	0.67	0.36
CA	0.70	0.70	0.79	0.82	0.81	0.81	0.80	0.80	0.79	0.79	0.80	0.80	0.80	0.81	0.81	0.84	0.84	0.68	0.38
FE	0.69	0.69	0.80	0.83	0.82	0.81	0.81	0.80	0.78	0.78	0.78	0.79	0.80	0.80	0.81	0.82	0.82	0.66	0.27
SO4	0.35	0.35	0.45	0.55	0.58	0.58	0.58	0.58	0.56	0.57	0.60	0.61	0.62	0.65	0.68	0.77	0.77	0.59	0.06

Table 11E. Inflow other constituent load sum lag correlations with outflow MeHg in Cell 3 and Cell 5.

Inflow Constituent Lag Sum Load vs Outflow MeHg Summary Table

Cell 3	Sum Lag-0	Sum Lag-1	Sum Lag-2	Sum Lag-3	Sum Lag-4	Sum Lag-5	Sum Lag-6	Sum Lag-7	Sum Lag-8	Sum Lag-9	Sum Lag-10	Sum Lag-11	Sum Lag-12	Sum Lag-13	Sum Lag-14	Sum Lag-21	Sum Lag-28	Sum Lag-56	Sum Lag-84
TSS	-0.13	-0.13	-0.10	-0.05	-0.04	-0.05	-0.05	-0.06	-0.07	-0.07	-0.07	-0.06	-0.07	-0.06	-0.04	0.07	0.37	0.50	0.72
CL	-0.22	-0.22	-0.23	-0.18	-0.17	-0.15	-0.15	-0.12	-0.11	-0.09	-0.07	-0.04	-0.02	0.06	0.16	0.45	0.56	0.47	0.41
DOC	0.21	0.21	0.31	0.43	0.45	0.46	0.46	0.49	0.51	0.54	0.55	0.57	0.57	0.60	0.63	0.73	0.77	0.35	0.29
TP	0.91	0.91	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.94	0.94	0.94	0.94	0.94	0.92	0.37	0.40
TKN	0.23	0.23	0.35	0.46	0.48	0.48	0.48	0.50	0.51	0.54	0.56	0.58	0.59	0.61	0.64	0.71	0.76	0.37	0.33
NOX	0.11	0.11	0.17	0.25	0.28	0.29	0.30	0.32	0.33	0.36	0.37	0.36	0.35	0.37	0.38	0.49	0.59	0.35	0.23
NH4	-0.10	-0.10	-0.08	-0.01	0.01	0.02	0.02	0.05	0.06	0.08	0.10	0.12	0.13	0.17	0.23	0.34	0.38	0.21	0.16
SIO2	0.32	0.32	0.44	0.55	0.56	0.56	0.56	0.57	0.58	0.60	0.61	0.62	0.62	0.64	0.66	0.72	0.75	0.35	0.28
CA	0.32	0.32	0.45	0.56	0.56	0.56	0.56	0.57	0.58	0.60	0.61	0.63	0.64	0.66	0.68	0.74	0.77	0.38	0.33
FE	0.25	0.25	0.37	0.48	0.49	0.49	0.48	0.49	0.49	0.50	0.51	0.52	0.52	0.54	0.56	0.60	0.65	0.37	0.29
SO4	-0.14	-0.14	-0.12	-0.05	-0.03	-0.02	-0.01	0.01	0.02	0.05	0.07	0.10	0.11	0.16	0.23	0.47	0.63	0.38	0.31

Inflow Constituent Lag Sum Load vs Outflow MeHg Summary Table

Cell 5	Sum Lag-0	Sum Lag-1	Sum Lag-2	Sum Lag-3	Sum Lag-4	Sum Lag-5	Sum Lag-6	Sum Lag-7	Sum Lag-8	Sum Lag-9	Sum Lag-10	Sum Lag-11	Sum Lag-12	Sum Lag-12	Sum Lag-14	Sum Lag-21	Sum Lag-28	Sum Lag-56	Sum Lag-84
TSS	0.31	0.31	0.34	0.41	0.43	0.40	0.42	0.42	0.37	0.36	0.36	0.35	0.34	0.30	0.29	0.15	0.12	-0.29	-0.45
CL	0.26	0.26	0.29	0.37	0.41	0.40	0.44	0.47	0.47	0.47	0.47	0.45	0.41	0.40	0.41	0.41	0.30	0.09	-0.31
DOC	0.62	0.62	0.65	0.69	0.69	0.68	0.70	0.71	0.72	0.72	0.70	0.68	0.65	0.63	0.62	0.61	0.59	0.40	0.26
TP	0.68	0.68	0.67	0.66	0.66	0.66	0.67	0.67	0.67	0.67	0.67	0.67	0.66	0.66	0.66	0.66	0.68	0.47	0.56
TKN	0.65	0.65	0.68	0.71	0.70	0.70	0.71	0.73	0.73	0.73	0.72	0.70	0.67	0.65	0.65	0.61	0.59	0.36	0.25
NOX	0.41	0.41	0.47	0.53	0.56	0.55	0.56	0.56	0.56	0.55	0.54	0.50	0.46	0.44	0.43	0.41	0.37	0.18	0.06
NH4	0.45	0.45	0.47	0.53	0.53	0.53	0.55	0.57	0.58	0.58	0.57	0.55	0.51	0.51	0.52	0.47	0.40	0.19	0.01
SIO2	0.65	0.65	0.68	0.69	0.69	0.68	0.70	0.71	0.71	0.70	0.69	0.67	0.64	0.62	0.62	0.60	0.57	0.35	0.22
CA	0.66	0.66	0.68	0.70	0.69	0.68	0.70	0.72	0.72	0.72	0.70	0.69	0.66	0.64	0.63	0.61	0.58	0.39	0.25
FE	0.67	0.67	0.70	0.71	0.71	0.70	0.72	0.73	0.72	0.72	0.71	0.69	0.67	0.65	0.64	0.60	0.57	0.35	0.14
SO4	0.37	0.37	0.41	0.49	0.51	0.51	0.54	0.57	0.58	0.59	0.58	0.55	0.51	0.50	0.50	0.51	0.47	0.32	0.01

Table 11F. Inflow other constituent load sum lag correlations with outflow %MeHg in Cell 3 and Cell 5.

Inflow Constituent Lag Sum Load vs Outflow %MeHg Summary Table

Cell 3	Sum Lag-0	Sum Lag-1	Sum Lag-2	Sum Lag-3	Sum Lag-4	Sum Lag-5	Sum Lag-6	Sum Lag-7	Sum Lag-8	Sum Lag-9	Sum Lag-10	Sum Lag-11	Sum Lag-12	Sum Lag-13	Sum Lag-14	Sum Lag-21	Sum Lag-28	Sum Lag-56	Sum Lag-84
TSS	-0.11	-0.11	-0.07	-0.02	0.00	-0.01	-0.02	-0.02	-0.03	-0.03	-0.02	-0.02	-0.02	-0.02	0.00	0.09	0.39	0.48	0.75
CL	-0.20	-0.20	-0.21	-0.16	-0.14	-0.12	-0.11	-0.08	-0.07	-0.04	-0.01	0.02	0.03	0.10	0.20	0.47	0.55	0.45	0.47
DOC	0.22	0.22	0.32	0.45	0.47	0.48	0.49	0.52	0.54	0.58	0.59	0.60	0.60	0.63	0.65	0.74	0.77	0.26	0.27
TP	0.93	0.93	0.94	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96	0.96	0.96	0.96	0.96	0.95	0.92	0.23	0.33
TKN	0.25	0.25	0.36	0.48	0.50	0.51	0.51	0.53	0.55	0.58	0.60	0.61	0.62	0.64	0.66	0.72	0.76	0.27	0.31
NOX	0.11	0.11	0.16	0.25	0.28	0.29	0.30	0.33	0.35	0.38	0.39	0.38	0.37	0.38	0.40	0.50	0.57	0.29	0.23
NH4	-0.08	-0.08	-0.06	0.02	0.04	0.05	0.05	0.08	0.10	0.13	0.15	0.16	0.16	0.20	0.25	0.36	0.38	0.14	0.18
SIO2	0.34	0.34	0.46	0.57	0.59	0.59	0.59	0.60	0.62	0.64	0.65	0.65	0.65	0.67	0.68	0.73	0.75	0.26	0.26
CA	0.34	0.34	0.47	0.58	0.59	0.60	0.59	0.61	0.62	0.65	0.66	0.67	0.67	0.69	0.70	0.75	0.76	0.29	0.31
FE	0.28	0.28	0.40	0.51	0.52	0.52	0.52	0.53	0.53	0.55	0.56	0.56	0.56	0.58	0.59	0.62	0.66	0.30	0.29
SO4	-0.13	-0.13	-0.11	-0.04	-0.02	0.00	0.01	0.04	0.05	0.08	0.11	0.13	0.14	0.19	0.25	0.48	0.62	0.33	0.33

Inflow Constituent Lag Sum Load vs Outflow %MeHg Summary Table

Cell 5	Sum Lag-0	Sum Lag-1	Sum Lag-2	Sum Lag-3	Sum Lag-4	Sum Lag-5	Sum Lag-6	Sum Lag-7	Sum Lag-8	Sum Lag-9	Sum Lag-10	Sum Lag-11	Sum Lag-12	Sum Lag-13	Sum Lag-14	Sum Lag-21	Sum Lag-28	Sum Lag-56	Sum Lag-84
TSS	0.27	0.27	0.19	0.19	0.19	0.17	0.22	0.24	0.24	0.23	0.21	0.17	0.12	0.06	0.03	-0.12	-0.18	-0.39	-0.25
CL	0.18	0.18	0.11	0.11	0.13	0.12	0.17	0.23	0.27	0.27	0.24	0.17	0.08	-0.01	-0.04	-0.15	-0.22	-0.12	-0.01
DOC	0.16	0.16	0.08	0.08	0.08	0.08	0.11	0.14	0.17	0.16	0.14	0.10	0.05	0.01	0.00	-0.04	-0.06	0.04	0.11
TP	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.05	0.05	0.04	0.03	0.03	0.02	0.02	0.03	0.05
TKN	0.21	0.21	0.13	0.12	0.12	0.11	0.14	0.18	0.20	0.20	0.17	0.13	0.08	0.04	0.02	-0.04	-0.07	-0.02	0.11
NOX	0.02	0.02	0.00	0.00	0.01	0.00	0.00	0.01	0.02	0.00	-0.02	-0.06	-0.10	-0.14	-0.15	-0.20	-0.28	-0.19	-0.01
NH4	0.24	0.24	0.16	0.16	0.16	0.15	0.19	0.24	0.28	0.28	0.25	0.19	0.13	0.08	0.06	-0.05	-0.11	-0.12	0.20
SIO2	0.16	0.16	0.09	0.08	0.08	0.08	0.10	0.13	0.15	0.15	0.13	0.09	0.04	0.01	0.00	-0.05	-0.08	-0.01	0.08
CA	0.17	0.17	0.10	0.09	0.09	0.08	0.11	0.14	0.17	0.17	0.15	0.11	0.06	0.02	0.01	-0.05	-0.07	0.01	0.12
FE	0.23	0.23	0.15	0.13	0.13	0.13	0.16	0.19	0.22	0.22	0.21	0.17	0.12	0.08	0.06	0.01	-0.02	0.02	0.09
SO4	0.16	0.16	0.09	0.10	0.11	0.10	0.15	0.20	0.25	0.25	0.22	0.15	0.08	0.01	-0.01	-0.08	-0.12	0.04	0.14

Table 12A. STA-6 inflow (G-600) surface water (0.5 m grab) constituent co-correlations for reporting period.

	TEMP (Deg C	D.O. (mg/L)	SP CON (uS/cm	PH UNITS	TSS (mg/L)	NOX (mg/L)	NH4 (mg/L)	TKN (mg/L)	OPO4 (mg/L)	TP (mg/L)	TDP (mg/L)	SIO2 (mg/L)	NA (mg/L)	K (mg/L)	CA (mg/L)	MG (mg/L)	CL (mg/L)	SO4 (mg/L)	HARD (mg/L)	TFE (ug/L)	ALK (mg/L)	DOC (mg/L)	THg (ng/L)	MeHg (ng/L)	% MEHG THG
TEMP	1.00	-0.04	-0.41	0.16	0.25	-0.40	-0.50	0.04	0.22	0.41	0.12	0.01	-0.51	0.36	-0.42	-0.04	-0.28	-0.10	-0.54	-0.23	-0.46	-0.19	0.40	0.40	0.19
DO	-0.04	1.00	0.11	0.85	0.55	-0.30	-0.47	0.20	-0.52	-0.16	-0.53	-0.36	-0.09	0.19	-0.36	0.24	0.51	0.43	-0.41	-0.60	0.06	-0.21	-0.62	-0.60	-0.33
SPEC CO	-0.41	0.11	1.00	-0.22	-0.08	0.13	0.49	0.14	-0.67	-0.78	-0.08	0.09	0.90	-0.79	0.86	-0.29	0.93	0.18	0.89	0.60	0.92	0.37	-0.88	-0.88	-0.32
pH	0.16	0.85	-0.22	1.00	0.55	-0.34	-0.73	0.12	-0.41	0.00	-0.64	-0.43	-0.49	0.45	-0.78	0.33	0.18	0.43	-0.77	-0.76	-0.32	-0.14	-0.60	-0.61	-0.38
TSS	0.25	0.55	-0.08	0.55	1.00	-0.10	-0.27	0.78	-0.11	0.34	0.17	0.26	0.38	0.01	0.10	0.22	0.40	0.33	0.29	0.60	0.20	-0.16	0.08	0.02	-0.01
NOX	-0.40	-0.30	0.13	-0.34	-0.10	1.00	0.39	0.02	0.33	-0.07	0.33	0.09	0.35	-0.24	0.10	-0.54	0.10	-0.08	0.19	0.26	0.16	0.30	0.24	0.83	0.87
NH4	-0.50	-0.47	0.49	-0.73	-0.27	0.39	1.00	0.23	0.03	-0.27	0.43	0.57	0.47	-0.25	0.64	0.10	0.27	0.12	0.73	0.82	0.58	0.39	-0.27	-0.27	-0.01
TKN	0.04	0.20	0.14	0.12	0.78	0.02	0.23	1.00	-0.09	0.21	0.41	0.64	0.42	-0.17	0.57	0.26	0.34	0.22	0.73	0.84	0.56	0.45	-0.20	-0.29	-0.24
OPO4	0.22	-0.52	-0.67	-0.41	-0.11	0.33	0.03	-0.09	1.00	0.87	0.97	0.30	-0.24	0.12	0.21	-0.21	-0.79	-0.50	0.20	0.44	-0.57	-0.40	0.94	0.94	0.35
TPO4	0.41	-0.16	-0.78	0.00	0.34	-0.07	-0.27	0.21	0.87	1.00	0.66	0.33	-0.49	0.68	-0.35	0.19	-0.78	-0.41	-0.42	0.07	-0.65	-0.45	0.96	0.95	0.33
TDPO4	0.12	-0.53	-0.08	-0.64	0.17	0.33	0.43	0.41	0.97	0.66	1.00	0.25	-0.64	0.80	0.05	-0.29	-0.32	0.33	-0.08	0.31	-0.18	0.42	0.34	0.54	0.49
SiO2	0.01	-0.36	0.09	-0.43	0.26	0.09	0.57	0.64	0.30	0.33	0.25	1.00	-0.03	0.39	0.09	0.53	-0.07	0.53	0.16	0.57	0.08	0.34	0.20	0.06	0.01
NA	-0.51	-0.09	0.90	-0.49	0.38	0.35	0.47	0.42	-0.24	-0.49	-0.64	-0.03	1.00	-0.71	0.65	-0.32	0.97	-0.35	0.64	0.37	0.75	-0.18	0.32	0.13	-0.07
K	0.36	0.19	-0.79	0.45	0.01	-0.24	-0.25	-0.17	0.12	0.68	0.80	0.39	-0.71	1.00	-0.77	0.63	-0.59	0.87	-0.71	-0.17	-0.83	0.48	0.22	0.46	0.50
CA	-0.42	-0.36	0.86	-0.78	0.10	0.10	0.64	0.57	0.21	-0.35	0.05	0.09	0.65	-0.77	1.00	-0.32	0.45	-0.54	0.99	0.66	0.97	0.29	-0.33	-0.52	-0.40
MG	-0.04	0.24	-0.29	0.33	0.22	-0.54	0.10	0.26	-0.21	0.19	-0.29	0.53	-0.32	0.63	-0.32	1.00	-0.20	0.73	-0.21	0.15	-0.35	0.09	-0.10	-0.47	-0.46
CL	-0.28	0.51	0.93	0.18	0.40	0.10	0.27	0.34	-0.79	-0.78	-0.32	-0.07	0.97	-0.59	0.45	-0.20	1.00	0.32	0.48	0.26	0.73	0.24	-0.78	-0.77	-0.25
SO4	-0.10	0.43	0.18	0.43	0.33	-0.08	0.12	0.22	-0.50	-0.41	0.33	0.53	-0.35	0.87	-0.54	0.73	0.32	1.00	-0.46	0.07	-0.09	0.50	-0.63	-0.53	0.09
HARDNE	-0.54	-0.41	0.89	-0.77	0.29	0.19	0.73	0.73	0.20	-0.42	-0.08	0.16	0.64	-0.71	0.99	-0.21	0.48	-0.46	1.00	0.70	0.97	0.26	-0.17	-0.49	-0.50
TFE	-0.23	-0.60	0.60	-0.76	0.60	0.26	0.82	0.84	0.44	0.07	0.31	0.57	0.37	-0.17	0.66	0.15	0.26	0.07	0.70	1.00	0.61	0.54	0.41	0.31	0.25
ALK	-0.46	0.06	0.92	-0.32	0.20	0.16	0.58	0.56	-0.57	-0.65	-0.18	0.08	0.75	-0.83	0.97	-0.35	0.73	-0.09	0.97	0.61	1.00	0.41	-0.87	-0.91	-0.43
TDORC	-0.19	-0.21	0.37	-0.14	-0.16	0.30	0.39	0.45	-0.40	-0.45	0.42	0.34	-0.18	0.48	0.29	0.09	0.24	0.50	0.26	0.54	0.41	1.00	-0.60	-0.57	-0.11
THg	0.40	-0.62	-0.88	-0.60	0.08	0.24	-0.27	-0.20	0.94	0.96	0.34	0.20	0.32	0.22	-0.33	-0.10	-0.78	-0.63	-0.17	0.41	-0.87	-0.60	1.00	0.95	0.29
MeHg	0.40	-0.60	-0.88	-0.61	0.02	0.83	-0.27	-0.29	0.94	0.95	0.54	0.06	0.13	0.46	-0.52	-0.47	-0.77	-0.53	-0.49	0.31	-0.91	-0.57	0.95	1.00	0.55
%MeHg	0.19	-0.33	-0.32	-0.38	-0.01	0.87	-0.01	-0.24	0.35	0.33	0.49	0.01	-0.07	0.50	-0.40	-0.46	-0.25	0.09	-0.50	0.25	-0.43	-0.11	0.29	0.55	1.00

Table 12B. STA-6 Cell 3 outflow (G-393B) surface water (0.5 m grab) constituent co-correlations for reporting period.

	TEMP (Deg C)	D.O. (mg/L)	SP COND (uS/cm)	PH UNITS	TSS (mg/L)	NOX (mg/L)	NH4 (mg/L)	TKN (mg/L)	OPO4 (mg/L)	TPO4 (mg/L)	TDPO4 (mg/L)	SIO2 (mg/L)	Na (mg/L)	K (mg/L)	Ca (mg/L)	Mg (mg/L)	Cl (mg/L)	SO4 (mg/L)	HARD (mg/L)	TFE (ug/L)	ALK (mg/L)	TDOC (mg/L)	THg (ng/L)	MEHg (ng/L)
TEMP	1.00	0.64	-0.87	1.00	-0.35	1.00	-0.05	-0.85	-0.10	-0.17	1.00	-0.61	-0.06	0.88	0.00	0.99	0.82	0.66	-0.53	0.62	-0.62	-0.36	0.34	0.48
DO	0.64	1.00	-0.39	0.66	-0.15	0.67	-0.22	-0.68	-0.18	-0.32	0.68	-0.84	0.12	0.68	0.26	0.79	0.72	0.68	0.49	0.15	0.52	0.42	-0.12	-0.29
SPEC COI	-0.87	-0.39	1.00	-0.86	0.38	-0.86	-0.14	0.67	-0.11	-0.08	-0.93	0.54	0.29	-0.81	0.24	-0.94	-0.48	-0.50	0.69	-0.60	0.92	0.59	-0.22	-0.57
pH	1.00	0.66	-0.86	1.00	-0.33	1.00	-0.06	-0.86	-0.12	-0.18	1.00	-0.62	-0.05	0.88	0.01	1.00	0.82	0.66	0.22	0.61	0.41	0.29	-0.45	-0.64
TSS	-0.35	-0.15	0.38	-0.33	1.00	-0.34	0.03	0.45	-0.26	-0.13	-0.40	0.28	0.58	-0.66	0.09	-0.63	-0.09	-0.41	0.25	-0.69	0.62	0.44	-0.49	-0.62
NOX	1.00	0.67	-0.86	1.00	-0.34	1.00	-0.06	-0.86	-0.12	-0.19	1.00	-0.62	-0.05	0.88	0.02	1.00	0.82	0.66	0.49	0.61	0.59	0.10	-0.40	-0.54
NH4	-0.05	-0.22	-0.14	-0.06	0.03	-0.06	1.00	0.45	0.59	0.76	0.00	-0.05	-0.17	-0.02	-0.01	-0.03	-0.15	-0.15	0.03	0.28	-0.24	-0.12	0.94	0.81
TKN	-0.85	-0.68	0.67	-0.86	0.45	-0.86	0.45	1.00	0.37	0.52	-0.93	0.63	0.14	-0.86	-0.08	-0.98	-0.74	-0.66	-0.18	-0.52	-0.13	0.39	0.88	0.65
OPO4	-0.10	-0.18	-0.11	-0.12	-0.26	-0.12	0.59	0.37	1.00	0.94	-0.41	0.63	-0.25	-0.54	-0.26	-0.76	-0.45	-0.16	-0.24	-0.07	-0.58	-0.31	0.96	0.85
TPO4	-0.17	-0.32	-0.08	-0.18	-0.13	-0.19	0.76	0.52	0.94	1.00	-0.46	0.56	0.03	-0.69	-0.63	-0.71	-0.49	-0.32	-0.68	-0.11	-0.68	-0.14	0.98	0.87
TDPO4	1.00	0.68	-0.93	1.00	-0.40	1.00	0.00	-0.93	-0.41	-0.46	1.00	-0.62	-0.05	0.88	0.02	1.00	0.89	0.66	-0.70	0.61	-0.64	0.35	0.78	0.70
SiO2	-0.61	-0.84	0.54	-0.62	0.28	-0.62	-0.05	0.63	0.63	0.56	-0.62	1.00	-0.24	-0.59	-0.36	-0.65	-0.66	-0.69	-0.43	0.07	-0.44	-0.34	0.17	0.01
NA	-0.06	0.12	0.29	-0.05	0.58	-0.05	-0.17	0.14	-0.25	0.03	-0.05	-0.24	1.00	0.00	0.35	0.03	0.38	0.11	0.45	-0.47	0.67	0.43	-0.13	0.16
K	0.88	0.68	-0.81	0.88	-0.66	0.88	-0.02	-0.86	-0.54	-0.69	0.88	-0.59	0.00	1.00	0.23	0.89	0.83	0.69	0.34	0.52	0.47	-0.56	-0.06	-0.40
CA	0.00	0.26	0.24	0.01	0.09	0.02	-0.01	-0.08	-0.26	-0.63	0.02	-0.36	0.35	0.23	1.00	0.14	0.14	0.64	0.99	0.07	0.91	-0.21	-0.79	-0.60
MG	0.99	0.79	-0.94	1.00	-0.63	1.00	-0.03	-0.98	-0.76	-0.71	1.00	-0.65	0.03	0.89	0.14	1.00	0.93	0.69	0.77	0.62	0.86	0.21	-0.57	-0.22
CL	0.82	0.72	-0.48	0.82	-0.09	0.82	-0.15	-0.74	-0.45	-0.49	0.89	-0.66	0.38	0.83	0.14	0.93	1.00	0.61	0.34	0.47	0.73	0.69	0.07	-0.48
SO4	0.66	0.68	-0.50	0.66	-0.41	0.66	-0.15	-0.66	-0.16	-0.32	0.66	-0.69	0.11	0.69	0.64	0.69	0.61	1.00	0.76	0.21	0.41	0.08	-0.31	-0.20
HARDNES	-0.53	0.49	0.69	0.22	0.25	0.49	0.03	-0.18	-0.24	-0.68	-0.70	-0.43	0.45	0.34	0.99	0.77	0.34	0.76	1.00	-0.42	0.89	-0.20	-0.73	-0.58
TFE	0.62	0.15	-0.60	0.61	-0.69	0.61	0.28	-0.52	-0.07	-0.11	0.61	0.07	-0.47	0.52	0.07	0.62	0.47	0.21	-0.42	1.00	-0.27	-0.21	0.41	0.27
ALK	-0.62	0.52	0.92	0.41	0.62	0.59	-0.24	-0.13	-0.58	-0.68	-0.64	-0.44	0.67	0.47	0.91	0.86	0.73	0.41	0.89	-0.27	1.00	0.45	-0.44	-0.83
TDORC	-0.36	0.42	0.59	0.29	0.44	0.10	-0.12	0.39	-0.31	-0.14	0.35	-0.34	0.43	-0.56	-0.21	0.21	0.69	0.08	-0.20	-0.21	0.45	1.00	0.37	-0.42
THg	0.34	-0.12	-0.22	-0.45	-0.49	-0.40	0.94	0.88	0.96	0.98	0.78	0.17	-0.13	-0.06	-0.79	-0.57	0.07	-0.31	-0.73	0.41	-0.44	0.37	1.00	0.83
MeHg	0.48	-0.29	-0.57	-0.64	-0.62	-0.54	0.81	0.65	0.85	0.87	0.70	0.01	0.16	-0.40	-0.60	-0.22	-0.48	-0.20	-0.58	0.27	-0.83	-0.42	0.83	1.00
%MeHg	0.52	-0.46	-0.77	-0.50	-0.51	-0.43	0.13	-0.08	0.16	0.18	0.57	0.08	0.16	-0.34	-0.51	-0.16	-0.58	-0.14	-0.46	0.36	-0.78	-0.61	0.11	0.63

Table 12C. STA-6 Cell 5 average of outflows (G-354A and C) surface water (0.5 m grab) constituent co-correlations for reporting period.

	TEMP Deg C	D.O. (mg/L)	SP CONE (uS/cm)	PH UNITS	TSS (mg/L)	NOX (mg/L)	NH4 (mg/L)	TKN (mg/L)	OPO4 (mg/L)	TPO4 (mg/L)	TDPO4 (mg/L)	SIO2 (mg/L)	Na (mg/L)	K (mg/L)	Ca (mg/L)	Mg (mg/L)	Cl (mg/L)	SO4 (mg/L)	HARD (mg/L)	TFE (ug/L)	ALK (mg/L)	TDOC (mg/L)	THg (ng/L)	MEHg (ng/L)	% MEHG THG
TEMP	1.00	-0.69	-0.42	-0.20		-0.24	0.09	0.18	0.12	0.32	0.52	0.66	-0.31	0.23	-0.42	-0.55	-0.32	-0.50	-0.47	0.58	-0.45	0.22	0.57	0.35	0.36
DO	-0.69	1.00	0.20	0.37		0.10	-0.22	-0.22	0.06	-0.26	-0.60	-0.81	0.44	-0.30	0.15	0.49	0.27	0.50	0.20	-0.60	0.14	-0.38	-0.62	-0.42	-0.41
SPEC CO	-0.42	0.20	1.00	0.34		0.21	0.21	0.15	0.00	-0.01	-0.27	-0.39	0.56	0.00	0.82	0.86	0.65	0.56	0.77	-0.33	0.79	0.01	-0.21	0.22	0.17
pH	-0.20	0.37	0.34	1.00		0.34	0.32	0.34	0.47	0.23	-0.31	-0.63	0.48	0.10	0.13	0.10	0.41	0.19	-0.16	-0.33	0.10	-0.16	-0.28	-0.20	-0.29
TSS	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00															
NOX	-0.24	0.10	0.21	0.34		1.00	0.16	0.14	0.51	-0.04	0.18	0.39	0.32	-0.12	0.17	-0.03	0.20	-0.27	-0.35	-0.51	0.15	0.43	0.00	-0.33	-0.45
NH4	0.09	-0.22	0.21	0.32		0.16	1.00	0.97	0.75	0.84	0.09	0.14	0.04	0.25	-0.24	-0.41	0.15	-0.60	-0.37	-0.10	-0.20	-0.18	-0.22	-0.04	0.09
TKN	0.18	-0.22	0.15	0.34		0.14	0.97	1.00	0.84	0.92	0.49	0.19	0.15	0.40	-0.45	-0.43	0.28	-0.64	-0.60	-0.12	-0.38	0.73	0.22	0.18	0.23
OPO4	0.12	0.06	0.00	0.47		0.51	0.75	0.84	1.00	0.90	0.89	0.23	0.46	0.64	-0.90	-0.44	0.08	-0.76	-0.88	-0.34	-0.82	0.03			
TPO4	0.32	-0.26	-0.01	0.23		-0.04	0.84	0.92	0.90	1.00	0.68	0.26	-0.11	0.44	-0.41	-0.58	-0.16	-0.66	-0.48	0.21	-0.39	0.20	0.69	0.58	0.53
TDPO4	0.52	-0.60	-0.27	-0.31		0.18	0.09	0.49	0.89	0.68	1.00	0.65	-0.09	0.27	-0.41	-0.29	-0.01	-0.39	-0.43	0.15	-0.34	0.21	0.50	0.43	0.35
SiO2	0.66	-0.81	-0.39	-0.63		0.39	0.14	0.19	0.23	0.26	0.65	1.00	-0.31	0.12	-0.30	-0.44	-0.28	-0.66	-0.32	0.28	-0.25	0.53	0.38	0.14	0.12
NA	-0.31	0.44	0.56	0.48		0.32	0.04	0.15	0.46	-0.11	-0.09	-0.31	1.00	0.16	-0.10	0.68	0.99	0.28	-0.05	-0.73	-0.06	-0.16	-0.28	0.13	0.14
K	0.23	-0.30	0.00	0.10		-0.12	0.25	0.40	0.64	0.44	0.27	0.12	0.16	1.00	-0.25	-0.08	0.25	-0.02	-0.25	0.20	-0.25	-0.05	0.52	0.65	0.39
Ca	-0.42	0.15	0.82	0.13		0.17	-0.24	-0.45	-0.90	-0.41	-0.41	-0.30	-0.10	-0.25	1.00	0.57	-0.12	0.67	1.00	0.11	0.99	-0.59	-0.11	0.04	-0.01
Mg	-0.55	0.49	0.86	0.10		-0.03	-0.41	-0.43	-0.44	-0.58	-0.29	-0.44	0.68	-0.08	0.57	1.00	0.60	0.71	0.62	-0.53	0.58	-0.54	-0.36	0.12	0.13
Cl	-0.32	0.27	0.65	0.41		0.20	0.15	0.28	0.08	-0.16	-0.01	-0.28	0.99	0.25	-0.12	0.60	1.00	0.23	-0.15	-0.71	0.07	0.19	-0.25	0.15	0.16
SO4	-0.50	0.50	0.56	0.19		-0.27	-0.60	-0.64	-0.76	-0.66	-0.39	-0.66	0.28	-0.02	0.67	0.71	0.23	1.00	0.70	-0.11	0.64	-0.29	0.02	0.26	0.05
HARDNE	-0.47	0.20	0.77	-0.16		-0.35	-0.37	-0.60	-0.88	-0.48	-0.43	-0.32	-0.05	-0.25	1.00	0.62	-0.15	0.70	1.00	0.06	0.99	-0.60	-0.04	0.15	0.06
TFE	0.58	-0.60	-0.33	-0.33		-0.51	-0.10	-0.12	-0.34	0.21	0.15	0.28	-0.73	0.20	0.11	-0.53	-0.71	-0.11	0.06	1.00	0.09	-0.01	0.55	0.39	0.34
ALK	-0.45	0.14	0.79	0.10		0.15	-0.20	-0.38	-0.82	-0.39	-0.34	-0.25	-0.06	-0.25	0.99	0.58	0.07	0.64	0.99	0.09	1.00	-0.23	-0.04	0.13	0.05
TDOC	0.22	-0.38	0.01	-0.16		0.43	-0.18	0.73	0.03	0.20	0.21	0.53	-0.16	-0.05	-0.59	-0.54	0.19	-0.29	-0.60	-0.01	-0.23	1.00	0.32	-0.15	-0.20
THg	0.57	-0.62	-0.21	-0.28		0.00	-0.22	0.22		0.69	0.50	0.38	-0.28	0.52	-0.11	-0.36	-0.25	0.02	-0.04	0.55	-0.04	0.32	1.00	0.70	0.31
MeHg	0.35	-0.42	0.22	-0.20		-0.33	-0.04	0.18		0.58	0.43	0.14	0.13	0.65	0.04	0.12	0.15	0.26	0.15	0.39	0.13	-0.15	0.70	1.00	0.84
%MEHG	0.36	-0.41	0.17	-0.29		-0.45	0.09	0.23		0.53	0.35	0.12	0.14	0.39	-0.01	0.13	0.16	0.05	0.06	0.34	0.05	-0.20	0.31	0.84	1.00

Table 13A. Soil constituent concentration (mg/Kg dry wt) co-correlations for STA-6 Cell 3 for all four sampling events in August and October 2002 and January and April 2003.

	BULK (g/cc)	ASH (%)	MOIST (%)	TN (mg/Kg	TP (mg/Kg	TS (mg/Kg	TCA (mg/Kg	TMG (mg/Kg	AVS (mg/Kg	TFE (mg/Kg	TMN (mg/Kg	THG (mg/Kg	MEHG (mg/Kg	% MEHG THG
BULK DENSITY	1.00	0.34	-0.98	0.13	-0.75	-0.53	-0.72	-0.86	-0.59	-0.54	-0.58	0.27	-0.06	-0.11
% ASH	0.34	1.00	-0.19	-0.39	-0.15	0.13	0.10	-0.30	0.46	0.15	-0.14	-0.44	-0.09	-0.08
% MOISTURE	-0.98	-0.19	1.00	-0.17	0.78	0.62	0.76	0.87	0.69	0.58	0.63	-0.30	-0.02	0.03
TN	0.13	-0.39	-0.17	1.00	0.23	-0.22	-0.09	0.03	-0.20	0.12	0.49	0.61	0.08	0.05
TP	-0.75	-0.15	0.78	0.23	1.00	0.20	0.86	0.72	0.60	0.87	0.76	-0.28	0.41	0.44
TS	-0.53	0.13	0.62	-0.22	0.20	1.00	0.10	0.38	0.46	-0.04	0.35	0.12	-0.56	-0.53
TCA	-0.72	0.10	0.76	-0.09	0.86	0.10	1.00	0.77	0.83	0.92	0.64	-0.64	0.32	0.37
TMG	-0.86	-0.30	0.87	0.03	0.72	0.38	0.77	1.00	0.68	0.58	0.77	-0.26	-0.17	-0.12
AVS	-0.59	0.46	0.69	-0.20	0.60	0.46	0.83	0.68	1.00	0.70	0.63	-0.57	-0.12	-0.07
TFE	-0.54	0.15	0.58	0.12	0.87	-0.04	0.92	0.58	0.70	1.00	0.59	-0.45	0.47	0.49
TMN	-0.58	-0.14	0.63	0.49	0.76	0.35	0.64	0.77	0.63	0.59	1.00	-0.03	-0.12	-0.09
THG	0.27	-0.44	-0.30	0.61	-0.28	0.12	-0.64	-0.26	-0.57	-0.45	-0.03	1.00	-0.36	-0.42
MEHG	-0.06	-0.09	-0.02	0.08	0.41	-0.56	0.32	-0.17	-0.12	0.47	-0.12	-0.36	1.00	1.00
% MEHG	-0.11	-0.08	0.03	0.05	0.44	-0.53	0.37	-0.12	-0.07	0.49	-0.09	-0.42	1.00	1.00

Table 13B. Soil constituent concentration (mg/Kg dry wt) co-correlations for STA-6 Cell 5 for all four sampling events in August and October 2002 and January and April 2003.

	BULK D (g/cc)	ASH (%)	MOIST (%)	TN (mg/Kg)	TP (mg/Kg)	TS (mg/Kg)	TCA (mg/Kg)	TMG (mg/Kg)	AVS (mg/Kg)	TFE (mg/Kg)	TMN (mg/Kg)	THG (mg/Kg)	MEHG (mg/Kg)	% MEHG THG
BULK DENSITY	1.00	0.58	-0.98	-0.50	-0.07	-0.40	-0.44	-0.40	-0.67	-0.53	-0.62	-0.64	-0.27	0.34
% ASH	0.58	1.00	-0.54	-0.90	0.51	-0.72	0.25	0.20	-0.32	-0.08	-0.13	-0.47	-0.78	-0.30
% MOISTURE	-0.98	-0.54	1.00	0.49	0.07	0.43	0.45	0.39	0.72	0.52	0.62	0.60	0.24	-0.29
TN	-0.50	-0.90	0.49	1.00	-0.53	0.74	-0.38	-0.38	0.29	-0.12	-0.05	0.16	0.65	0.49
TP	-0.07	0.51	0.07	-0.53	1.00	-0.43	0.47	0.63	-0.12	0.58	0.18	0.11	-0.57	-0.67
TS	-0.40	-0.72	0.43	0.74	-0.43	1.00	-0.22	-0.26	0.25	-0.07	-0.18	0.31	0.37	0.15
TCA	-0.44	0.25	0.45	-0.38	0.47	-0.22	1.00	0.93	0.53	0.79	0.81	0.51	-0.18	-0.70
TMG	-0.40	0.20	0.39	-0.38	0.63	-0.26	0.93	1.00	0.38	0.91	0.78	0.57	-0.17	-0.75
AVS	-0.67	-0.32	0.72	0.29	-0.12	0.25	0.53	0.38	1.00	0.34	0.42	0.32	0.49	0.02
TFE	-0.53	-0.08	0.52	-0.12	0.58	-0.07	0.79	0.91	0.34	1.00	0.76	0.64	0.04	-0.65
TMN	-0.62	-0.13	0.62	-0.05	0.18	-0.18	0.81	0.78	0.42	0.76	1.00	0.68	0.20	-0.47
THG	-0.64	-0.47	0.60	0.16	0.11	0.31	0.51	0.57	0.32	0.64	0.68	1.00	0.39	-0.50
MEHG	-0.27	-0.78	0.24	0.65	-0.57	0.37	-0.18	-0.17	0.49	0.04	0.20	0.39	1.00	0.55
% MEHG	0.34	-0.30	-0.29	0.49	-0.67	0.15	-0.70	-0.75	0.02	-0.65	-0.47	-0.50	0.55	1.00

Table 13C. Soil constituent concentration (mg/Kg dry wt) co-correlations for combined STA-6 Cells 3 and 5 for all four sampling events in August and October 2002 and January and April 2003.

	BULK D (g/cc)	ASH (%)	MOIST (%)	TN (mg/Kg)	TP (mg/Kg)	TS (mg/Kg)	TCA (mg/Kg)	TMG (mg/Kg)	AVS (mg/Kg)	TFE (mg/Kg)	TMN (mg/Kg)	THG (mg/Kg)	MEHG (mg/Kg)	% MEHG THG
BULK DENSITY	1.00	0.53	-0.98	-0.40	-0.03	-0.43	-0.30	-0.31	-0.51	-0.53	-0.54	-0.53	-0.18	-0.03
% ASH	0.53	1.00	-0.46	-0.87	0.56	-0.55	0.47	0.39	-0.13	-0.13	0.04	-0.60	-0.49	-0.36
% MOISTURE	-0.98	-0.46	1.00	0.35	0.05	0.48	0.33	0.32	0.59	0.55	0.54	0.46	0.13	0.01
TN	-0.40	-0.87	0.35	1.00	-0.53	0.45	-0.51	-0.48	0.12	0.06	-0.09	0.40	0.42	0.36
TP	-0.03	0.56	0.05	-0.53	1.00	-0.32	0.56	0.68	-0.06	0.41	0.27	-0.07	-0.26	-0.29
TS	-0.43	-0.55	0.48	0.45	-0.32	1.00	-0.33	-0.26	0.48	0.08	-0.11	0.38	0.00	-0.07
TCA	-0.30	0.47	0.33	-0.51	0.56	-0.33	1.00	0.93	0.20	0.54	0.78	0.12	-0.23	-0.32
TMG	-0.31	0.39	0.32	-0.48	0.68	-0.26	0.93	1.00	0.15	0.59	0.78	0.21	-0.31	-0.42
AVS	-0.51	-0.13	0.59	0.12	-0.06	0.48	0.20	0.15	1.00	0.59	0.27	0.04	0.08	0.07
TFE	-0.53	-0.13	0.55	0.06	0.41	0.08	0.54	0.59	0.59	1.00	0.60	0.40	0.35	0.20
TMN	-0.54	0.04	0.54	-0.09	0.27	-0.11	0.78	0.78	0.27	0.60	1.00	0.45	-0.11	-0.25
THG	-0.53	-0.60	0.46	0.40	-0.07	0.38	0.12	0.21	0.04	0.40	0.45	1.00	0.23	-0.04
MEHG	-0.18	-0.49	0.13	0.42	-0.26	0.00	-0.23	-0.31	0.08	0.35	-0.11	0.23	1.00	0.96
% MEHG	-0.03	-0.36	0.01	0.36	-0.29	-0.07	-0.32	-0.42	0.07	0.20	-0.25	-0.04	0.96	1.00

Table 13D. Ratio of soil constituent concentration (mg/Kg dry wt) co-correlations between STA-6 Cell 3 and Cell 5 for all four sampling events in August and October 2002 and January and April 2003.

	BULK D (g/cc)	ASH (%)	MOIST (%)	TN (mg/Kg)	TP (mg/Kg)	TS (mg/Kg)	TCA (mg/Kg)	TMG (mg/Kg)	AVS (mg/Kg)	TFE (mg/Kg)	TMN (mg/Kg)	THG (mg/Kg)	MEHG (mg/Kg)	% MEHG/THG
BULK DENSITY	1.00	0.59	1.00	-0.26	11.37	1.31	1.63	2.17	0.89	1.02	0.94	-0.43	0.21	-0.31
% ASH	0.59	1.00	0.35	0.43	-0.30	-0.18	0.41	-1.53	-1.42	-1.88	1.02	0.94	0.12	0.26
% MOISTURE	1.00	0.35	1.00	-0.36	11.46	1.44	1.67	2.22	0.96	1.13	1.02	-0.50	-0.09	-0.10
TN	-0.26	0.43	-0.36	1.00	-0.44	-0.30	0.24	-0.07	-0.69	-0.98	-10.13	3.71	0.12	0.10
TP	11.37	-0.30	11.46	-0.44	1.00	-0.47	1.82	1.14	-4.91	1.52	4.15	-2.48	-0.72	-0.67
TS	1.31	-0.18	1.44	-0.30	-0.47	1.00	-0.47	-1.45	1.79	0.51	-1.95	0.38	-1.50	-3.44
TCA	1.63	0.41	1.67	0.24	1.82	-0.47	1.00	0.83	1.54	1.16	0.78	-1.24	-1.76	-0.52
TMG	2.17	-1.53	2.22	-0.07	1.14	-1.45	0.83	1.00	1.79	0.64	0.99	-0.45	0.99	0.17
AVS	0.89	-1.42	0.96	-0.69	-4.91	1.79	1.54	1.79	1.00	2.07	1.49	-1.76	-0.25	-2.72
TFE	1.02	-1.88	1.13	-0.98	1.52	0.51	1.16	0.64	2.07	1.00	0.78	-0.70	11.90	-0.76
TMN	0.94	1.02	1.02	-10.13	4.15	-1.95	0.78	0.99	1.49	0.78	1.00	-0.04	-0.63	0.19
THG	-0.43	0.94	-0.50	3.71	-2.48	0.38	-1.24	-0.45	-1.76	-0.70	-0.04	1.00	-0.92	0.84
MEHG	0.21	0.12	-0.09	0.12	-0.72	-1.50	-1.76	0.99	-0.25	11.90	-0.63	-0.92	1.00	1.83
% MEHG	-0.31	0.26	-0.10	0.10	-0.67	-3.44	-0.52	0.17	-2.72	-0.76	0.19	0.84	1.83	1.00

Table 14A. Combined Cell 3 and 5 soil constituent co-correlations for each sampling event: 08/06/02.

20020806	BD (G/CC)	ASH (%)	MOIST (%)	TN (mg/Kg)	TP (mg/Kg)	TS (mg/Kg)	TCA (mg/Kg)	TMG (mg/Kg)	AVS (mg/Kg)	TFE (mg/Kg)	TMN (mg/Kg)	THG (mg/Kg)	MEHG (mg/Kg)	% MEHG THG
BULK D	1.00	0.90	-0.98	-0.98	0.64	-0.79	0.22	0.26		-0.41	-0.36	-0.81	-0.61	-0.52
ASH%	0.90	1.00	-0.90	-0.96	0.72	-0.92	0.48	0.40		-0.28	-0.13	-0.91	-0.64	-0.56
MOIST	-0.98	-0.90	1.00	0.97	-0.65	0.75	-0.27	-0.29		0.45	0.36	0.80	0.66	0.59
TN	-0.98	-0.96	0.97	1.00	-0.71	0.87	-0.37	-0.37		0.35	0.22	0.84	0.67	0.59
TP	0.64	0.72	-0.65	-0.71	1.00	-0.85	0.81	0.80		0.37	0.25	-0.43	-0.23	-0.21
TS	-0.79	-0.92	0.75	0.87	-0.85	1.00	-0.66	-0.59		-0.09	-0.15	0.74	0.45	0.38
TCA	0.22	0.48	-0.27	-0.37	0.81	-0.66	1.00	0.94		0.56	0.70	-0.14	-0.27	-0.31
TMG	0.26	0.40	-0.29	-0.37	0.80	-0.59	0.94	1.00		0.57	0.73	0.01	-0.31	-0.38
AVS														
TFE	-0.41	-0.28	0.45	0.35	0.37	-0.09	0.56	0.57		1.00	0.74	0.51	0.56	0.49
TMN	-0.36	-0.13	0.36	0.22	0.25	-0.15	0.70	0.73		0.74	1.00	0.42	-0.04	-0.13
THG	-0.81	-0.91	0.80	0.84	-0.43	0.74	-0.14	0.01		0.51	0.42	1.00	0.51	0.39
MEHG	-0.61	-0.64	0.66	0.67	-0.23	0.45	-0.27	-0.31		0.56	-0.04	0.51	1.00	0.99
% MEHG	-0.44	-0.49	0.54	0.54	0.34	0.23	-0.11	-0.22		0.64	-0.06	0.33	0.99	1.00

Table 14B. Combined Cell 3 and 5 soil constituent co-correlations for each sampling event: 10/29/02.

20021029	G/CC	ASH %	MOIST %	TN (mg/Kg)	TP (mg/Kg)	TS (mg/Kg)	TCA (mg/Kg)	TMG (mg/Kg)	AVS (mg/Kg)	TFE (mg/Kg)	TMN (mg/Kg)	THG (mg/Kg)	MEHG (mg/Kg)	% MEHG THG
BD	1.00	0.48	-0.98	-0.13	-0.42	-0.41	-0.45	-0.66	-0.55	-0.65	-0.74	-0.81	0.01	0.60
ASH%	0.48	1.00	-0.37	-0.87	0.57	-0.92	0.53	0.27	-0.58	-0.03	-0.09	-0.80	-0.45	-0.02
MOIST	-0.98	-0.37	1.00	0.05	0.49	0.35	0.50	0.70	0.52	0.58	0.75	0.69	-0.12	-0.62
TN	-0.13	-0.87	0.05	1.00	-0.70	0.78	-0.76	-0.56	0.33	-0.28	-0.03	0.52	0.43	0.22
TP	-0.42	0.57	0.49	-0.70	1.00	-0.62	0.97	0.88	-0.20	0.62	0.70	-0.02	-0.45	-0.61
TS	-0.41	-0.92	0.35	0.78	-0.62	1.00	-0.56	-0.25	0.54	-0.22	-0.04	0.59	0.22	-0.03
TCA	-0.45	0.53	0.50	-0.76	0.97	-0.56	1.00	0.93	-0.18	0.66	0.66	0.03	-0.46	-0.67
TMG	-0.66	0.27	0.70	-0.56	0.88	-0.25	0.93	1.00	-0.10	0.59	0.79	0.22	-0.57	-0.86
AVS	-0.55	-0.58	0.52	0.33	-0.20	0.54	-0.18	-0.10	1.00	0.36	-0.09	0.60	0.64	0.31
TFE	-0.65	-0.03	0.58	-0.28	0.62	-0.22	0.66	0.59	0.36	1.00	0.56	0.61	0.31	-0.28
TMN	-0.74	-0.09	0.75	-0.03	0.70	-0.04	0.66	0.79	-0.09	0.56	1.00	0.51	-0.38	-0.84
THG	-0.81	-0.80	0.69	0.52	-0.02	0.59	0.03	0.22	0.60	0.61	0.51	1.00	0.43	-0.27
MEHG	0.01	-0.45	-0.12	0.43	-0.45	0.22	-0.46	-0.57	0.64	0.31	-0.38	0.43	1.00	0.73
% MEHG	0.49	0.44	-0.48	-0.26	-0.54	-0.57	-0.50	-0.87	0.28	0.05	-0.76	-0.37	0.64	1.00

Table 14C. Combined Cell 3 and 5 soil constituent co-correlations for each sampling event: 01/21/03.

20030121	G/CC	ASH %	MOIST %	TN (mg/Kg)	TP (mg/Kg)	TS (mg/Kg)	TCA (mg/Kg)	TMG (mg/Kg)	AVS (mg/Kg)	TFE (mg/Kg)	TMN (mg/Kg)	THG (mg/Kg)	MEHG (mg/Kg)	% MEHG THG
BD	1.00	0.45	-0.99	-0.24	-0.33	-0.14	-0.38	-0.58	-0.56	-0.84	-0.40	-0.63	-0.42	-0.06
ASH%	0.45	1.00	-0.41	-0.95	0.40	-0.80	0.54	0.41	-0.52	-0.41	0.27	-0.32	-0.68	-0.53
MOIST	-0.99	-0.41	1.00	0.17	0.26	0.06	0.47	0.64	0.62	0.87	0.51	0.67	0.49	0.11
TN	-0.24	-0.95	0.17	1.00	-0.34	0.90	-0.76	-0.63	0.28	0.17	-0.52	0.13	0.46	0.41
TP	-0.33	0.40	0.26	-0.34	1.00	-0.34	0.29	0.44	-0.15	0.29	-0.03	-0.10	-0.41	-0.44
TS	-0.14	-0.80	0.06	0.90	-0.34	1.00	-0.70	-0.57	-0.07	-0.05	-0.35	0.35	0.17	0.05
TCA	-0.38	0.54	0.47	-0.76	0.29	-0.70	1.00	0.96	0.08	0.30	0.86	0.39	-0.12	-0.34
TMG	-0.58	0.41	0.64	-0.63	0.44	-0.57	0.96	1.00	0.14	0.46	0.84	0.50	-0.08	-0.37
AVS	-0.56	-0.52	0.62	0.28	-0.15	-0.07	0.08	0.14	1.00	0.82	0.09	0.09	0.94	0.84
TFE	-0.84	-0.41	0.87	0.17	0.29	-0.05	0.30	0.46	0.82	1.00	0.31	0.41	0.70	0.43
TMN	-0.40	0.27	0.51	-0.52	-0.03	-0.35	0.86	0.84	0.09	0.31	1.00	0.73	0.05	-0.30
THG	-0.63	-0.32	0.67	0.13	-0.10	0.35	0.39	0.50	0.09	0.41	0.73	1.00	0.18	-0.28
MEHG	-0.42	-0.68	0.49	0.46	-0.41	0.17	-0.12	-0.08	0.94	0.70	0.05	0.18	1.00	0.89
% MEHG	-0.19	-0.34	0.21	0.22	0.39	-0.20	-0.22	-0.18	0.84	0.63	-0.33	-0.38	0.85	1.00

Table 14D. Combined Cell 3 and 5 soil constituent co-correlations for each sampling event: 04/15/03.

20030415	G/CC	ASH %	MOIST %	TN (mg/Kg)	TP (mg/Kg)	TS (mg/Kg)	TCA (mg/Kg)	TMG (mg/Kg)	AVS (mg/Kg)	TFE (mg/Kg)	TMN (mg/Kg)	THG (mg/Kg)	MEHG (mg/Kg)	% MEHG/THG
BD	1.00	0.61	-0.99	-0.61	0.79	-0.64	0.32	0.67	-0.79	-0.08	0.13	0.04	-0.86	-0.76
ASH%	0.61	1.00	-0.60	-0.60	0.81	-0.52	0.82	0.96	-0.17	0.67	0.71	0.16	-0.39	-0.45
MOIST	-0.99	-0.60	1.00	0.67	-0.74	0.61	-0.33	-0.68	0.81	0.09	-0.16	-0.07	0.91	0.82
TN	-0.61	-0.60	0.67	1.00	-0.54	-0.17	-0.46	-0.70	0.33	-0.23	-0.18	-0.68	0.64	0.86
TP	0.79	0.81	-0.74	-0.54	1.00	-0.33	0.41	0.73	-0.26	0.41	0.21	0.13	-0.40	-0.39
TS	-0.64	-0.52	0.61	-0.17	-0.33	1.00	-0.54	-0.58	0.63	0.12	-0.63	0.56	0.54	0.28
TCA	0.32	0.82	-0.33	-0.46	0.41	-0.54	1.00	0.89	-0.15	0.51	0.81	0.26	-0.29	-0.41
TMG	0.67	0.96	-0.68	-0.70	0.73	-0.58	0.89	1.00	-0.33	0.52	0.69	0.26	-0.54	-0.63
AVS	-0.79	-0.17	0.81	0.33	-0.26	0.63	-0.15	-0.33	1.00	0.58	0.00	0.12	0.92	0.75
TFE	-0.08	0.67	0.09	-0.23	0.41	0.12	0.51	0.52	0.58	1.00	0.66	0.08	0.31	0.17
TMN	0.13	0.71	-0.16	-0.18	0.21	-0.63	0.81	0.69	0.00	0.66	1.00	-0.21	-0.16	-0.16
THG	0.04	0.16	-0.07	-0.68	0.13	0.56	0.26	0.26	0.12	0.08	-0.21	1.00	-0.07	-0.43
MEHG	-0.86	-0.39	0.91	0.64	-0.40	0.54	-0.29	-0.54	0.92	0.31	-0.16	-0.07	1.00	0.92
% MEHG	-0.74	-0.13	0.83	0.82	0.56	0.28	-0.30	-0.46	0.72	0.43	-0.09	-0.40	0.90	1.00

Table 15A. Cell 3 soil MeHg concentration, load, change in load, and percent change in load versus soil constituent concentrations, loads, change in loads, and percent change in loads at Lag-0, Lag-1 (12 weeks preceding), Lag-2 (24 weeks preceding), and Lag-3 (36 weeks preceding).

	ASH	MOIST	TN	TP	TS	TCA	TMG	AVS	TFE	TMN	THG	MEHG
Cell 3												
MeHG Conc												
LAG-0 WK	-0.09	-0.02	0.08	0.41	-0.56	0.32	-0.17	-0.12	0.47	-0.12	-0.36	1.00
LAG-12 WK	0.40	-0.05	-0.50	0.31	-0.66	0.40	-0.25	0.03	0.56	-0.34	-0.67	0.89
LAG-24 WK	-0.03	0.78	-0.82	0.17	0.90	0.17	0.46	0.99	-0.15	-0.19	-0.38	-0.19
Lag-36 WK	-0.56	0.79	0.59	0.44	0.78	-0.14	0.96	0.85	0.18	0.88	0.92	-0.37
MeHG Load												
LAG-0 WK	0.46	0.39	0.36	0.62	-0.47	0.56	-0.05	-0.34	0.76	0.00	0.37	1.00
LAG-12 WK	-0.21	-0.15	-0.27	0.18	-0.66	0.56	-0.37	-0.26	0.12	-0.31	-0.30	0.75
LAG-24 WK	-0.52	-0.54	-0.72	-0.54	0.59	-0.26	-0.51	0.48	-0.54	-0.48	-0.61	-0.54
Lag-36 WK	-0.59	-0.44	-0.63	-0.28	0.69	-0.46	-0.47	0.22	-0.50	-0.29	-0.37	-0.70
Change MeHG Load												
LAG-0 WK	0.76	0.76	0.60	0.52	0.90	-0.23	0.27	-0.57	0.72	0.25	0.72	1.00
LAG-12 WK	-0.86	-0.81	-0.70	-0.36	-0.73	0.16	-0.54	0.37	-0.78	-0.30	-0.82	-0.43
LAG-24 WK												
Lag-36 WK												
% Change MeHG Load												
LAG-0 WK	0.88	0.97	0.79	0.64	0.79	0.29	0.77	-0.90	0.80	0.57	0.81	1.00
LAG-12 WK	-0.96	-0.99	-0.98	-0.67	-0.92	-0.29	-0.91	0.86	-0.96	-0.66	-0.97	-0.96

Table 15B. Cell 5 soil MeHg concentration, load, change in load, and percent change in load versus soil constituent concentrations, loads, change in loads, and percent change in loads at Lag-0, Lag-1 (12 weeks preceding), Lag-2 (24 weeks preceding), and Lag-3 (36 weeks preceding).

	ASH	MOIST	TN	TP	TS	TCA	TMG	AVS	TFE	TMN	THG	MEHG
Cell 5												
MeHG Conc												
LAG-0 WK	-0.78	0.24	0.65	-0.57	0.37	-0.18	-0.17	0.49	0.04	0.20	0.39	1.00
LAG-12 WK	-0.68	0.06	0.72	-0.64	0.56	-0.47	-0.44	0.06	-0.14	-0.22	0.04	0.69
LAG-24 WK	-0.07	-0.10	0.33	-0.63	0.02	-0.34	-0.53	-0.69	-0.40	-0.20	-0.39	0.20
Lag-36 WK	0.20	-0.12	-0.08	-0.55	0.25	-0.73	-0.90	0.00	-0.95	-0.80	-0.68	-0.36
MeHG Load												
LAG-0 WK	0.43	0.50	0.67	-0.24	0.54	-0.24	-0.05	-0.22	0.10	-0.12	0.42	1.00
LAG-12 WK	0.00	0.13	0.25	-0.40	0.04	-0.34	-0.36	0.28	-0.32	-0.32	-0.28	0.38
LAG-24 WK	0.12	0.38	0.72	-0.68	0.56	-0.65	-0.61	-0.22	-0.51	-0.63	-0.36	0.66
Lag-36 WK	0.17	0.57	0.88	-0.38	0.77	-0.55	-0.56	0.00	-0.65	-0.79	-0.54	0.03
Change MeHG Load												
LAG-0 WK	0.69	0.68	0.57	0.39	0.51	0.29	0.55	-0.45	0.77	0.36	0.84	1.00
LAG-12 WK	-0.87	-0.90	-0.75	-0.49	-0.75	-0.23	-0.54	0.61	-0.80	-0.33	-0.78	-0.80
LAG-24 WK												
Lag-36 WK												
% Change MeHG Load												
LAG-0 WK	0.66	0.70	0.49	0.66	-0.15	0.20	0.76	-0.54	0.87	0.43	0.91	1.00
LAG-12 WK	-0.74	-0.83	-0.48	-0.42	-0.49	-0.32	-0.62	0.10	-0.57	-0.46	-0.55	-0.45
LAG-24 WK												
Lag-36 WK												

Table 16A. Inter-correlation between STA-6 common inflow (G-600) constituent concentrations and STA-6 Cell 3 and Cell 5 soil constituent concentrations (µg/Kg dry wt) from four sampling events in August and October 2002 and January and April 2003.

	BULK D (g/cc)	ASH (%)	MOIST (%)	TN (mg/Kg)	TP (mg/Kg)	TS (mg/Kg)	TCA (mg/Kg)	TMG (mg/Kg)	AVS (mg/Kg)	TFE (mg/Kg)	TMN (mg/Kg)	THG (mg/Kg)	MEHG (mg/Kg)	% MeHg) THg
TEMP	0.16	0.66	-0.13	-0.80	0.13	0.06	0.12	0.07	-0.09	-0.02	-0.10	-0.74	0.27	0.30
DO	-0.58	-0.33	0.66	0.25	0.69	0.79	0.50	0.51	0.73	0.57	0.50	0.43	-0.75	-0.78
SPEC CO	-0.68	-0.70	0.69	0.54	0.54	0.49	0.51	0.54	0.68	0.61	0.63	0.63	-0.57	-0.66
pH	-0.28	-0.16	0.40	0.37	0.46	0.78	0.14	0.15	0.53	0.25	0.15	0.54	-0.88	-0.82
TSS	0.06	0.51	0.04	-0.44	0.30	0.48	0.09	0.06	0.16	0.04	-0.09	-0.31	-0.28	-0.20
NOX	0.68	0.32	-0.71	0.01	-0.73	-0.65	-0.67	-0.67	-0.74	-0.69	-0.65	-0.17	0.51	0.61
NH4	0.18	-0.43	-0.30	0.45	-0.59	-0.77	-0.33	-0.30	-0.44	-0.28	-0.13	0.24	0.50	0.44
TKN	-0.20	0.01	0.14	-0.33	0.17	-0.10	0.32	0.31	0.08	0.25	0.27	-0.33	0.30	0.22
OPO4	0.38	0.39	-0.49	-0.60	-0.46	-0.77	-0.17	-0.20	-0.60	-0.31	-0.25	-0.75	0.95	0.91
TPO4	0.28	0.71	-0.31	-0.95	-0.09	-0.30	0.05	0.00	-0.33	-0.14	-0.17	-0.96	0.67	0.67
TDPO4	0.43	0.48	-0.53	-0.64	-0.46	-0.72	-0.21	-0.24	-0.61	-0.36	-0.31	-0.77	0.90	0.89
SiO2	0.86	0.30	-0.85	0.29	-0.90	-0.55	-0.98	-0.97	-0.81	-0.93	-0.90	0.12	0.21	0.36
NA	-0.67	-0.70	0.74	0.72	0.62	0.76	0.43	0.47	0.79	0.58	0.55	0.87	-0.92	-0.97
K	0.39	0.45	-0.49	-0.68	-0.44	-0.76	-0.15	-0.18	-0.60	-0.30	-0.24	-0.82	0.97	0.94
CA	-0.82	-0.87	0.77	0.48	0.53	0.23	0.67	0.70	0.68	0.75	0.81	0.56	-0.28	-0.48
MG	-0.47	-0.86	0.49	0.96	0.22	0.33	0.14	0.20	0.48	0.33	0.37	0.99	-0.66	-0.71
CL	-0.49	-0.48	0.56	0.52	0.49	0.66	0.32	0.34	0.62	0.43	0.40	0.69	-0.87	-0.88
SO4	-0.51	-0.55	0.37	0.00	0.17	-0.35	0.53	0.55	0.20	0.50	0.62	-0.06	0.46	0.27
HARDNE	-0.75	-0.99	0.72	0.80	0.43	0.30	0.48	0.54	0.65	0.63	0.70	0.84	-0.49	-0.62
TFE	0.28	-0.32	-0.41	0.35	-0.68	-0.86	-0.40	-0.37	-0.55	-0.37	-0.22	0.12	0.62	0.57
ALK	-0.72	-0.84	0.72	0.68	0.50	0.44	0.50	0.54	0.70	0.62	0.66	0.80	-0.64	-0.76
TDORC	0.07	-0.49	-0.21	0.40	-0.50	-0.76	-0.20	-0.16	-0.36	-0.16	0.00	0.19	0.55	0.46
THg	0.87	0.49	-0.93	-0.23	-0.95	-0.93	-0.80	-0.81	-0.98	-0.87	-0.80	-0.45	0.81	0.89
MeHg	0.39	0.43	-0.50	-0.65	-0.46	-0.78	-0.16	-0.19	-0.61	-0.32	-0.25	-0.81	0.98	0.95
%MeHg	0.21	0.37	-0.31	-0.72	-0.25	-0.64	0.05	0.02	-0.42	-0.11	-0.06	-0.83	0.92	0.86

Table 16B. Inter-correlation between STA-6 Cell 3 outflow (G-393B) constituent concentrations and STA-6 Cell 3 soil constituent concentrations (µg/Kg dry wt) from four sampling events in August and October 2002 and January and April 2003.

	BD (G/CC)	ASH (%)	MOIST (%)	TN (mg/Kg)	TP (mg/Kg)	TS (mg/Kg)	TCA (mg/Kg)	TMG (mg/Kg)	AVS (mg/Kg)	TFE (mg/Kg)	TMN (mg/Kg)	THG (mg/Kg)	MEHG (mg/Kg)	% (MEHG THG)
TEMP	0.45	0.32	-0.53	-0.47	-0.74	-0.45	-0.55	-0.71	-0.48	-0.85	-0.95	-0.65	0.62	0.66
DO	-0.48	-0.50	0.51	0.54	0.77	0.31	0.56	0.72	0.36	0.87	0.89	0.65	-0.42	-0.47
SPEC COI	-0.55	0.30	0.72	-0.37	0.57	0.95	0.63	0.66	0.94	0.54	0.73	-0.10	-0.86	-0.83
pH	0.07	-0.33	-0.08	0.66	0.20	-0.19	-0.03	0.12	-0.18	0.33	0.35	0.68	-0.10	-0.17
TSS	0.56	0.44	-0.46	0.25	-0.41	-0.12	-0.50	-0.41	-0.19	-0.30	-0.09	0.36	-0.33	-0.36
NOX	-0.53	0.07	0.65	-0.17	0.60	0.74	0.60	0.65	0.75	0.59	0.70	0.04	-0.66	-0.64
NH4	0.66	0.20	-0.67	0.29	-0.59	-0.53	-0.66	-0.62	-0.57	-0.51	-0.45	0.23	0.20	0.16
TKN	0.62	0.34	-0.61	0.08	-0.62	-0.41	-0.63	-0.63	-0.46	-0.58	-0.51	0.05	0.15	0.13
OPO4	0.08	-0.35	-0.23	0.01	-0.21	-0.52	-0.17	-0.25	-0.49	-0.26	-0.49	-0.23	0.73	0.74
TPO4	0.28	-0.11	-0.40	-0.02	-0.41	-0.54	-0.36	-0.44	-0.53	-0.45	-0.60	-0.22	0.63	0.64
TDPO4	0.72	0.26	-0.79	0.01	-0.82	-0.75	-0.78	-0.84	-0.78	-0.83	-0.92	-0.15	0.69	0.69
SiO2	0.80	0.64	-0.79	-0.29	-0.97	-0.46	-0.84	-0.94	-0.54	-1.00	-0.92	-0.36	0.30	0.32
NA	-0.49	0.33	0.67	-0.30	0.55	0.94	0.58	0.63	0.92	0.54	0.76	0.00	-0.93	-0.90
K	0.20	-0.20	-0.37	-0.23	-0.46	-0.62	-0.32	-0.48	-0.60	-0.56	-0.82	-0.52	0.92	0.95
CA	-0.83	-0.10	0.89	-0.26	0.76	0.79	0.86	0.83	0.83	0.67	0.71	-0.13	-0.56	-0.53
MG	-0.56	0.05	0.71	-0.01	0.72	0.84	0.66	0.76	0.84	0.76	0.93	0.25	-0.87	-0.86
CL	-0.50	0.40	0.67	-0.39	0.45	0.94	0.57	0.56	0.92	0.40	0.61	-0.16	-0.95	-0.91
SO4	-0.99	-0.38	0.97	-0.45	0.84	0.69	0.97	0.89	0.76	0.71	0.57	-0.42	-0.13	-0.08
HARDNES	-0.88	-0.38	0.93	-0.02	0.97	0.74	0.93	0.98	0.80	0.95	0.94	0.12	-0.51	-0.50
TFE	0.81	0.59	-0.82	-0.25	-0.98	-0.52	-0.86	-0.95	-0.59	-1.00	-0.94	-0.34	0.35	0.37
ALK	-0.74	-0.05	0.84	-0.12	0.77	0.83	0.81	0.83	0.85	0.73	0.84	0.07	-0.77	-0.76
TDORC	-0.84	-0.36	0.90	0.02	0.96	0.74	0.90	0.97	0.79	0.95	0.96	0.18	-0.55	-0.54
THg	0.39	0.24	-0.48	-0.47	-0.70	-0.47	-0.49	-0.67	-0.48	-0.81	-0.94	-0.67	0.68	0.73
MeHg	-0.02	0.67	0.08	-0.96	-0.33	0.39	-0.02	-0.21	0.35	-0.50	-0.44	-0.92	-0.07	0.01
%MeHg	-0.05	0.74	0.15	-0.95	-0.27	0.52	0.03	-0.13	0.47	-0.42	-0.31	-0.85	-0.26	-0.17

Table 16C. Inter-correlation between STA-6 Cell 5 outflow (G-354A and G-354C) constituent concentrations and STA-6 Cell 3 soil constituent concentrations (µg/Kg dry wt) from four sampling events in August and October 2002 and January and April 2003.

WATER	BLK D (G/CC)	ASH (%)	MOIST (%)	TN (m/Kg)	TP (m/Kg)	TS (m/Kg)	TCA (m/Kg)	TMG (m/Kg)	AVS (m/Kg)	TFE (m/Kg)	TMN (m/Kg)	THG (m/Kg)	MEHG (m/Kg)	% MEHG THG
TEMP	0.83	0.58	-0.78	-0.81	-0.14	-0.23	-0.32	-0.28	-0.73	-0.20	-0.52	-0.81	0.07	0.39
DO	-0.96	-0.25	0.97	0.37	0.71	0.39	0.60	0.55	1.00	0.59	0.53	0.75	-0.65	-0.81
SPEC CON	-0.89	-0.30	0.82	0.64	0.15	-0.07	0.56	0.53	0.89	0.43	0.77	0.59	-0.04	-0.26
pH	-0.86	0.33	0.84	0.02	0.46	-0.38	0.95	0.94	0.99	0.88	0.97	0.13	-0.30	-0.27
TSS														
NOX	-0.60	-0.81	0.52	0.96	-0.11	0.34	-0.03	-0.07	0.39	-0.15	0.24	0.85	0.13	-0.26
NH4	-0.62	-0.73	0.53	0.94	-0.17	0.19	0.05	0.02	0.49	-0.09	0.36	0.76	0.22	-0.15
TKN	0.25	0.24	-0.12	-0.61	0.62	0.53	-0.12	-0.12	-0.58	0.08	-0.53	-0.07	-0.73	-0.54
OPO4														
TPO4	0.85	0.61	-0.84	-0.69	-0.45	-0.55	-0.28	-0.23	-0.80	-0.24	-0.33	-0.94	0.43	0.73
TDPO4	0.71	-0.56	-0.77	0.39	-0.82	0.17	-0.94	-0.94	-0.74	-0.99	-0.73	-0.02	0.70	0.53
SiO2	0.93	-0.24	-0.94	-0.01	-0.70	0.10	-0.93	-0.91	-0.95	-0.91	-0.85	-0.32	0.57	0.56
NA	-0.86	-0.09	0.92	0.12	0.89	0.46	0.61	0.57	0.84	0.66	0.42	0.65	-0.85	-0.92
K	0.68	0.78	-0.62	-0.93	-0.01	-0.38	-0.06	-0.01	-0.48	0.05	-0.28	-0.88	-0.02	0.36
Ca	-0.40	-0.27	0.28	0.66	-0.49	-0.46	0.22	0.22	0.65	0.02	0.61	0.19	0.61	0.40
MG	-0.95	-0.43	0.93	0.60	0.47	0.33	0.50	0.45	0.93	0.44	0.56	0.82	-0.41	-0.65
Cl	-0.79	-0.07	0.86	0.04	0.93	0.52	0.56	0.52	0.70	0.63	0.32	0.62	-0.91	-0.95
SO4	-0.84	0.19	0.79	0.21	0.25	-0.43	0.86	0.85	1.00	0.75	0.98	0.18	-0.09	-0.12
HARDNES	-0.46	-0.30	0.34	0.68	-0.44	-0.41	0.25	0.24	0.67	0.06	0.63	0.25	0.55	0.33
TFE	0.80	0.51	-0.83	-0.49	-0.66	-0.69	-0.29	-0.23	-0.97	-0.31	-0.21	-0.91	0.66	0.90
ALK	-0.33	-0.43	0.20	0.76	-0.57	-0.34	0.05	0.04	0.51	-0.15	0.46	0.28	0.66	0.40
TDOC	0.49	0.12	-0.38	-0.54	0.38	0.54	-0.39	-0.39	-0.78	-0.20	-0.74	-0.13	-0.51	-0.35
THg	0.89	0.23	-0.93	-0.26	-0.82	-0.51	-0.54	-0.50	-0.94	-0.58	-0.40	-0.75	0.78	0.91
MeHg	0.91	0.50	-0.90	-0.61	-0.52	-0.47	-0.40	-0.35	-0.91	-0.37	-0.43	-0.89	0.48	0.74
%MEHG	0.57	0.66	-0.47	-0.92	0.27	-0.05	-0.07	-0.04	-0.50	0.09	-0.41	-0.66	-0.33	0.02

Table 17A. Inter-correlation between STA-6 Cell 3 outflow (G-393B) constituent concentrations and STA-6 Cell 3 soil constituent concentrations converted to µg/M^3 from four sampling events in August and October 2002 and January and April 2003.

	BD (G/CC)	ASH (%)	MOIST (%)	TN (mg/Kg)	TP (mg/Kg)	TS (mg/Kg)	TCA (mg/Kg)	TMG (mg/Kg)	AVS (mg/Kg)	TFE (mg/Kg)	TMN (mg/Kg)	THG (mg/Kg)	MEHG (mg/Kg)	%MEHG (MEHG THG)
TEMP	0.45	0.41	0.54	0.31	0.39	-0.05	0.92	0.40	-0.37	0.32	0.18	0.34	0.73	0.76
DO	-0.48	-0.48	-0.58	-0.33	-0.41	-0.16	-0.83	-0.43	0.23	-0.34	-0.25	-0.37	-0.60	-0.62
SPEC CO	-0.55	-0.42	-0.54	-0.56	-0.60	0.62	-0.54	-0.55	0.93	-0.54	-0.35	-0.52	-0.96	-0.95
pH	0.07	0.04	-0.02	0.20	0.15	-0.21	-0.54	0.11	-0.25	0.19	0.21	0.16	-0.06	-0.11
TSS	0.56	0.60	0.53	0.57	0.55	0.42	-0.31	0.57	-0.14	0.58	0.66	0.59	0.04	-0.04
NOX	-0.53	-0.45	-0.54	-0.51	-0.55	0.36	-0.52	-0.52	0.71	-0.50	-0.35	-0.49	-0.80	-0.79
NH4	0.66	0.63	0.64	0.66	0.67	0.02	0.09	0.66	-0.52	0.66	0.62	0.66	0.50	0.45
TKN	0.62	0.61	0.63	0.59	0.61	0.15	0.20	0.61	-0.39	0.59	0.56	0.60	0.45	0.40
OPO4	0.08	-0.02	0.10	0.05	0.10	-0.57	0.59	0.06	-0.49	0.04	-0.12	0.03	0.61	0.65
TPO4	0.28	0.20	0.31	0.24	0.29	-0.37	0.58	0.26	-0.50	0.23	0.09	0.23	0.64	0.67
TDPO4	0.72	0.67	0.75	0.65	0.70	-0.10	0.68	0.70	-0.69	0.65	0.54	0.66	0.92	0.92
SiO2	0.80	0.80	0.87	0.68	0.74	0.29	0.62	0.76	-0.40	0.69	0.62	0.72	0.67	0.65
NA	-0.49	-0.35	-0.48	-0.49	-0.53	0.67	-0.63	-0.48	0.91	-0.47	-0.26	-0.44	-0.98	-0.98
K	0.20	0.09	0.26	0.12	0.19	-0.54	0.94	0.16	-0.56	0.10	-0.10	0.10	0.83	0.89
CA	-0.83	-0.76	-0.81	-0.82	-0.85	0.19	-0.36	-0.83	0.76	-0.82	-0.72	-0.81	-0.84	-0.80
MG	-0.56	-0.46	-0.60	-0.50	-0.57	0.44	-0.80	-0.54	0.78	-0.49	-0.30	-0.49	-0.98	-0.99
CL	-0.50	-0.35	-0.46	-0.53	-0.56	0.70	-0.46	-0.50	0.91	-0.51	-0.31	-0.48	-0.94	-0.95
SO4	-0.99	-0.96	-0.95	-1.00	-1.00	-0.16	0.00	-0.99	0.69	-1.00	-0.97	-1.00	-0.62	-0.53
HARDNES	-0.88	-0.83	-0.91	-0.81	-0.86	-0.01	-0.58	-0.85	0.69	-0.81	-0.69	-0.82	-0.87	-0.83
TFE	0.81	0.80	0.88	0.69	0.75	0.23	0.64	0.77	-0.45	0.71	0.62	0.73	0.72	0.69
ALK	-0.74	-0.65	-0.75	-0.70	-0.75	0.30	-0.61	-0.73	0.78	-0.69	-0.54	-0.69	-0.95	-0.94
TDORC	-0.84	-0.79	-0.88	-0.76	-0.82	0.02	-0.63	-0.82	0.69	-0.77	-0.64	-0.78	-0.88	-0.85
THg	0.39	0.34	0.48	0.25	0.34	-0.13	0.96	0.34	-0.38	0.25	0.10	0.28	0.75	0.79
MeHg	-0.02	0.06	0.11	-0.20	-0.14	0.53	0.62	-0.07	0.47	-0.18	-0.16	-0.13	-0.05	0.00
%MeHg	-0.05	0.06	0.08	-0.22	-0.17	0.67	0.46	-0.09	0.60	-0.19	-0.14	-0.14	-0.20	-0.17

Table 17B. Inter-correlation between average STA-6 Cell 5 outflow (G-354A and G-354C) constituent concentrations and STA-6 Cell 3 soil constituent concentrations converted to µg/M^3 from four sampling events in August and October 2002 and January and April 2003.

	BULK D (G/CC)	ASH (%)	MOIST (%)	TN (m/Kg)	TP (m/Kg)	TS (m/Kg)	TCA (m/Kg)	TMG (m/Kg)	AVS (m/Kg)	TFE (m/Kg)	TMN (m/Kg)	THG (m/Kg)	MEHG (m/Kg)	% MEHG THG
WATER														
TEMP	0.83	0.89	0.91	0.73	0.92	0.32	0.82	0.94	-0.38	0.95	0.79	0.60	0.66	0.70
DO	-0.96	-0.97	-0.87	-0.92	-0.82	-0.28	-0.65	-0.91	0.93	-0.95	-0.87	-0.72	-0.98	-0.98
SPEC CO	-0.89	-0.89	-0.98	-0.83	-0.99	-0.61	-0.59	-0.82	0.61	-0.91	-0.61	-0.81	-0.67	-0.64
pH	-0.86	-0.77	-0.85	-0.92	-0.85	-0.88	-0.05	-0.48	0.97	-0.69	-0.28	-1.00	-0.72	-0.59
TSS														
NOX	-0.60	-0.70	-0.71	-0.45	-0.73	-0.06	-0.91	-0.87	-0.03	-0.80	-0.75	-0.30	-0.42	-0.51
NH4	-0.62	-0.70	-0.76	-0.49	-0.79	-0.20	-0.83	-0.82	0.07	-0.80	-0.67	-0.39	-0.39	-0.46
TKN	0.25	0.24	0.49	0.19	0.57	0.57	0.20	0.23	-0.19	0.32	-0.05	0.38	-0.12	-0.16
OPO4														
TPO4	0.85	0.92	0.82	0.75	0.79	0.06	0.89	1.00	-0.47	0.96	0.97	0.50	0.83	0.90
TDPO4	0.71	0.61	0.57	0.82	0.52	0.62	-0.14	0.29	-0.95	0.48	0.24	0.83	0.78	0.65
SiO2	0.93	0.86	0.86	0.98	0.82	0.69	0.20	0.61	-0.99	0.77	0.49	0.95	0.90	0.79
NA	-0.86	-0.87	-0.70	-0.86	-0.63	-0.17	-0.50	-0.77	0.99	-0.80	-0.81	-0.63	-0.99	-0.98
K	0.68	0.77	0.77	0.54	0.78	0.08	0.92	0.92	-0.07	0.86	0.81	0.37	0.53	0.61
Ca	-0.40	-0.40	-0.63	-0.34	-0.70	-0.61	-0.30	-0.38	0.27	-0.47	-0.10	-0.49	-0.04	-0.01
MG	-0.95	-0.99	-0.94	-0.88	-0.91	-0.31	-0.77	-0.97	0.69	-1.00	-0.88	-0.70	-0.88	-0.90
Cl	-0.79	-0.80	-0.61	-0.79	-0.53	-0.08	-0.47	-0.71	0.94	-0.73	-0.79	-0.55	-0.96	-0.96
SO4	-0.84	-0.76	-0.90	-0.87	-0.91	-0.90	-0.14	-0.52	0.88	-0.72	-0.28	-0.97	-0.63	-0.51
HARDNE	-0.46	-0.46	-0.68	-0.40	-0.74	-0.61	-0.35	-0.44	0.30	-0.53	-0.16	-0.53	-0.11	-0.08
TFE	0.80	0.87	0.70	0.73	0.65	-0.07	0.82	0.93	-0.79	0.88	0.98	0.43	0.89	0.96
ALK	-0.33	-0.35	-0.56	-0.24	-0.64	-0.46	-0.40	-0.40	0.10	-0.45	-0.15	-0.35	0.02	0.03
TDOC	0.49	0.46	0.69	0.46	0.76	0.74	0.21	0.37	-0.45	0.50	0.08	0.63	0.14	0.07
THg	0.89	0.91	0.75	0.86	0.69	0.14	0.62	0.85	-1.00	0.87	0.88	0.61	0.98	1.00
MeHg	0.91	0.97	0.87	0.83	0.84	0.17	0.83	0.99	-0.66	0.98	0.94	0.60	0.89	0.93
fracMEHC	0.57	0.64	0.74	0.45	0.78	0.28	0.74	0.74	-0.09	0.74	0.55	0.40	0.30	0.35

Table 17C. Inter-correlation between STA-6 common inflow (G-600) constituent concentrations and STA-6 Cell 3 and Cell 5 soil constituent concentrations converted to µg/M^3 from four sampling events in August and October 2002 and January and April 2003.

	BULK D (g/cc)	ASH (%)	MOIST (%)	TN (mg/Kg)	TP (mg/Kg)	TS (mg/Kg)	TCA (mg/Kg)	TMG (mg/Kg)	AVS (mg/Kg)	TFE (mg/Kg)	TMN (mg/Kg)	THG (mg/Kg)	MEHG (mg/Kg)	% MeHg) THg
TEMP	0.16	0.19	0.27	-0.01	0.32	0.12	0.72	0.46	0.04	0.30	0.40	0.00	0.30	0.30
DO	-0.58	-0.58	-0.53	-0.50	-0.51	0.36	-0.46	-0.65	0.75	-0.61	-0.69	-0.47	-0.78	-0.78
SPEC CO	-0.68	-0.70	-0.71	-0.57	-0.72	-0.06	-0.62	-0.79	0.60	-0.75	-0.78	-0.56	-0.72	-0.66
pH	-0.28	-0.28	-0.23	-0.15	-0.22	0.70	-0.59	-0.49	0.58	-0.36	-0.54	-0.11	-0.73	-0.82
TSS	0.06	0.08	0.18	0.00	0.22	0.57	0.25	0.15	0.31	0.12	0.08	0.03	-0.14	-0.20
NOX	0.68	0.67	0.62	0.67	0.60	0.04	0.17	0.60	-0.74	0.65	0.64	0.65	0.68	0.61
NH4	0.18	0.15	0.02	0.23	-0.03	-0.66	-0.18	0.05	-0.61	0.11	0.15	0.20	0.39	0.44
TKN	-0.20	-0.19	-0.18	-0.30	-0.16	-0.39	0.35	0.03	0.07	-0.11	0.04	-0.31	0.13	0.22
OPO4	0.38	0.39	0.37	0.21	0.37	-0.61	0.79	0.66	-0.61	0.50	0.70	0.18	0.84	0.91
TPO4	0.28	0.31	0.37	0.06	0.41	-0.21	0.96	0.67	-0.23	0.45	0.64	0.05	0.62	0.67
TDPO4	0.43	0.45	0.43	0.26	0.44	-0.50	0.81	0.71	-0.60	0.55	0.73	0.23	0.84	0.89
SiO2	0.86	0.84	0.79	0.95	0.75	0.31	-0.14	0.55	-0.81	0.75	0.58	0.95	0.52	0.36
NA	-0.67	-0.69	-0.68	-0.50	-0.69	0.31	-0.88	-0.91	0.74	-0.78	-0.92	-0.47	-0.96	-0.97
K	0.39	0.40	0.38	0.20	0.39	-0.61	0.86	0.70	-0.59	0.51	0.73	0.16	0.86	0.94
CA	-0.82	-0.83	-0.88	-0.75	-0.90	-0.60	-0.51	-0.86	0.53	-0.86	-0.83	-0.76	-0.63	-0.48
MG	-0.47	-0.50	-0.57	-0.26	-0.60	0.04	-0.98	-0.81	0.34	-0.63	-0.78	-0.25	-0.71	-0.71
CL	-0.49	-0.50	-0.49	-0.36	-0.49	0.28	-0.72	-0.71	0.59	-0.58	-0.73	-0.34	-0.83	-0.88
SO4	-0.51	-0.52	-0.58	-0.58	-0.59	-0.97	0.14	-0.29	0.05	-0.45	-0.23	-0.62	0.08	0.27
HARDNE	-0.75	-0.77	-0.84	-0.60	-0.87	-0.32	-0.80	-0.92	0.49	-0.85	-0.88	-0.60	-0.71	-0.62
TFE	0.28	0.26	0.13	0.31	0.08	-0.68	-0.06	0.19	-0.71	0.23	0.28	0.27	0.53	0.57
ALK	-0.72	-0.74	-0.77	-0.59	-0.79	-0.22	-0.79	-0.91	0.57	-0.81	-0.89	-0.58	-0.82	-0.76
TDORC	0.07	0.04	-0.08	0.10	-0.13	-0.79	-0.12	0.00	-0.54	0.02	0.10	0.06	0.38	0.46
THg	0.87	0.86	0.80	0.80	0.78	-0.22	0.47	0.85	-0.99	0.87	0.90	0.78	0.95	0.89
MeHg	0.39	0.41	0.38	0.21	0.39	-0.63	0.85	0.70	-0.61	0.52	0.73	0.17	0.87	0.95
%MeHg	0.21	0.22	0.21	0.00	0.23	-0.67	0.87	0.58	-0.42	0.35	0.60	-0.03	0.75	0.86

Table 18A. Lag-1 Cell 3 inter-correlations.

	BD (G/CC)	ASH (%)	MOIST (%)	TN (mg/Kg)	TP (mg/Kg)	TS (mg/Kg)	TCA (mg/Kg)	TMG (mg/Kg)	AVS (mg/Kg)	TFE (mg/Kg)	TMN (mg/Kg)	THG (mg/Kg)	MEHG (mg/Kg)	% (MEHG THG)
TEMP	-0.24	-0.08	0.09	-0.62	-0.18	-0.12	0.09	-0.14	-0.09	-0.35	-0.56	-0.82	0.61	0.68
DO	0.02	0.04	0.11	0.46	0.31	0.25	0.10	0.29	0.23	0.43	0.60	0.66	-0.60	-0.65
SPEC CONI	-0.30	-0.55	0.31	0.78	0.68	0.06	0.39	0.59	0.10	0.81	0.79	0.88	-0.32	-0.39
pH	-0.50	-0.24	0.54	0.25	0.66	0.40	0.56	0.65	0.44	0.69	0.71	0.39	-0.44	-0.46
TSS	-0.15	0.46	0.38	0.03	0.36	0.73	0.30	0.42	0.69	0.42	0.71	0.35	-0.98	-0.99
NOX	0.08	-0.47	-0.20	0.42	0.02	-0.45	-0.11	-0.06	-0.42	0.07	-0.07	0.29	0.39	0.36
NH4	-0.48	-0.73	0.30	0.20	0.43	-0.22	0.41	0.36	-0.14	0.38	0.11	0.03	0.47	0.47
TKN	-0.66	0.26	0.73	-0.67	0.41	0.75	0.65	0.52	0.77	0.26	0.29	-0.54	-0.39	-0.32
OPO4	-0.38	0.17	0.44	-0.30	0.29	0.49	0.40	0.35	0.49	0.23	0.28	-0.19	-0.35	-0.32
TPO4	-0.58	0.08	0.52	-0.75	0.18	0.39	0.49	0.27	0.43	-0.01	-0.12	-0.79	0.12	0.19
TDPO4	-0.18	0.14	0.12	-0.59	-0.15	0.09	0.09	-0.09	0.10	-0.28	-0.36	-0.67	0.26	0.32
SiO2	0.13	-0.17	-0.30	-0.33	-0.42	-0.54	-0.26	-0.43	-0.51	-0.55	-0.80	-0.61	0.89	0.93
NA	-1.00	0.16	0.98	0.19	0.89	0.78	1.00	0.97	0.81	0.84	0.96	0.51	-0.93	-0.95
K	-0.44	-0.85	0.18	0.98	0.77	-0.27	0.43	0.61	-0.23	0.83	0.63	0.99	-0.01	-0.09
CA	-0.43	-0.98	0.28	0.72	0.66	-0.32	0.43	0.54	-0.22	0.73	0.53	0.63	0.35	0.28
MG	-0.88	-0.38	0.72	0.67	1.00	0.34	0.88	0.96	0.39	1.00	0.97	0.89	-0.59	-0.65
CL	-0.75	-0.27	0.81	-0.07	0.83	0.76	0.80	0.85	0.79	0.82	0.89	0.07	-0.64	-0.63
SO4	0.33	-0.65	-0.46	0.90	-0.09	-0.82	-0.34	-0.22	-0.78	0.05	-0.09	0.71	0.54	0.45
HARDNESS	0.44	-0.44	-0.50	0.99	-0.10	-0.68	-0.41	-0.23	-0.67	0.08	0.07	0.91	0.21	0.11
TFE	-0.57	-0.52	0.44	-0.52	0.31	0.03	0.47	0.32	0.11	0.15	-0.18	-0.74	0.71	0.77
ALK	-0.17	-0.74	0.12	0.81	0.48	-0.25	0.21	0.37	-0.19	0.62	0.57	0.80	0.06	-0.04
TDORC	-0.45	0.41	0.51	-0.98	0.12	0.67	0.42	0.24	0.66	-0.07	-0.06	-0.91	-0.19	-0.09
THg	-0.84	-0.07	0.84	-0.77	0.58	0.72	0.81	0.66	0.77	0.40	0.29	-0.73	-0.11	-0.03
MeHg	-0.55	0.36	0.61	-0.95	0.24	0.75	0.53	0.36	0.75	0.06	0.07	-0.86	-0.26	-0.16
%MeHg	-0.59	0.24	0.62	-0.95	0.25	0.67	0.55	0.36	0.68	0.06	0.01	-0.90	-0.11	-0.01

Table 18B. Lag-1 Cell 5 inter-correlations.

SOIL	BLK D	ASH	MOIST	TN	TP	TS	TCA	TMG	AVS	TFE	TMN	THG	MEHG	%
	(G/CC)	(%)	(%)	(m/Kg)	(m/Kg)	(m/Kg)	(m/Kg)	(m/Kg)	(m/Kg)	(m/Kg)	(m/Kg)	(m/Kg)	(m/Kg)	MEHG
WATER														THG
TEMP	0.20	0.97	-0.19	-0.82	0.03	-0.82	0.51	0.55	0.43	0.52	0.40	-0.89	0.07	0.44
DO	-0.28	-0.93	0.28	0.76	0.12	0.88	-0.42	-0.47	-0.46	-0.41	-0.37	0.93	-0.21	-0.57
SPEC COND	-0.31	-0.83	0.21	0.98	-0.45	0.19	-0.26	-0.29	0.18	-0.41	0.09	0.66	0.46	0.07
pH	-0.94	-0.37	0.95	0.47	0.65	0.46	0.51	0.46	0.99	0.49	0.47	0.83	-0.60	-0.81
TSS														
NOX	-0.07	0.81	0.17	-0.88	0.73	-0.12	0.56	0.57	0.12	0.70	0.18	-0.43	-0.70	-0.35
NH4	-0.99	0.15	0.95	0.33	0.17	-0.95	0.79	0.78	0.98	0.66	0.97	0.41	0.05	-0.09
TKN	-0.51	0.74	0.58	-0.61	0.77	-0.27	0.90	0.90	0.60	0.96	0.63	-0.22	-0.67	-0.41
OPO4														
TPO4	-0.37	0.70	0.33	-0.31	0.04	-0.86	0.82	0.84	0.96	0.73	0.88	-0.47	0.12	0.32
TDPO4	-0.63	0.66	0.68	-0.50	0.79	-0.24	0.94	0.93	0.69	0.99	0.70	-0.10	-0.68	-0.46
SiO2	0.20	0.89	-0.10	-0.98	0.50	-0.27	0.40	0.42	-0.03	0.53	0.05	-0.65	-0.48	-0.09
NA	-0.99	-0.22	0.99	0.40	0.64	0.27	0.66	0.61	1.00	0.63	0.64	0.71	-0.56	-0.72
K	-0.87	-0.47	0.81	0.75	0.16	0.11	0.43	0.39	0.82	0.31	0.63	0.73	-0.07	-0.35
Ca	0.32	-0.70	-0.42	0.74	-0.86	0.02	-0.68	-0.68	-0.28	-0.81	-0.31	0.21	0.82	0.53
MG	-0.54	-0.87	0.47	0.98	-0.12	0.42	-0.12	-0.16	0.29	-0.23	0.14	0.87	0.12	-0.28
Cl	-0.98	-0.22	0.99	0.38	0.66	0.30	0.65	0.61	1.00	0.63	0.62	0.72	-0.59	-0.74
SO4	-0.42	-0.72	0.32	0.95	-0.42	0.05	-0.09	-0.11	0.36	-0.25	0.28	0.61	0.46	0.10
HARDNESS	0.28	-0.72	-0.38	0.76	-0.84	0.05	-0.67	-0.67	-0.26	-0.80	-0.30	0.25	0.80	0.50
TFE	0.22	0.31	-0.32	0.01	-0.73	-0.90	0.10	0.14	0.70	-0.05	0.40	-0.59	0.83	0.90
ALK	0.19	-0.70	-0.30	0.79	-0.83	-0.02	-0.57	-0.58	-0.14	-0.72	-0.18	0.26	0.81	0.51
TDOC	0.55	0.90	-0.51	-0.91	-0.07	-0.64	0.15	0.20	-0.17	0.22	0.00	-0.97	0.10	0.49
THg	-0.23	0.50	0.14	-0.09	-0.30	-0.93	0.59	0.62	0.99	0.45	0.80	-0.47	0.46	0.57
MeHg	-0.67	-0.09	0.57	0.52	-0.16	-0.46	0.55	0.54	0.87	0.38	0.84	0.23	0.31	0.16
%MEHG	-0.76	-0.12	0.67	0.53	-0.05	-0.37	0.60	0.58	0.89	0.43	0.86	0.32	0.19	0.03