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EL DORADO

CHEMICAL COMPANY

January 24, 2013

Mary Barnett, Ecologist
Water Division
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR. 72118-5317

Re: Final Report Outfalls 006 and 007 TRE
Including 4th Quarter 2012 Activities Report
El Dorado Chemical Company
NPDES Permit # AR 00000752; AFIN 70-00040

Dear Ms. Barnett:

As required by the Storm Water Toxicity Reduction Evaluation (TRE) Plan for Outfalls 006 and 007 – rev 2.0 (dated January 25, 2011) and in accordance with ADEQ's approval dated January 27, 2011, this letter provides the quarterly activities report and also serves as the final TRE report.

4th Quarter 2012 Activities Report.

TRE activities completed during the period from October 1, 2012 through December 31, 2012 include:

1) Continued the baseline whole effluent toxicity (WET) testing and analytical chemistry on a monthly basis when discharge occurred. In addition to the current critical dilutions of 100 % effluent and the current 0.75 dilution series, the WET testing dilution series included the approved new critical dilutions for Outfall 006 and 007. These new critical dilutions are 22 % and 50 %, respectively. The new critical dilutions are based on those developed through the site-specific flow study submitted to, and approved by, ADEQ;

2) Continued the assemblage and tracking of facility discharge data, including flow, total suspended solids (TSS), ammonia nitrogen (NH_3-N), total dissolved solids (TDS), Cadmium (Cd), Lead (Pb), Zinc (Zn), and pH as they may relate to the WET;

3) Continued lime applications to increase alkalinity of watershed soils with the objective of increasing the buffering capacity of the watershed and to counteract the low pH of storm waters generated within the respective watersheds; and

4) Continued efforts to define sources of storm water flows to each of the storm water outfall and remove sources of potential contaminated storm waters into the Outfall 001 wastewater treatment system.

Additional details of the activities completed during the 4th Quarter 2012 are provided below.

Continued the Routine Baseline Toxicity Testing and Associated Analytical Chemistry

During this reporting period (October 1, 2012 through December 31, 2012), the routine WET tests were completed monthly at the first storm event of each month. Since the WET test reports have been or will be submitted to ADEQ under separate cover with the DMRs for the period, the full reports are not attached to this status report. The WET testing completed during the 4th Quarter 2012 is summarized at the bottom of the following table. Results for the WET testing completed during the TRE (January 2011-December 2012) are summarized in the table below. Additional details of each of the WET tests and period of record plots are provided in ***Attachment 1.***

Collectively, the WET tests completed on the discharge through Outfall 006 typically pass with a No Observed Effect Concentration (NOEC) of 100 % effluent (27 of 46 tests). The Outfall 006 WET tests have passed with a NOEC above 22 % (the new critical dilution) 87 % of the time (40 of 46 tests) since the TRE was initiated in January 2011. However, the Outfall 007 effluent passes WET testing at the new critical dilution (50 % effluent) in less than one-half of the WET tests completed since the TRE was initiated.

Although there have been some WET test failures at the maximum dilution of 100% effluent, the WET tests results are not consistent as indicated by:

- the fathead minnow having passed 21 of 22 Outfall 006 WET tests;
- the water flea having passed 19 of 22 Outfall 006 WET tests, failing only 3 WET tests with NOEC less than 22% effluent;
- the fathead minnow having passed 9 of 23 Outfall 007 WET tests; and
- the water flea having passed 9 of 23 Outfall 007 WET tests.

Also, as indicated by Table 1 below, efforts by the facility to improve quality of the storm water effluents through Outfall 006 and Outfall 007 has resulted in improved WET test performance when comparing the results of 2011 to 2012. As indicated by NOEC results, 2011 had a combined 17 failed WET tests in 12 months while 2012 has had 13 failed WET tests in a 12 month period (excluding those tests with only 100% effluent and control as occurred in June 2011).

Table 1. Summary of acute WET tests completed during the EDCC TRE. POR January 2011 - December 2012.

Date of test	Date of Sample collection	Storm event (inches)	Outfall 006			Outfall 007		
			Discharge MGD	NOEC % Effluent		Discharge MGD	NOEC % Effluent	
				Water flea	Fathead minnow		Water flea	Fathead minnow
January 18-20, 2011	1/17/2011	2.0	0.788	100	100	2.281	100	100
February 25-27, 2011	2/24/2011	0.8	0.259	75	56	0.003	<56	75
March 9-11, 2011	3/8/2011	0.2	0.224	100	42	0.0757	<32	<32
April 5-7, 2011	4/4/2011	0.5	0.400	56	42	3.590	<32	<32
May 3-5, 2011	5/2/2011	0.8	0.2987	75	56	0.003	<32	<32
June 2011*	NA	NA	NA	NA	NA	NA	NA	NA
July 25-27,2011	7/24/11	0.36	1.034	100	100	1.299	100	32
August 15-18, 2011	8/14/11	0.41	0.044	100	100	0.262	<32	<32
August 25-28, 2011	8/24/11	1.37	0.677	<22	100	0.608	<50	<32
Sept. 24-26,2011	9/23/11	0.73	0.073	75	100	0.365	<32	<32
Oct. 19-21, 2011	10/18/11	0.40	0.2598	100	100	0.9177	75	100
Nov. 9-11, 2011	11/8/11	0.45	0.5752	<32	32	1.299	<32	<32
Dec. 5-8, 2011	12/4/11	1.0	0.4007	NA**	100	0.7562	NA**	100
Dec.18-20, 2011	12/15/11	0.30	0.2598	22	NA	0.1797	<50	NA
Jan.10-12, 2012	1/9/2012	0.8	0.3257	100	100	0.4783	42	56
Feb. 4-6, 2012	2/4/2012	0.5	0.0224	75	100	0.0575	56	56
Mar. 9-12, 2012	3/8/2012	2.3	1.6610	100	100	4.369	100	100
April 3-5, 2012	4/2/2012	0.5	0.1512	100	100	0.2618	75	32
May 15, 2012**	NO DISCHARGE related to storm event							
June 13, 2012***	6/12/2012	0.7	0.0224	<100	<100	0.0575	<100	<100
July 11-13, 2012	7/10/2012	0.6	0.044	100	100	0.1797	<32	<32
August 19-21, 2012	8/18/2012	1.2	0.073	75	75	0.1797	<32	75
Sept. 9-11, 2012	9/08/2012	2.4	0.1512	100	100	0.1797	50	56
October 2-4, 2012	10/01/12	3.1	0.0224	100	100	0.0575	<32	<32
November 5-8,2012	11/4/2012	0.5	0.0443	<22	<22	0.0575	<32	<32
December 5-7,2012	12/4/2012	0.2	0.073	100	100	0.1099	<32	<32

Shaded cells indicate the WET tests that passed at the new critical dilutions (006 at 22 % and 007 at 50 %) reflecting site runoff to the receiving stream as developed by the ADEQ approved flow study.

*June 2011 no Storm event and therefore no discharge for the month.

**May 2012 discharge occurred through Outfall 007 resulting from fire control efforts after May 15, 2012 facility explosion, no WET test testing completed at direction of ADEQ.

***June 2012 Test: 100 % effluent was only test dilution due to limited organisms at testing facility,

A summary of the individual monthly WET tests results for Outfall 006 and Outfall 007 completed during the course of the 4th Quarter 2012 is provided below. The WET tests completed during this reporting period passed 2 of 3 sets on Outfall 006 but failed all three months testing on Outfall 007. The details of each of the WET tests were evaluated to determine if a potential cause for the test results could be identified. The review of the individual WET tests did not identify a consistent pattern of response or a direct cause for the reduced NOECs in Outfall 007 during this reporting period.

October 2012 WET Tests Results

The October 2012 WET tests were completed on discharge resulting from a 3.1 inch storm event on October 1, 2012. The flows measured at the time of sample collection (within 30 minutes of first discharge) were 0.0224 mgd and 0.0575 mgd through Outfall 006 and Outfall 007, respectively. The October 2012 WET testing passed two (2) of the four (4) monitored endpoints in the maximum exposure (100 % effluent), having passed both Outfall 006 WET tests but failing both the Outfall 007 WET tests. The October 2012 WET test results were submitted to ADEQ along with the October DMR.

Outfall 006. Outfall 006 effluent passed both tests in the 100 % exposure. The NOEC concentrations (100 % effluent) were greater than the approved new critical dilution of 22 % effluent. The October 2012 WET tests continued the WET test performance of passed testing at effluent concentrations of 22% effluent or greater. The WET test analytical chemistry reported a pH of 7.3 su to 7.5 su, conductivity ranged from 897 to 904 uS, and the dissolved oxygen ranged from 7.3 mg/L to 7.5 mg/L. All these parameters were within typical ranges for the discharge.

Outfall 007. Outfall 007 effluent failed both tests in 100 % exposure. The NOEC concentrations were less than 32 % effluent. The October 2012 WET tests demonstrated reduced WET performance when compared to the results of the previous month which passed at the new critical dilutions. The WET test analytical chemistry reported a pH of 6.4 su to 6.9 su, the dissolved oxygen ranged from 8.0 mg/L to 8.3 mg/L, both within typical ranges for the discharge. However, the conductivity ranged from 12,590 to 15,650 uS, which were greatly elevated when compared to other WET test that passed the WET testing. The October 2012 storm events (accompanied by high winds) resulted in water infiltration into the damaged E2 warehouse side walls which ultimately flowed out of the warehouse into the Outfall 007 drain system resulting in the elevated conductivity demonstrated during this reporting period. Repairs were made to the North and West wall of the building where the rain was blowing in. The drains to the 007 area from the E2 warehouse area were plugged and a pump was used to pump storm water to the treatment plant down the Third street drain system.

The low dissolved oxygen demonstrated in previous WET test failures did not occur during the October 2012 WET testing, therefore dissolved oxygen levels did not seem to be an issue in the 4th Quarter 2012 WET tests.

November 2012 WET Tests Results

The November 2012 WET tests were completed on discharges resulting from a 0.5 inch storm event on November 4, 2012. The flow measured at the time of sample collection (within 30 minutes of discharge) was 0.0443 mgd and 0.0575 mgd through Outfall 006 and Outfall 007, respectively. The November 2012 acute WET testing failed all four (4) of the monitored endpoints with NOECs of <22 % in Outfall 006 and <32% in Outfall 007. The November 2012 WET test results were submitted to ADEQ along with the DMR for the period.

Outfall 006. Outfall 006 effluent failed both tests in the minimum exposure of the test series (22 % exposure). This result of the November WET test is atypical of the discharge through Outfall 006. The WET test on Outfall 006 effluent has not failed at this level previously during the TRE. The lime treatment in the watershed during November 2012 occurred on November 2, 2012, less than 48 hours prior to the sample collection. Although the pH of the discharge as measured at the time of sample collection was 7.09 su, the pH as measured at the WET testing lab 24 hours after sample collection was reported as 4.6 su to 5.1 su. The pH meters used by the facility at the time of collection are calibrated daily and results of calibration recorded in QA/QC logs. The meters used at the time of sample collection was within calibration. It was not determined if the pH at the WET lab was verified by calibration. Although not typical for the Outfall 006 storm water discharge, the difference in pH could represent a pH drift as a function of the holding time. The dissolved oxygen and conductivity were within typical range for Outfall 006 discharge.

Outfall 007. Outfall 007 effluent also failed at the lowest dilution of the exposure series (32% effluent). Like the analytical associated with Outfall 006, the pH measured at the time of sample collections was 6.46 su and reported as 4.7su to 5.2 su at the WET testing lab 24 hours after sample collection. The November 2012 fathead minnow WET tests continued the results demonstrated in the previous month.

The low dissolved oxygen demonstrated in previous WET test failures was not an issue with the 4th Quarter 2012 WET tests. Therefore, dissolved oxygen levels did not present as an issue in the November 2012 WET tests.

The conductivity continued to be elevated but the range of conductivities measured in the November 2012 WET tests were reported by the WET test lab as 10,050 uS to 10,300 uS, approximately 10 times the typical range. The condition as described

in the previous month continued into November 2012. Actions implemented in late October reduced the conductivity as measured in early November by approximately 1/3 from approximately 15,000 uS to around 10,000 uS. Efforts to reroute collected storm waters continued.

December 2012 Test Results

The December 2012 WET tests were completed on discharges resulting from a 0.2 inch storm event on December 4, 2012. The flows measured at the time of sample collection (within 30 minutes of discharge) were 0.073 mgd and 0.1099 mgd through Outfall 006 and Outfall 007, respectively. The December 2012 WET testing passed both the Outfall 006 endpoints in 100% exposure but failed both of the Outfall 007 WET tests at the lowest exposure (32% effluent). The December 2012 WET test results have been submitted to ADEQ along with the DMR for the period.

Outfall 006. Outfall 006 effluent passed both tests in 100 % exposure. The NOEC concentration was greater than the approved new critical dilution of 22 % effluent. The December 2012 WET tests demonstrated improved WET performance when compared to the ATYPICAL results of November 2012. The pH, conductivities and dissolved oxygen were all within typical levels for the discharge.

Outfall 007. Outfall 007 effluent failed both the water flea and the fathead minnow WET test. The effects of lime treatment in the watershed during the 3rd Quarter 2012 were reflected in the pH of the storm runoff that ranged from 6.6 su to 7.3 su.

The low dissolved oxygen demonstrated in previous WET test failures was not an issue with the 4th Quarter 2012 WET tests. The dissolved oxygen levels (7.2 mg/L to 8.3 mg/L) were not an issue in the 4th quarter 2012 WET tests.

The conductivities measured during the December 2012 WET testing (16,410 uS to 16,620 uS) continued to be elevated when compared to typical levels. Efforts to reroute collected storm waters to the Day pond for treatment and discharge through Outfall 001 continued.

Facility Discharge Data

In addition to the routine WET testing, collection of additional facility information continues. This information includes, but is not limited to, facility operations, chemical use data, tracking of internal housekeeping records and documentation of activities within the individual outfall sub-basins.

There were 12 days with measurable storm events during the 4th Quarter of 2012. The storm events ranged from 0.2 inch to 3.1 inches in a 24-hour period totaling 12.3 inches for the quarter. The frequency of discharges through the storm water outfalls during the 4th Quarter of 2012 were increased when compared to the previous three month period.

There were three (3) discharge events in October and November and six (6) in December.

The routine analytical monitoring of Outfalls 006 and 007 was continued throughout the TRE process. The effluent data was regressed against the NOECs generated by the concurrent WET testing. Tables 2 and 3 provides a summary of the regression of the individual analytical parameters and the water flea acute WET NOEC for Outfall 006 and 007, respectively. The water flea NOEC results were selected since they were typically shown to be the more sensitive of the two species. ***Attachment 2*** provides plots of the compared variables for Outfalls 006 and 007.

For Outfall 006, only TSS was determined to be correlated with NOEC performance with a positive statistical significance. Although not significant, ammonia was found to be the next closely correlated to NOEC with p-value of 0.08 and a negative correlation statistic of -0.34 indicating that as ammonia concentration increased, the NOEC decreased. None of the other analytical parameters typically measured as required by the NPDES permit were demonstrated to have a significant correlation with the WET test results.

Table 2. Summary of correlation analyses for *Daphnia pulex* at Outfall 006 with effluent data during concurrent sampling periods. EDCC TRE POR January 2011- December 2012.

Variables Compared	***Correlation Statistic***	***p-value***[1]
Survival NOEC:Flow	0.11	0.55
Survival NOEC:pH	-0.06	0.74
Survival NOEC:TSS	0.48	0.01
Survival NOEC:NH_3-N	-0.34	0.08
Survival NOEC:TDS	-0.25	0.2
Survival NOEC:Cadmium	-0.18	0.37
Survival NOEC:Lead	0.16	0.42
Survival NOEC:Zinc	-0.08	0.67
Survival NOEC:Oil & Grease	0.22	0.31
Survival NOEC:Conductivity	-0.26	0.1

[1] p-value must be below 0.05 for ***correlation*** to be considered statistically significant.

For Outfall 007, conductivity and ammonia (negative relationships) and flow (positive relationship) were determined to be significantly correlated to the water flea WET NOEC. In addition, both conductivity and ammonia were found to have low p-values of 0.0006 and 0.003, respectively, and a negative correlation statistic of -0.63 and -0.62, respectively, indicating that as concentrations increased, the NOEC decreased. Flow demonstrated a positive correlation statistic, indicating as the flow increased the WET test performance also increased but was only slightly significant. None of the other analytical parameters typically measured as required by the NPDES permit were demonstrated to have a significant correlation with the WET test results.

Table 3. Summary of correlation analyses for *Daphnia pulex* at Outfall 007 with effluent data during concurrent sampling periods. EDCC TRE POR January 2011- December 2012.

Variables Compared	***Correlation Statistic***	***p-value[1]***
Survival NOEC:Flow	0.37	0.03
Survival NOEC:pH	0.16	0.36
Survival NOEC:TSS	-0.06	0.79
Survival NOEC:NH_3-N	-0.62	0.003
Survival NOEC:TDS	-0.26	0.31
Survival NOEC:Cadmium	-0.35	0.14
Survival NOEC:Lead	-0.32	0.18
Survival NOEC:Zinc	-0.11	0.64
Survival NOEC:Oil & Grease	0.2	0.38
Survival NOEC:Conductivity	-0.63	0.0006

[1] p-value must be below 0.05 for correlation to be considered statistically significant

Treatment of Watershed Soils

The routine practice of monitoring the Outfall 006 and Outfall 007 storm water ditches after storm events as long as residual storm water is present in drainage ditches continues. Results of this monitoring have demonstrated that the pH of the residual storm waters in these drainage ditches are approximately 6 su.

In an attempt to increase the buffering capacity of soils in the watersheds, multiple applications of pelletized lime were applied during the 4th Quarter of 2012. Pelletized lime continues to be applied to the watershed with the intent to stabilize pH fluctuation within a range of 1 su to 1.5 su. The increased conductivity as measured during the WET testing may be related to the lime application which occurred within 24-48 hours prior to the discharge events.

During the 4th Quarter of 2012, there were a total of 20 lime applications (10 in the Outfall 006 watershed and 10 in the Outfall 007 watershed). Individual applications varied between one-half and one ton. A total of 7.5 tons were applied in the Outfall 006 watershed during the 4th Quarter 2012 and 8 tons were applied in the Outfall 007 watershed.

Modifications to Watershed Flows

For the past several years, EDCC has implemented measures to minimize surface runoff to Outfalls 006 and 007. Those measures have included construction of drainage swales, culverts and other means to reduce the drainage areas of those outfalls and

divert flow of contaminated storm waters to the collection and treatment system that discharges through Outfall 001. In addition, the modifications to the individual watersheds, especially in watershed for Outfall 007, have further reduced the volume of storm water discharged from each watershed individual watersheds. Figures 1 -3 depict specific modifications to the Outfall 007 watershed.

Figure 1. This area drainage, previously discharged through Outfall 007, has been removed from 007 and now is diverted to the Day Pond for treatment. View is from south west to east north east.

Figure 2.This area drainage has been diverted to the Day Pond for treatment; it previously discharged through Outfall 007. View is from west to east during storm event.

Figure 3. Discharge point at the end of new underground line that collects water from areas in figure 1 and 2 and flows to the head wall under the tracks and into the new line east to Lake Lee (Day Pond). Drain boxes have been installed along the line to capture all of the water on the south side of the road that previously discharged through Outfall 007. View from northwest to southeast.

These modifications have resulted in modification to the Storm Water Pollution Prevention Plan (SWPPP) that identifies the boundaries of the Outfall 006 and Outfall 007 watersheds. While the Outfall 006 watershed remains unmodified, the Outfall 007 watershed has been modified to exclude areas of industrial activity including other areas previously included in the Outfall 001 watershed. This has resulted in the watershed size changing from 5.57 acres to 12.12 acres ($0.0087mi^2$ to $0.0189mi^2$) for Outfall 007. (***Attachment 3.*** Old and New site flow figures in SWPPP).

Monitoring of the storm events and discharge flows have demonstrated that the greatest flow volume was not generated by the largest storm events. Discharge flow is more often determined by storm intensity and antecedent conditions than the magnitude of the storm event.

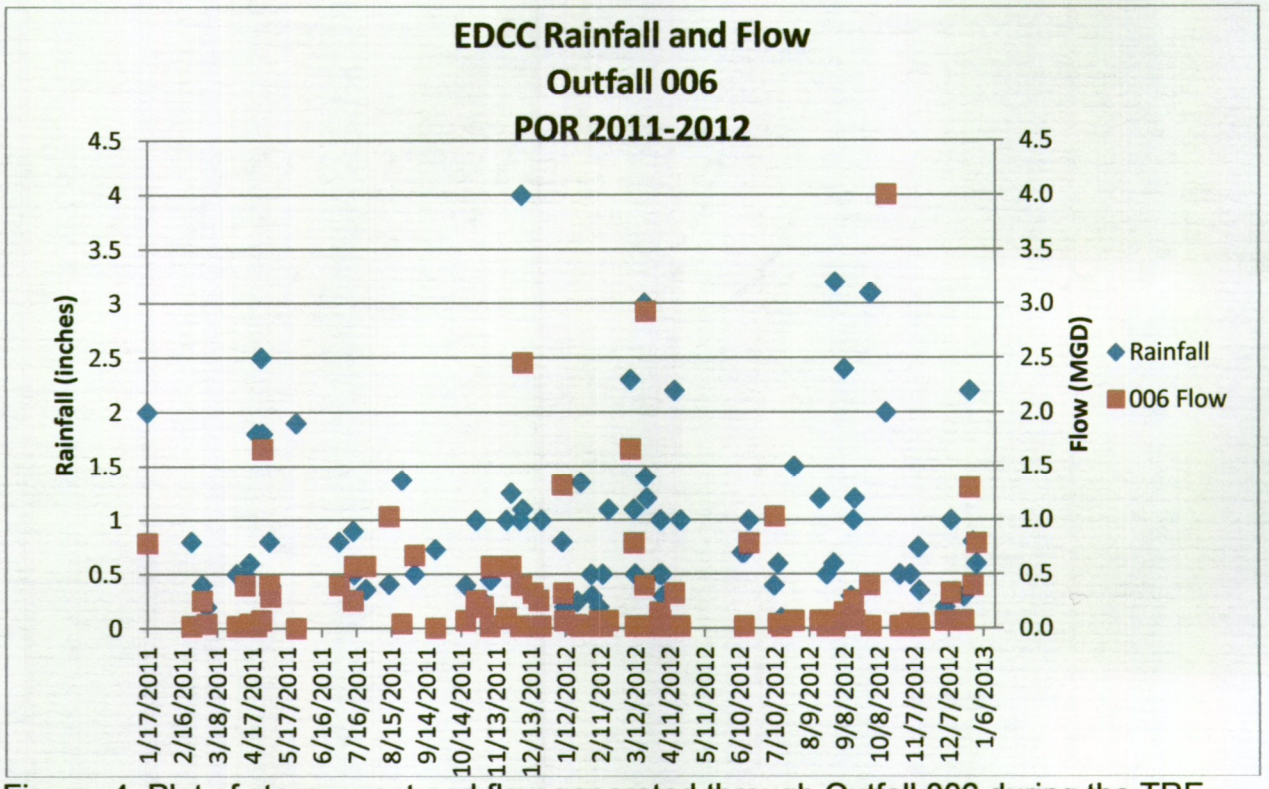


Figure 4. Plot of storm event and flow generated through Outfall 006 during the TRE.

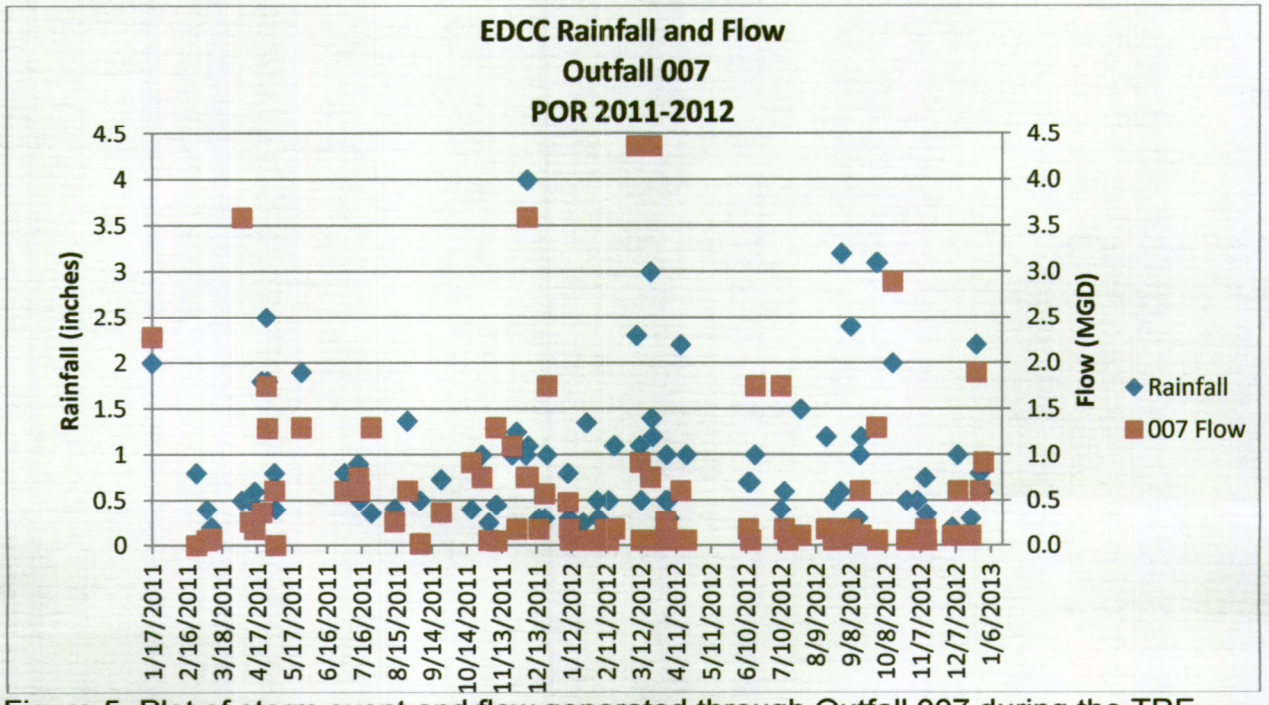


Figure 5. Plot of storm event and flow generated through Outfall 007 during the TRE.

Additional Watershed Modifications during the TRE.

In addition, during the TRE process, EDCC has completed other facility modifications and corrective actions including but not limited to:

- EDCC's goal is to continue to improve the storm water discharges through Outfalls 006 and 007. This will be accomplished by improving the seeding and vegetative growth in the watersheds where possible.

- Outfalls 006 and 007 are monitored two to three times per week for flow or pooling water that may impact the water during a storm event. No dry weather flow has been reported to date.

- The north recovery well pumps were changed and electrical alarm system repaired. The sulfuric plant French drain pump was found to be inoperative and a temporary pump was installed until the main pump is repaired. The DSN plant sump pump was found plugged with trash. The pump and sump were cleaned and put back in service.

- During sampling for two rain events in a 12 hour window the pH was good at 9:30 p.m. sampling and low at the 8:30 a.m. sampling the next morning. Two tons of pellet lime was applied to the Outfall 007 watershed area. A meeting was held with the acid team to advise them of the rapid change and educate them as to the importance of the French drains. The environmental team suggested installing a sump pump in the French drain under the DSN in the man-way on the north side of the plant. Maintenance has agreed to install a temporary pump so the environmental team can gather more data.

- The DSN pump has been installed and is pumping. The pH data from the testing during rain events has been high due to very limited rainfall and no flush time. Additional lime was added to 007 watershed.

- Additional lime has been routinely added to the watersheds. Roadway dust and solids from the ditch are washing down to the outfall contributing to the TSS in the sample. EDCC is continuing to monitor the area. Samples were taken from the dirt from along the tracks where the railcar cleaning is done and the results are being evaluated. However, it appears, due to the limited activity in the area, that contamination is coming from past activity.

- EDCC continues to apply pellet lime to the area to control the pH. The rail spurs are monitored both by the environmental team as well as the rail team for prills and leaking railcar gates. The installation of new lines from the two recovery wells back to the DSN

plant was completed The French drain sump on the north side of the DSN is being addressed. EDCC has looked at the areas that drain to 006 and 007 and found significant activity in the 007 area on the north side of the Gas Engine Building (GEB). If the plugged drains are leaking (which only a dye test will prove) this may be an opportunity. This investigation is ongoing for 006 as well.

- Fluids have been drained from the two train engines by the E2 warehouse.

- Dye has been ordered to dye test the drains on the north side of the GEB and make sure the drains are plugged and not leaking. This will be initiated after the first of the year. There have been rainfall amounts that have flushed the system but pH control is still problematic.

- Lime continues to be applied at ½ ton to the 006 outfall watershed and a full ton on the 007watershed.

- Collapsed culvert that drains to Outfall 006 repaired allowing full drainage of the area on the south side of the rail scale tracks eliminating two and three day sampling after a rain.

- The October 2012 storm events (accompanied by high winds) resulted in water infiltration into the damaged E2 warehouse side walls which ultimately flowed out of the warehouse into the Outfall 007 drain system resulting in the elevated conductivity. Repairs were made to the North and West wall of the building where the rain was blowing in. The drains to the 007 area from the E2 warehouse area were plugged and a pump was used to pump storm water to the treatment plant down the Third street drain system.

- The DSN sump pump is operational as well as the recovery well.

- The dye has arrived and the testing on the drains has begun and should be completed by the end of the month. We continue to sample to attempt to identify any opportunities for improvement. The culvert on the east side of 006 has been repaired and is draining properly.

- Dye testing shows existing drains as shown on the SWPPP facility site storm water map (Attachment 3.b). Monitoring pH of the residual ditch water continues as well as additional pH testing during rain events throughout the area.

Summary of TRE activities.

The WET test results during the TRE demonstrated that the storm water discharge through Outfall 006 meets and surpasses the approved new critical dilutions for WET

test compliance in almost 90 % of the WET tests completed during the TRE. Efforts to continue improvement in water quality through Outfall 006 will continue.

However, since Outfall 007 continues to fail WET tests at dilutions less than the proposed critical dilution of 50 %, the focus will be directed at additional site improvements in the Outfall 007 watershed.

In accordance with the TRE Plan, this report provides the final quarterly report and activities proposed to achieve increased WET test performance. The proposed actions include continued efforts to identify sources of contaminants and complete activities to achieve compliance with WET testing in Outfall 007 through continued monitoring of effluent constituents, tracking of site storm data (duration and magnitude), and discharge volumes. In addition, EDCC will continue assessment of facility data, including the monitoring of routine storm water sources and discharge data with particular attention to facility conditions during the WET monitoring periods.

Please do not hesitate to contact me if you have any questions or require additional information regarding the implementation of the Outfall 006/007 TRE.

Respectfully submitted,
El Dorado Chemical Company

Kyle Wimsett,
EDCC EH&S Manager

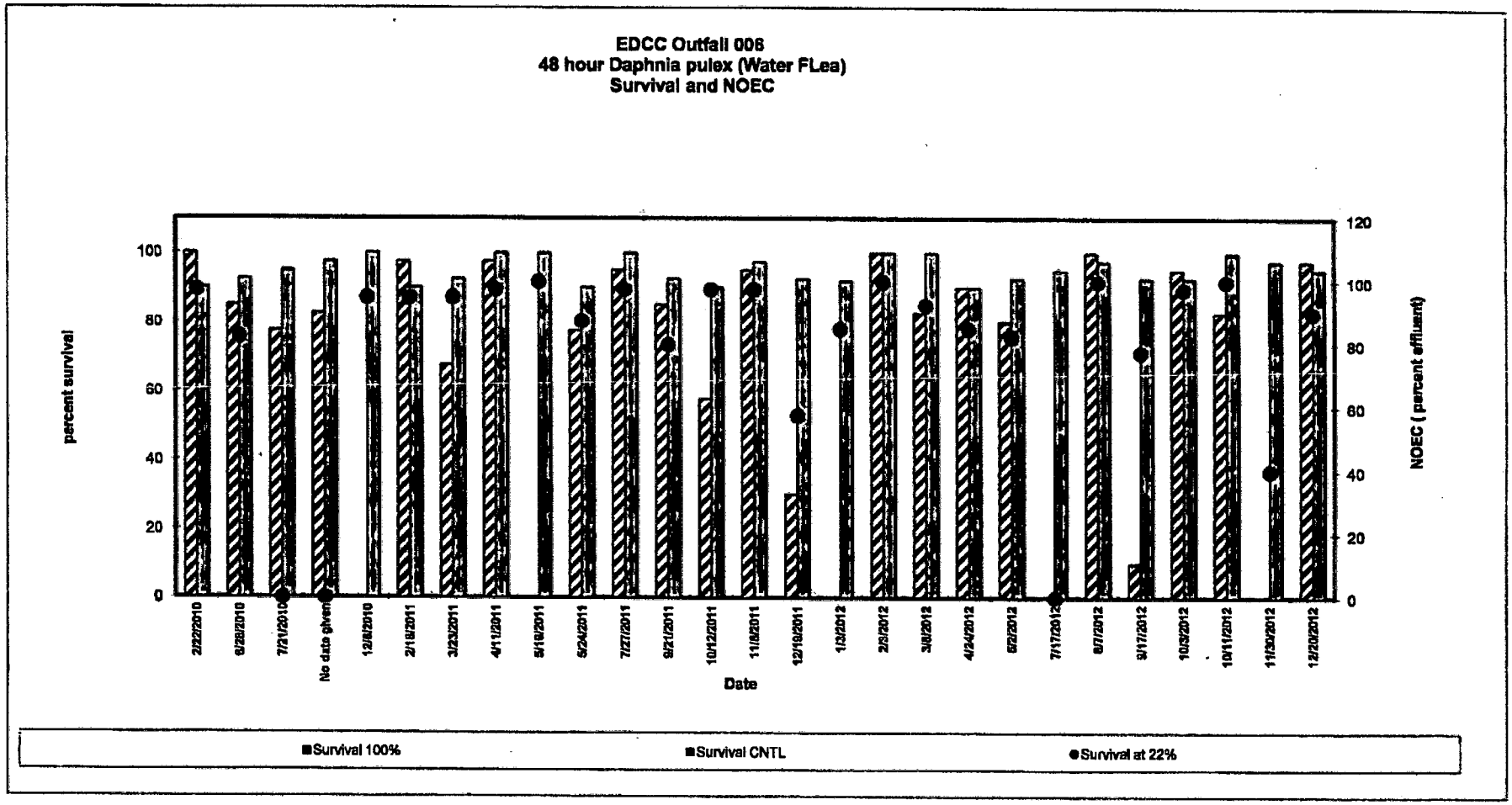
ECC: Greg Withrow, EDCC General Manager
John Carver, LSB Industries
Roland McDaniel, GBMc & Associates
Chuck Nestrud, CN&J

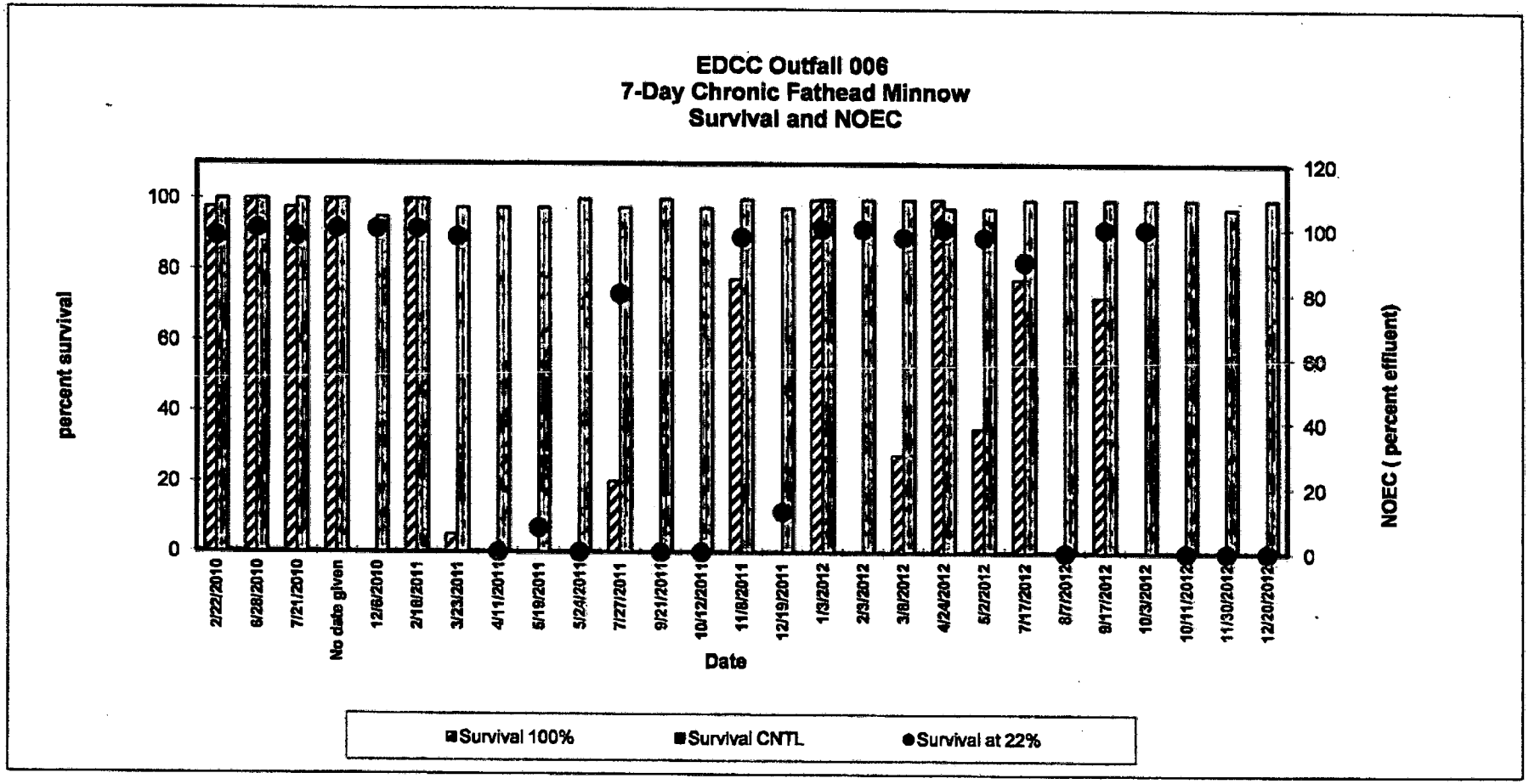
Attachment 1

Summary Tables and Plots
of
WET test results

EDCC Outfall 006 Toxicity Summary (48 hour acute tests). POR 2/22/2010- 12/20/12

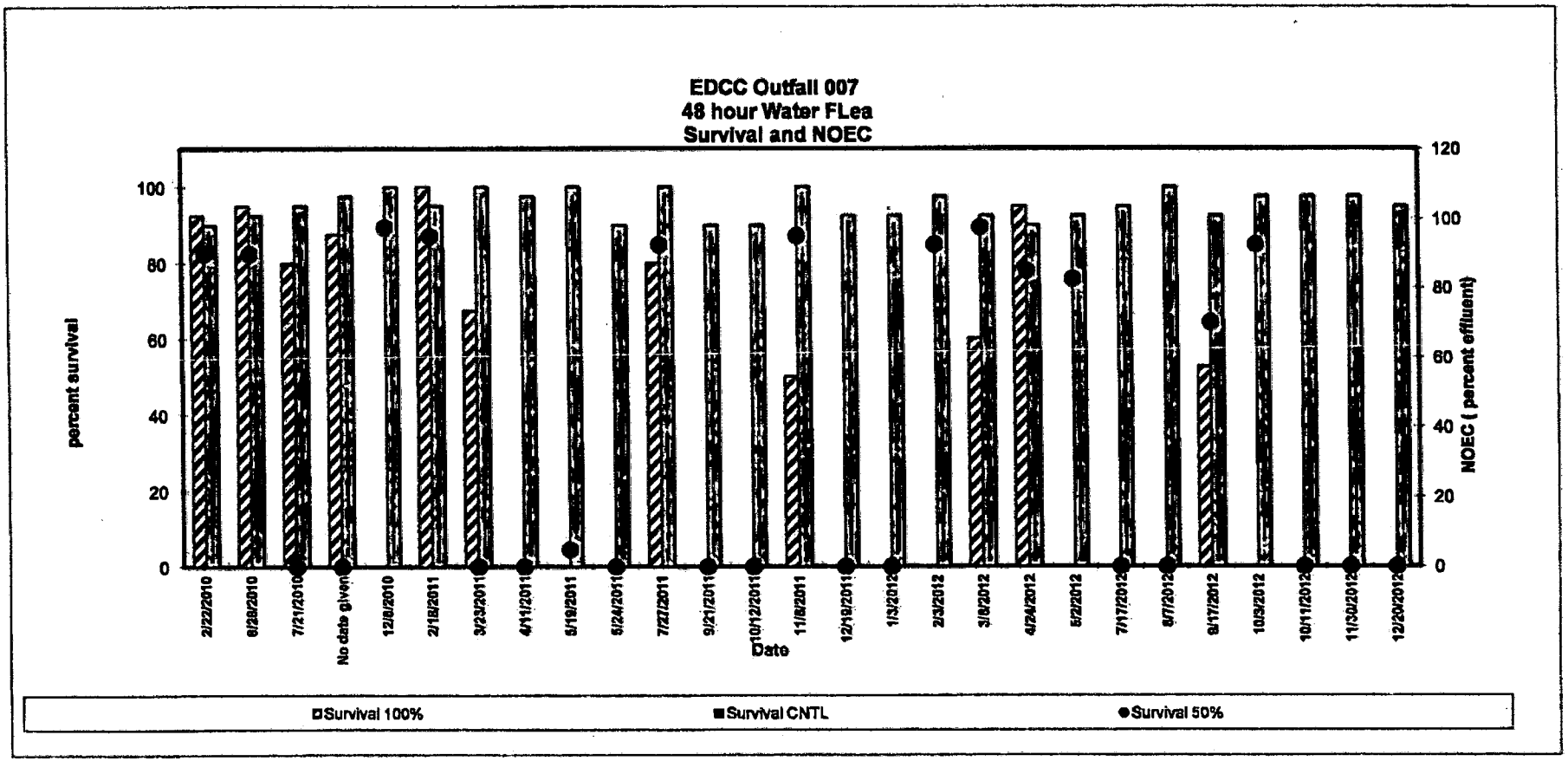
		Daphnia pulex (Water Flea)							Pimephales promelas (Fathead Minnow)							Maximum concentrations					Min.
		Lethality					Ref tox							Ref tox							
Report Date	Sample Date	Survival 100%	Survival 100%	Survival NOEC	Survival at 50%	LC50	upper	lower	Survival 100%	Survival 100%	Survival NOEC	Survival 50%	LC50	upper	lower	Sal	Hardness	Alkalinity	Conductivity	pH	D.O.
2/22/2010	1/26-28/2010	90	100	100	97.5	1.22	2.4	0.796	100	87.5	100	100	7.06	8.49	3.25	73.6	32	36	360	7.6	7
6/28/2010	5/18-20/2010	92.5	85	100	82.5	1.73	2.6	0.886	100	100	100	100	6.14	8.29	4.06	>3.6	48	68	437	7.8	7.2
7/21/2010	7/1-3/2010	95	77.5	0	--	1.91	2.66	0.953	100	100	100	100	8.82	8.82	8.64	1.2	36	86	519	8.2	7.7
No data given	9/1-4/2010	97.5	82.5	0	--	--	--	--	100	100	100	100	--	--	--	--	40	70	--	7.9	7.6
12/6/2010	11/16-19/2010	100	0	?	95	1.78	2.58	1.17	100	0	?	97.5	6.09	7.95	4.02	6	308	4	1225	5.8	7.3
2/18/2011	1/18-20-2011	90	97.5	75	95	1.65	2.64	1.02	100	100	56	100	6.09	7.59	4.16	6	72	120	553	8.4	7.9
3/23/2011	2/25-27/2011	82.5	67.5	75	95	1.07	2.61	0.91	95	0	56	97.5	6.09	7.43	4.22	6	72	120	912	8.1	7.8
4/11/2011	3/9-11/2011	100	97.5	?	97.5	1.81	2.56	0.92	100	0	42	100	6.37	7.75	4.12	6	472	24	2250	6.6	7.7
5/19/2011	4/5-7/2011	100	0	56	100	1.5	2.5	0.91	95	5	42	97.5	7.94	8.1	4.17	6	452	56	2440	7.2	7.4
5/24/2011	5/3-5/2011	90	77.5	100	87.5	1.38	2.42	0.9	100	100	100	97.5	5.88	8.06	4.24	1	408	48	1492	7.4	7.5
7/27/2011	7/4-6/2011	100	95	100	97.5	1.9	2.6	0.59	100	87.5	100	100	7.06	8.12	4.27	6	320	40	1123	7.5	7
9/21/2011	8/15-18/2011	92.5	85	100	80	--	--	--	97.5	100	100	100	--	--	--	3	288	32	986	7.5	7.2
10/12/2011	9/5-7/2011	90	57.5	75	97.5	--	--	--	95	95	100	100	--	--	--	6	816	8	270	7.1	7.8
11/8/2011	10/19-21/2011	97.5	95	100	97.5	--	--	--	100	100	100	97.5	--	--	--	6	352	12	1615	7	7.2
12/19/2011	11/9-11/2011	92.5	30	0	57.5	--	--	--	97.5	47.5	32	87.5	--	--	--	3	712	160	1654	7.5	7.6
1/3/2012	12/5-18/2011	92	--	22	85	--	--	--	100	100	100	100	--	--	--	6	192	28	756	7.4	7.7
2/3/2012	1/10-12/2012	100	100	100	100	--	--	--	100	100	100	100	--	--	--	0.5	248	44	962	7.4	7.8
3/8/2012	2/4-6/2012	100	82.5	75	92.5	--	--	--	100	97.5	100	100	--	--	--	1	548	88	1417	7.9	7.9
4/24/2012	3/9-12/2012	90	90	100	85	--	--	--	100	95	100	87.5	--	--	--	3	228	48	735	7.5	7.2
5/2/2012	4/3-5/2012	92.5	80	100	82.5	--	--	--	100	90	100	95	--	--	--	3	192	28	884	7.5	7.4
7/17/2012	6/12-15/2012	95	0	0	--	--	--	--	100	75	75	95	--	--	--	6	800	8	5750	6	7.5
8/7/2012	7/11-13/2012	97.5	100	100	100	--	--	--	100	100	100	100	--	--	--	3	332	16	1064	7.1	7.5
9/17/2012	8/19-21-2012	92.5	10	75	77.5	--	--	--	100	0	75	100	--	--	--	6	300	8	1634	6	7.7
10/3/2012	9/9-11/2012	92.5	95	100	97.5	--	--	--	100	100	100	100	--	--	--	6	176	20	865	7.4	7.3
10/11/2012	10/2-4/2012	100	82.5	100	100	--	--	--	100	100	100	100	--	--	--	1	252	32	904	7.5	8
11/30/2012	11/5-8/2012	97.5	0	0	40	20.8	--	--	97.5	0	0	0	11.5	--	--	>6	72	4	7290	6.8	8.3
12/20/2012	12/5-7/2012	95	97.5	100	90	--	--	--	97.5	100	100	100	--	--	--	>6	240	36	631	7.7	7.3

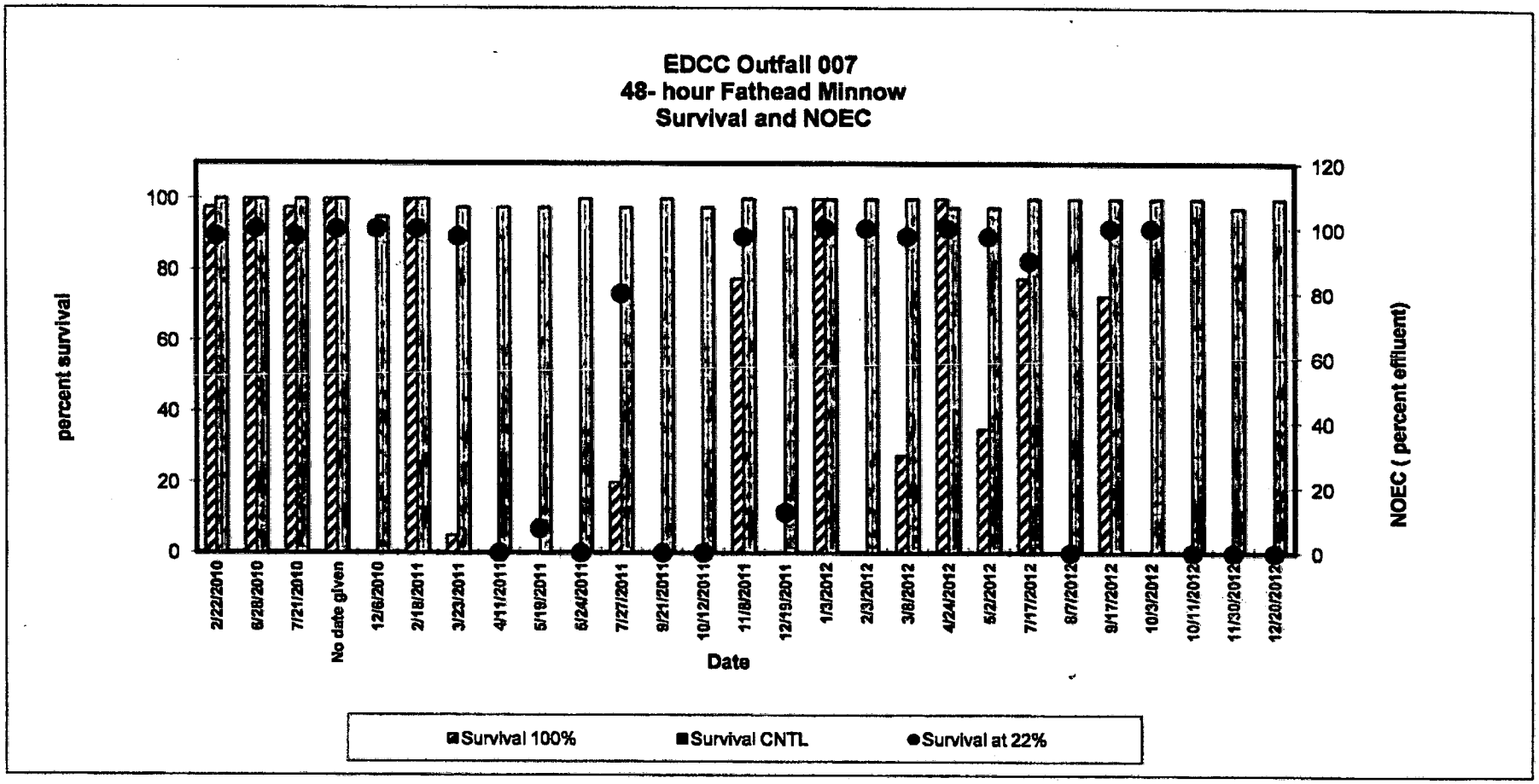

EDCC Outfall 006
48 hour Daphnia pulex (Water FLea)
Survival and NOEC
percent survival
NOEC (percent effluent)
Date
0
20
40
60
80
100
120
2/22/2010
6/28/2010
7/21/2010
No data given
12/8/2010
2/18/2011
3/23/2011
4/11/2011
5/18/2011
5/24/2011
7/27/2011
9/21/2011
10/12/2011
11/8/2011
12/19/2011
1/3/2012
2/3/2012
3/8/2012
4/24/2012
5/2/2012
7/17/2012
8/7/2012
9/17/2012
10/3/2012
10/11/2012
11/30/2012
12/20/2012
Survival 100%
Survival CNTL
Survival at 22%


EDCC Outfall 006
7-Day Chronic Fathead Minnow
Survival and NOEC
percent survival
NOEC (percent effluent)
Date
0
20
40
60
80
100
120
2/22/2010
6/28/2010
7/21/2010
No date given
12/6/2010
2/16/2011
3/23/2011
4/11/2011
5/19/2011
5/24/2011
7/27/2011
9/21/2011
10/12/2011
11/8/2011
12/19/2011
1/3/2012
2/3/2012
3/8/2012
4/24/2012
5/2/2012
7/17/2012
8/7/2012
9/17/2012
10/3/2012
10/11/2012
11/30/2012
12/20/2012
Survival 100%
Survival CNTL
Survival at 22%

EDCC Outfall 007 Toxicity Summary (48 hour acute tests). POR 2/22/2010 through 12/20/12.

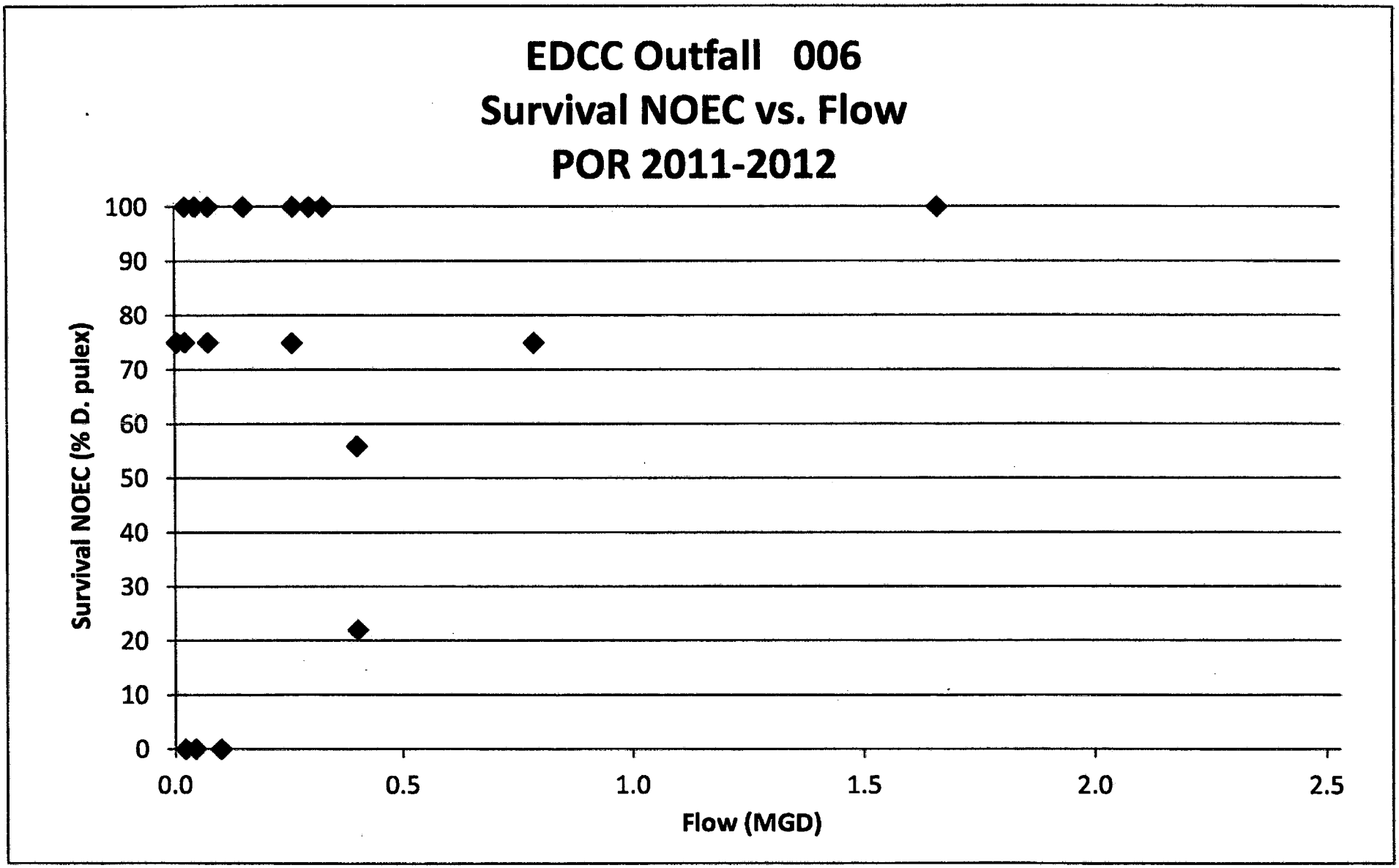
		Daphnia pulex (Water Flea)							Pimephales promelas (Fathead Minnow)							Maximum concentrations					
		Lethality					Ref tox							Ref tox							
Report Date	Sample Date	Survival Ctrl%	Survival 100%	Survival 50EC	Survival at 32%	LC50	upper	lower	Survival Ctrl%	Survival 100%	Survival 50EC	Survival 32%	LC50	upper	lower	Sal	Residual	Alkalinity	Conductivity	pH	D.O.
2/22/2010	1/26-28/2010	90	92.5	100	90	1.22	2.4	0.796	100	97.5	100	97.5	7.06	8.49	3.25	73.6	28	36	361	7.7	7.2
6/28/2010	5/18-20/2010	92.5	95	100	90	1.73	2.6	0.886	100	100	100	100	6.14	8.29	4.06	73.6	60	60	461	7.9	7.2
7/21/2010	7/1-3/2010	95	80	100	--	1.91	2.86	0.953	100	97.5	100	97.5	8.82	8.82	6.64	1.08	36	88	541	8.1	8.2
No date given	9/1-4/2010	97.5	87.5	100	--	--	--	--	100	100	100	100	--	--	--	--	36	72	--	7.5	7.9
12/6/2010	11/16-19/2010	100	0	56	97.5	1.76	2.58	1.17	95	0	56	100	6.09	7.95	4.02	6	192	4	1198	5.9	7.8
2/18/2011	1/18-20-2011	95	100	100	95	1.65	2.64	1.02	100	100	100	100	6.09	7.59	4.16	1	52	100	562	8.4	7.9
3/23/2011	2/25-27/2011	100	67.5	0	--	1.07	2.61	0.91	97.5	5	75	97.5	6.09	7.43	4.22	6	40	80	892	8.1	7.7
4/11/2011	3/9-11/2011	97.5	0	0	0	1.81	2.56	0.92	97.5	0	0	0	6.37	7.75	4.12	6	1200	<1	3110	4.2	7.8
5/19/2011	4/5-7/2011	100	0	0	5	1.5	2.5	0.91	97.5	0	0	7.5	7.94	8.1	4.17	6	872	4	5060	6.8	7.5
5/24/2011	5/3-5/2011	90	0	0	0	1.36	2.42	0.9	100	0	0	0	5.66	8.06	4.24	1	1094	<1	1450	4.2	7.6
7/27/2011	7/4-6/2011	100	80	100	92.5	1.9	2.6	0.59	97.5	20	32	80	7.06	8.12	4.27	6	204	32	1907	6.8	7.2
9/21/2011	8/15-18/2011	90	0	0	0	--	--	--	100	0	0	0	--	--	--	6	488	48	1003	6.5	7.7
10/12/2011	9/5-7/2011	90	0	0	0	--	--	--	97.5	0	0	0	--	--	--	>6	2332	8	1809	6.5	8.3
11/8/2011	10/19-21/2011	100	50	75	95	--	--	--	100	77.5	100	97.5	--	--	--	6	220	20	1332	7.4	7.5
12/19/2011	11/9-11/2011	92.5	0	0	--	--	--	--	97.5	0	0	12.5	--	--	--	6	220	36	3660	7.4	7.7
1/3/2012	12/5-18/2011	92.5	--	0	--	--	--	--	100	100	100	100	--	--	--	6	184	16	921	7.2	7.6
2/3/2012	1/10-12/2012	97.5	0	42	92.5	--	--	--	100	0	56	100	--	--	--	1	468	4	1657	6.5	7.7
3/8/2012	2/4-6/2012	92.5	60	56	97.5	--	--	--	100	27.5	56	97.5	--	--	--	6	1176	0	2930	4.9	8.3
4/24/2012	3/9-12/2012	90	95	100	85	--	--	--	97.5	100	100	100	--	--	--	3	188	44	595	7.8	7.4
5/2/2012	4/3-5/2012	92.5	0	32	82.5	55.5	--	--	97.5	35	75	97.5	92.2	--	--	6	396	24	2600	7.5	7.4
7/17/2012	6/12-15/2012	95	0	0	--	--	--	--	100	77.5	100	90	--	--	--	6	680	0.4	3020	6	7.9
8/7/2012	7/11-13/2012	100	0	0	0	5.6		--	100	0	0	0	5.6	--	--	6	940	24	10600	6.8	7.8
9/17/2012	8/19-21-2012	92.5	52.5	0	70	*	--	--	100	72.5	75	100	*	--	--	6	476	0	1535	6.7	7.9
10/3/2012	9/9-11/2012	97.5	0	50	92.5	61.19	--	--	100	0	56	100	65.4	--	--	6	312	24	3470	7.1	7.9
10/11/2012	10/2-4/2012	97.5	0	0	0	5.4	--	--	100	0	0	0	5.6	--	--	>6	1008	84	15650	6.9	8
11/30/2012	11/5-8/2012	97.5	0	0	0	16	--	--	97.5	0	0	0	16	--	--	>6	100	4	10580	6.8	8.2
12/20/2012	12/5-7/2012	95	0	0	--	23			100	0	0	0	16			>6	1096	68	16500	7.3	7.2

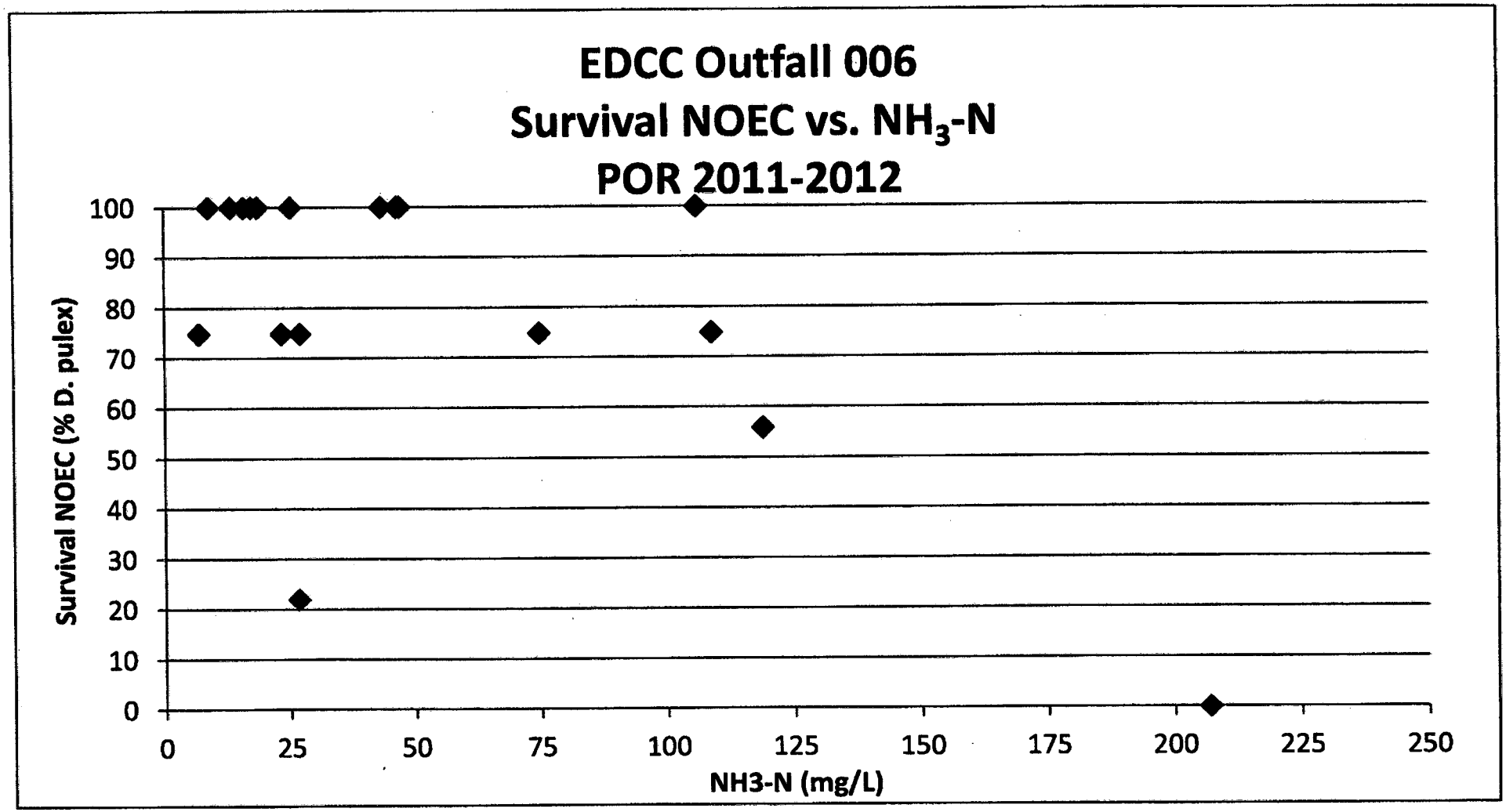

EDCC Outfall 007
48 hour Water FLea
Survival and NOEC
percent survival
NOEC (percent effluent)
Date
0
20
40
60
80
100
120
2/22/2010
6/28/2010
7/21/2010
No date given
12/8/2010
2/15/2011
3/23/2011
4/11/2011
5/19/2011
5/24/2011
7/27/2011
9/21/2011
10/12/2011
11/8/2011
12/19/2011
1/3/2012
2/3/2012
3/8/2012
4/24/2012
5/2/2012
7/17/2012
8/7/2012
9/17/2012
10/3/2012
10/11/2012
11/30/2012
12/20/2012
Survival 100%
Survival CNTL
Survival 50%

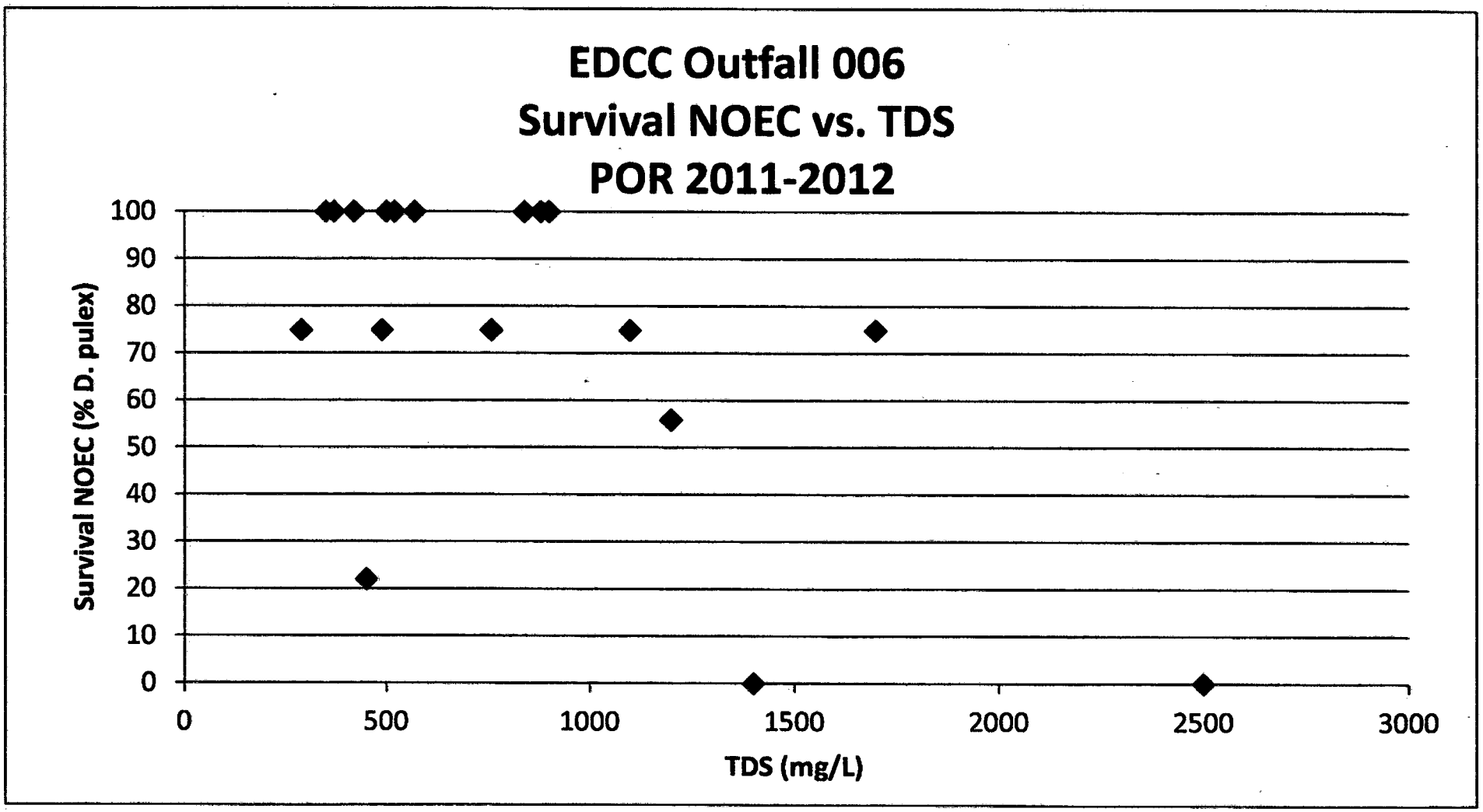

EDCC Outfall 007
48- hour Fathead Minnow
Survival and NOEC
percent survival
NOEC (percent effluent)
Date
0
20
40
60
80
100
120
2/22/2010
6/28/2010
7/21/2010
No date given
12/6/2010
2/18/2011
3/23/2011
4/11/2011
5/19/2011
6/24/2011
7/27/2011
9/21/2011
10/12/2011
11/8/2011
12/19/2011
1/3/2012
2/3/2012
3/8/2012
4/24/2012
5/2/2012
7/17/2012
8/7/2012
9/17/2012
10/3/2012
10/11/2012
11/30/2012
12/20/2012
Survival 100%
Survival CNTL
Survival at 22%

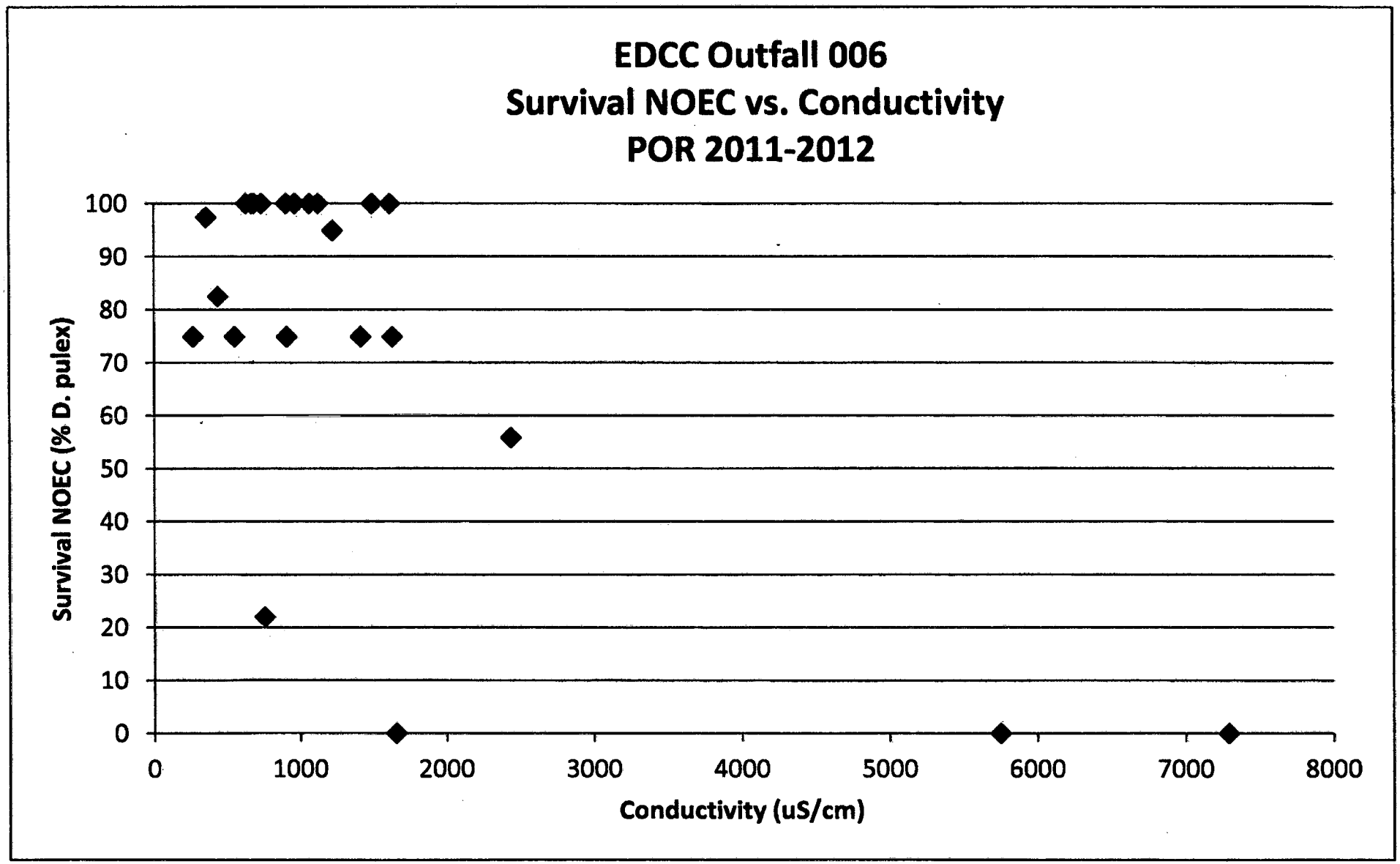
Attachment 2

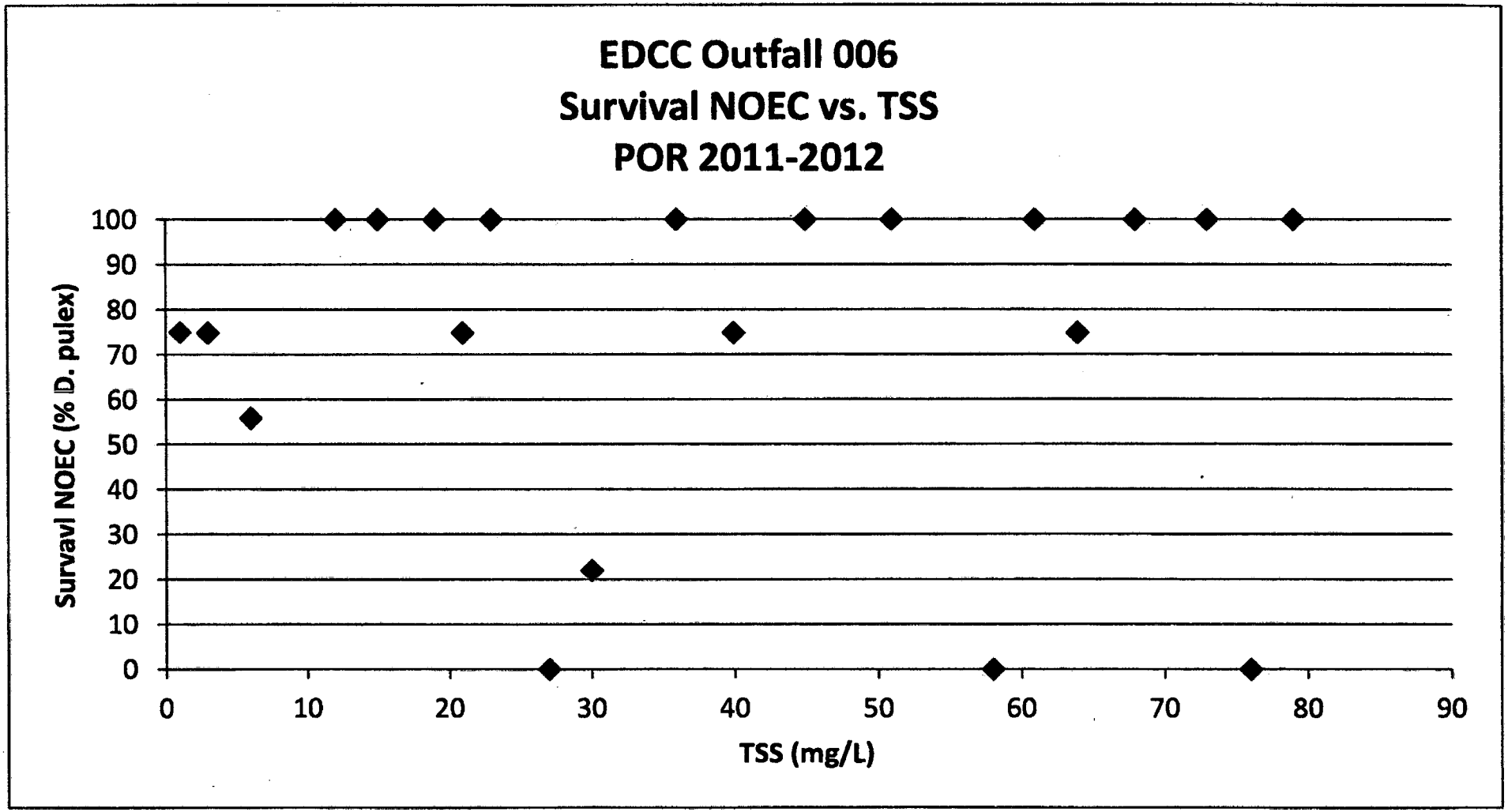
Plots
NOEC of Water flea vs. Effluent concentrations
Outfalls 006 and 007

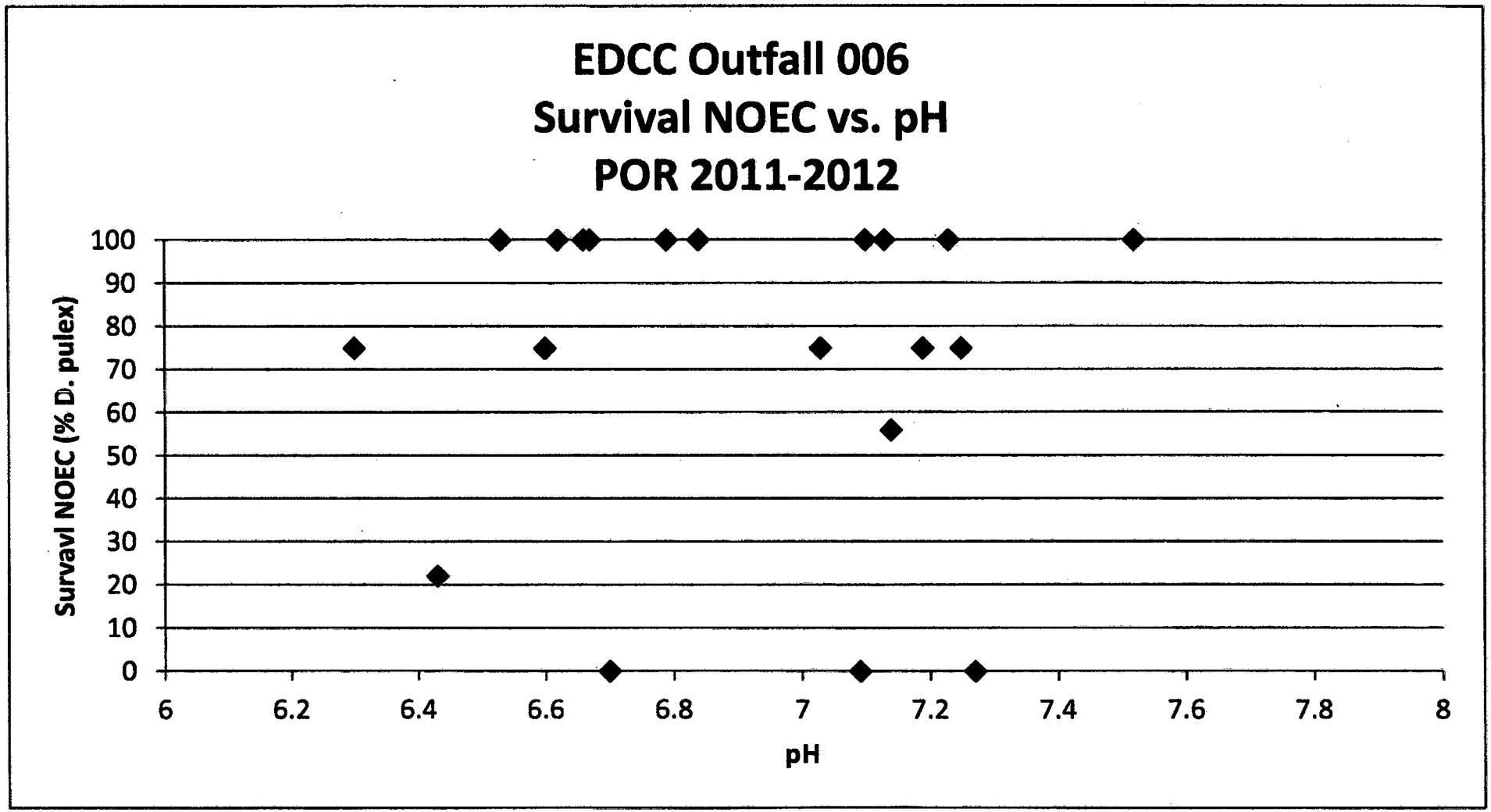

EDCC Outfall 006
Survival NOEC vs. Flow
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.5
1.0
1.5
2.0
2.5
Flow (MGD)

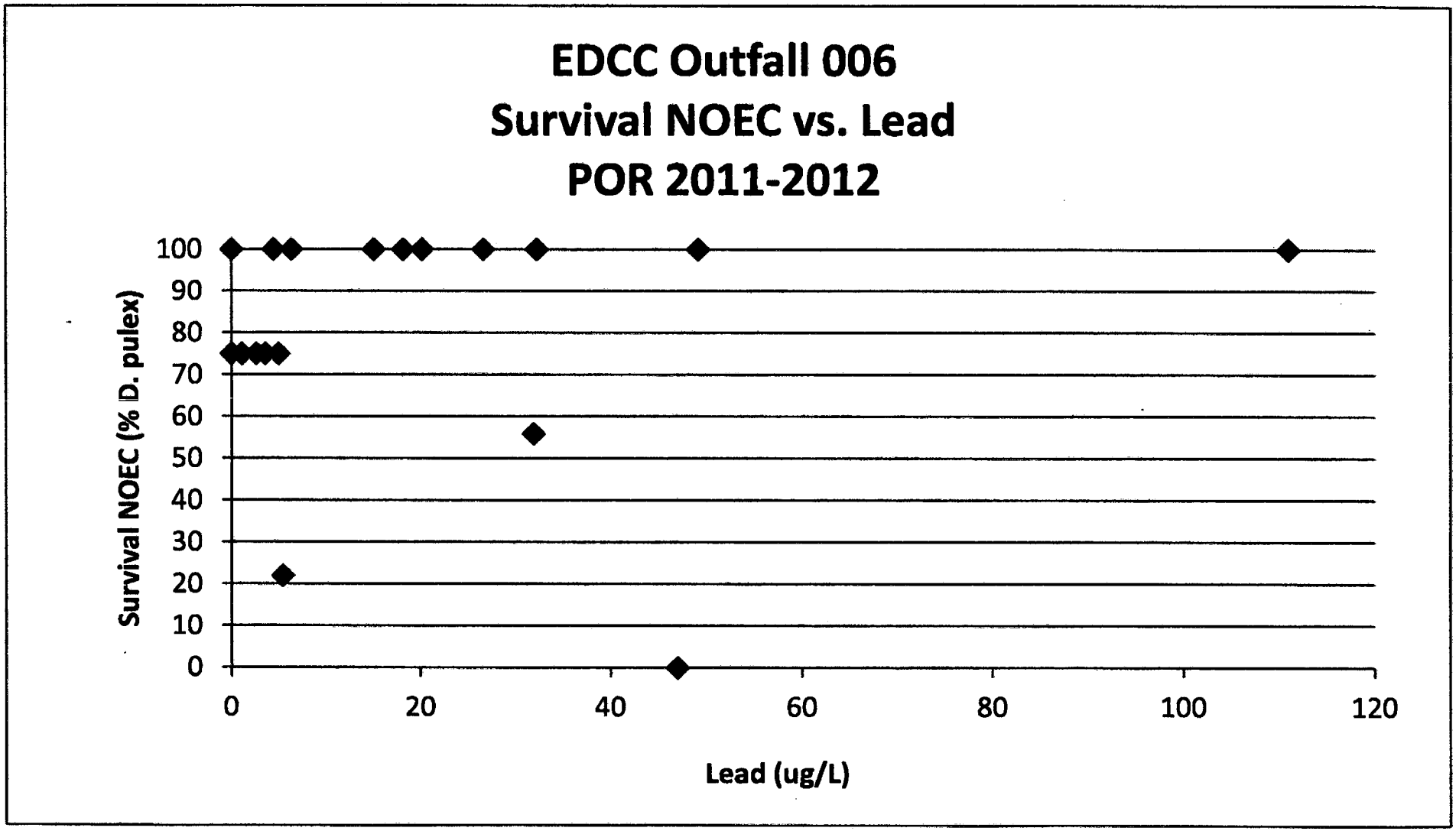

EDCC Outfall 006
Survival NOEC vs. NH3-N
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
0
25
50
75
100
125
150
175
200
225
250
NH3-N (mg/L)

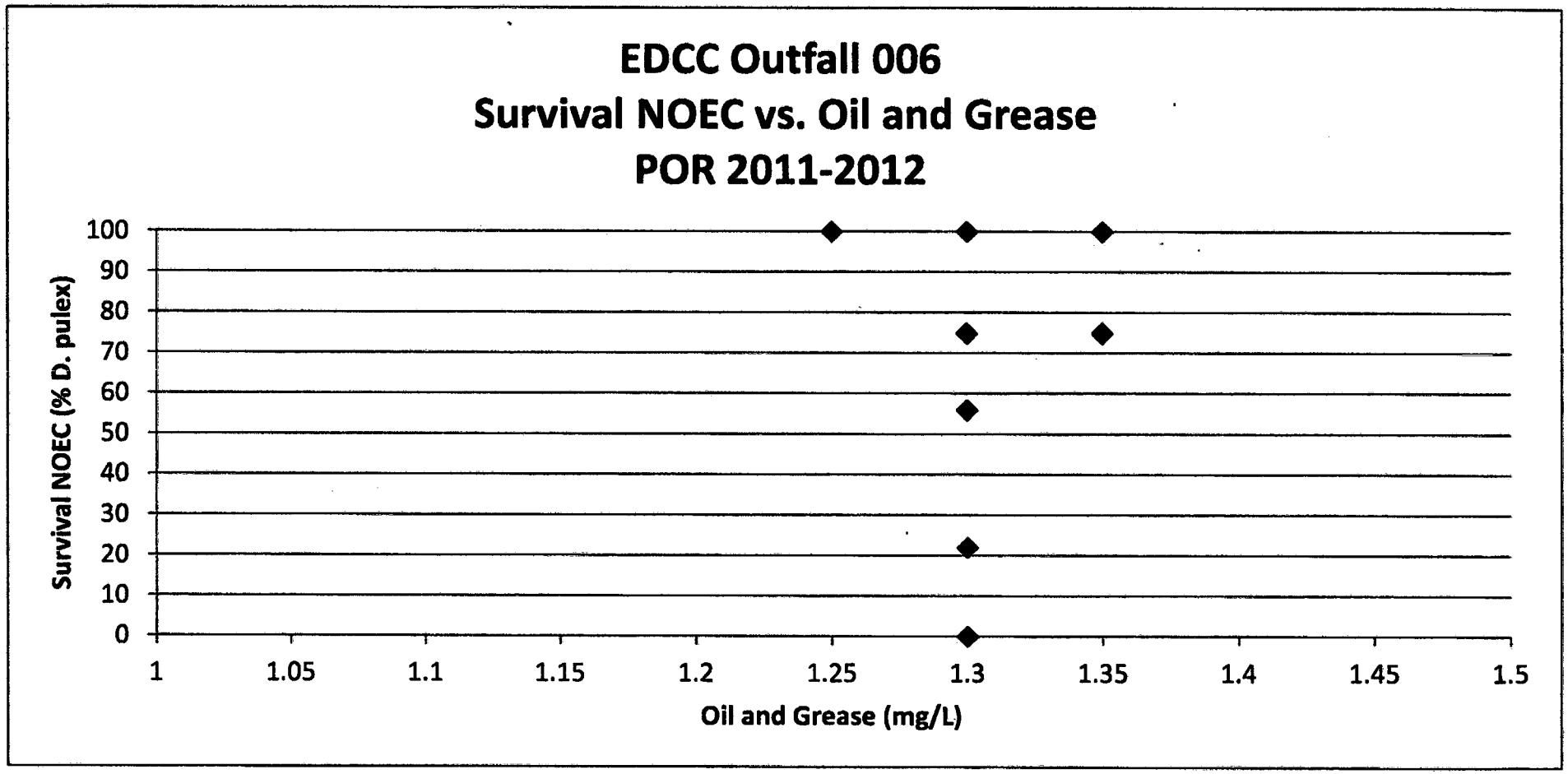

EDCC Outfall 006
Survival NOEC vs. TDS
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
0
500
1000
1500
2000
2500
3000
TDS (mg/L)

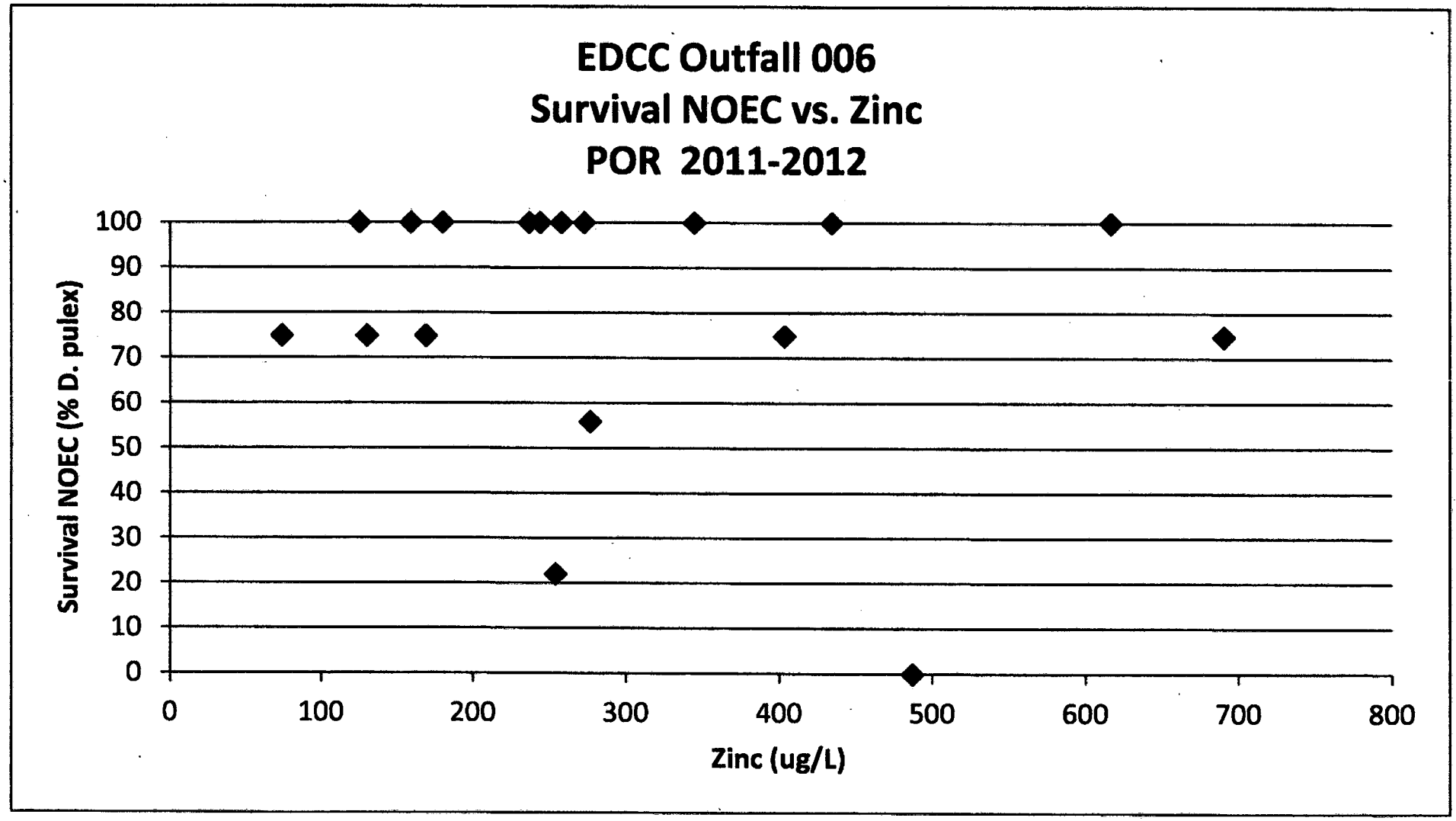

EDCC Outfall 006
Survival NOEC vs. Conductivity
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
0
1000
2000
3000
4000
5000
6000
7000
8000
Conductivity (uS/cm)

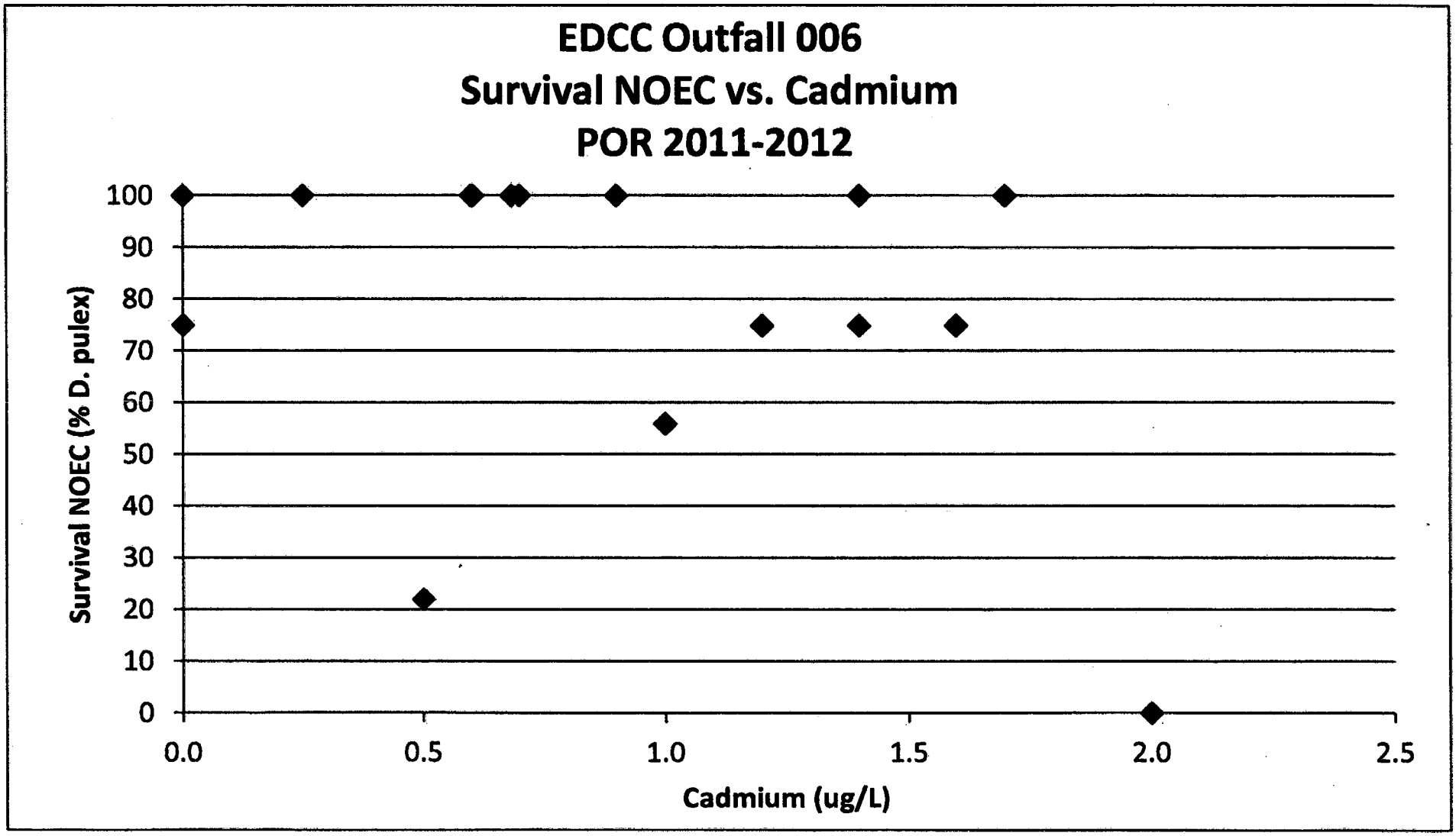

EDCC Outfall 006
Survival NOEC vs. TSS
POR 2011-2012
Survavl NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
TSS (mg/L)

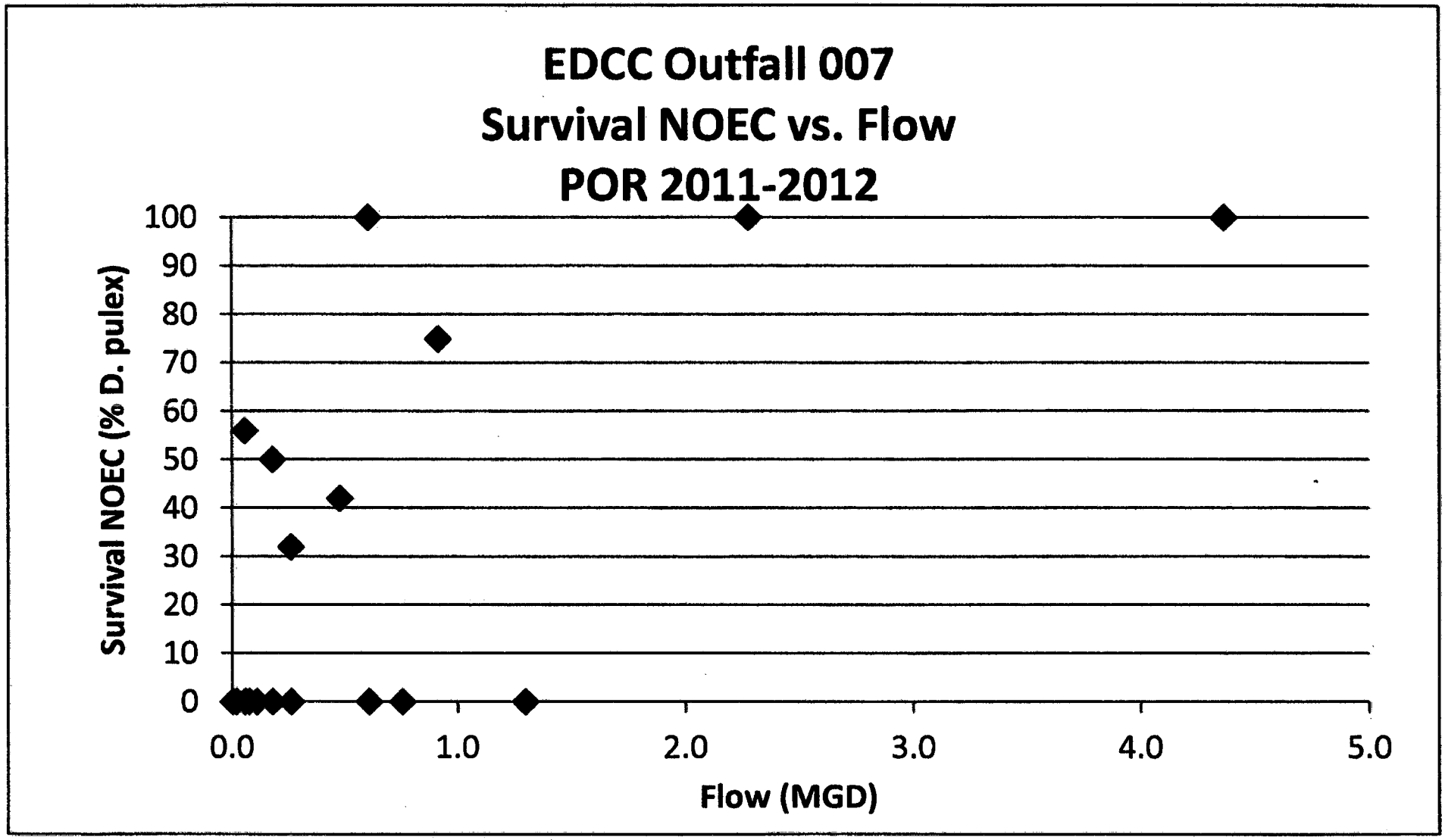

EDCC Outfall 006
Survival NOEC vs. pH
POR 2011-2012
Survavl NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
6
6.2
6.4
6.6
6.8
7
7.2
7.4
7.6
7.8
8
pH

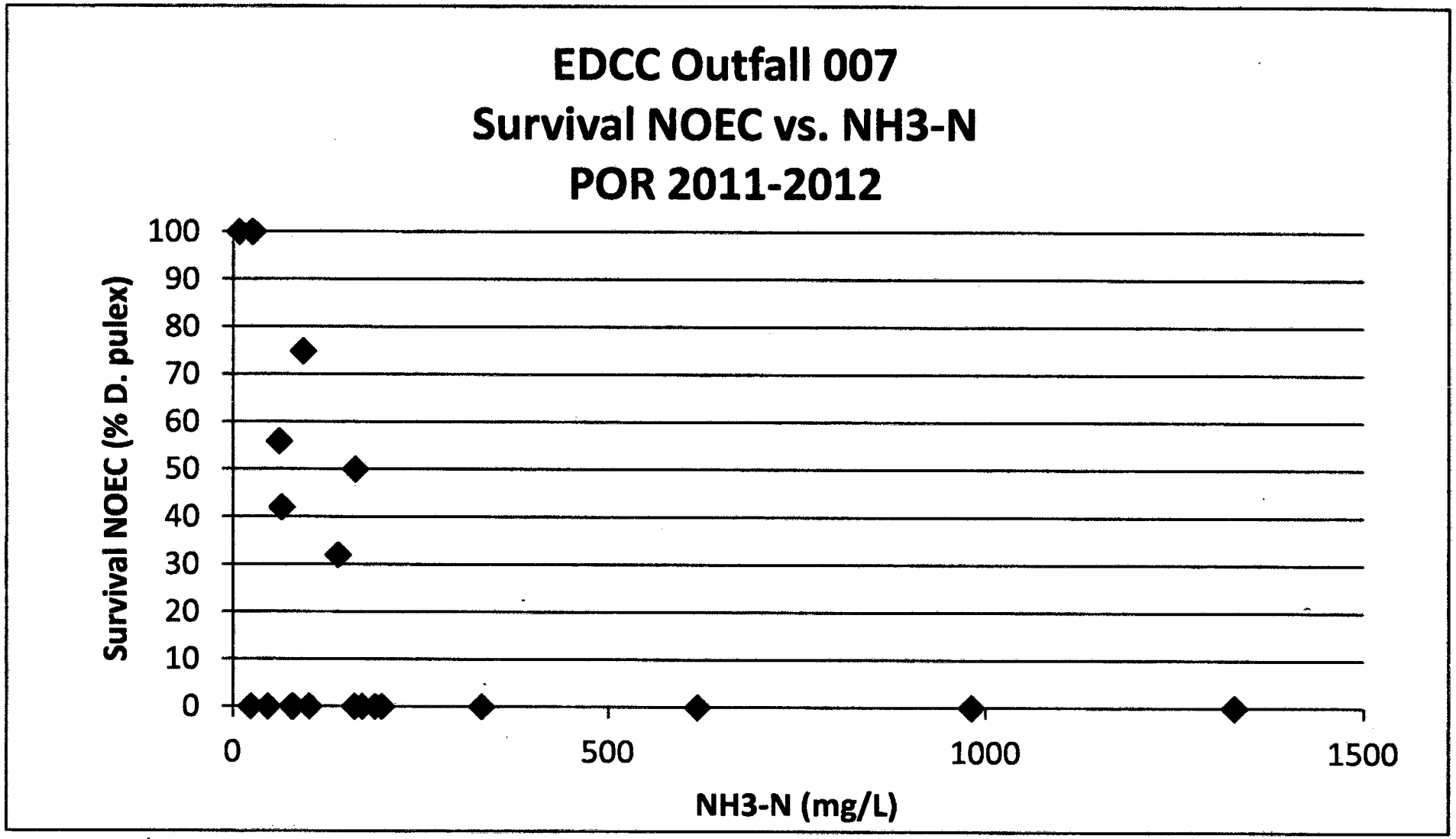

EDCC Outfall 006
Survival NOEC vs. Lead
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
0
20
40
60
80
100
120
Lead (ug/L)

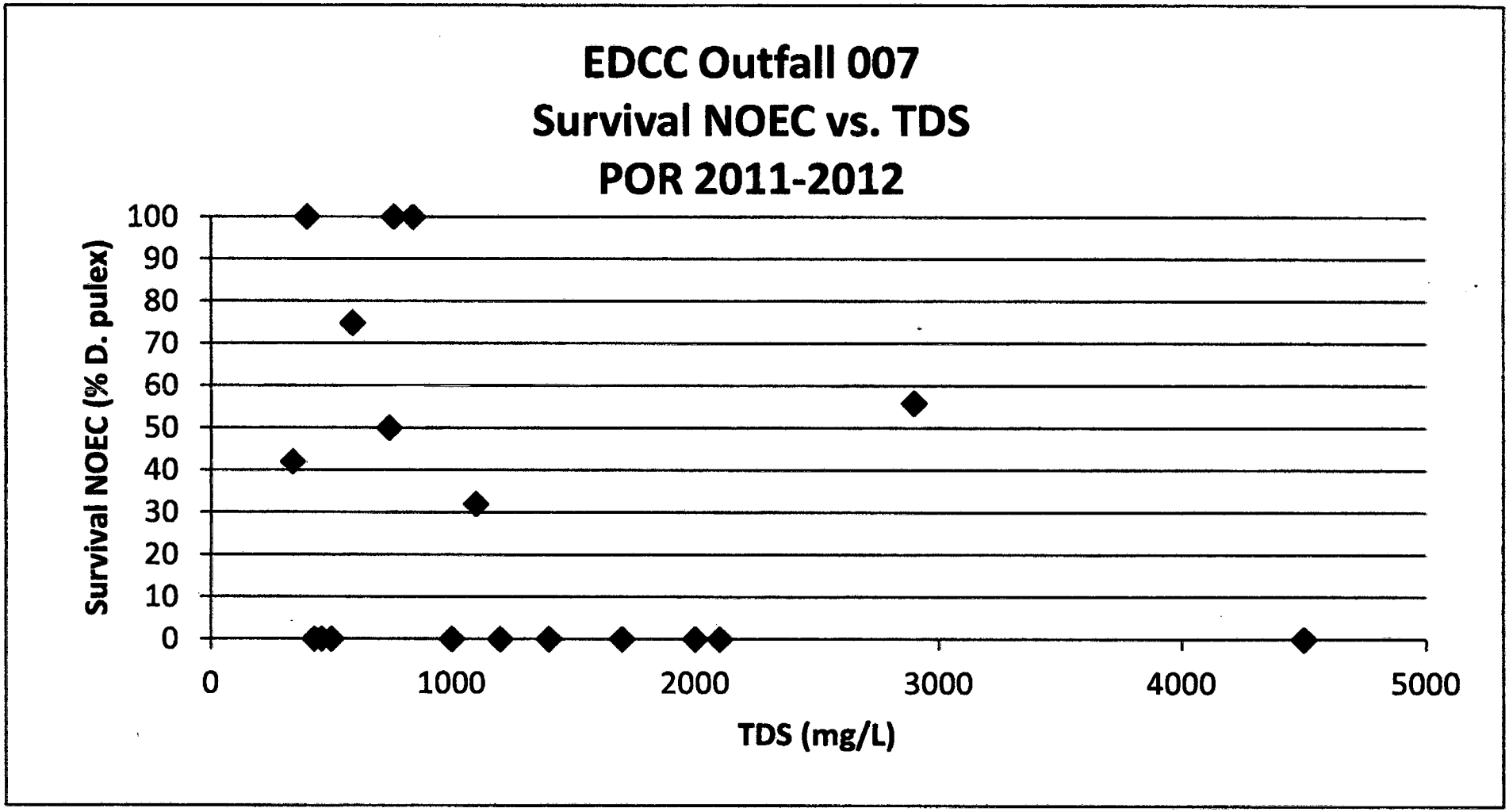

EDCC Outfall 006
Survival NOEC vs. Oil and Grease
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
1
1.05
1.1
1.15
1.2
1.25
1.3
1.35
1.4
1.45
1.5
Oil and Grease (mg/L)

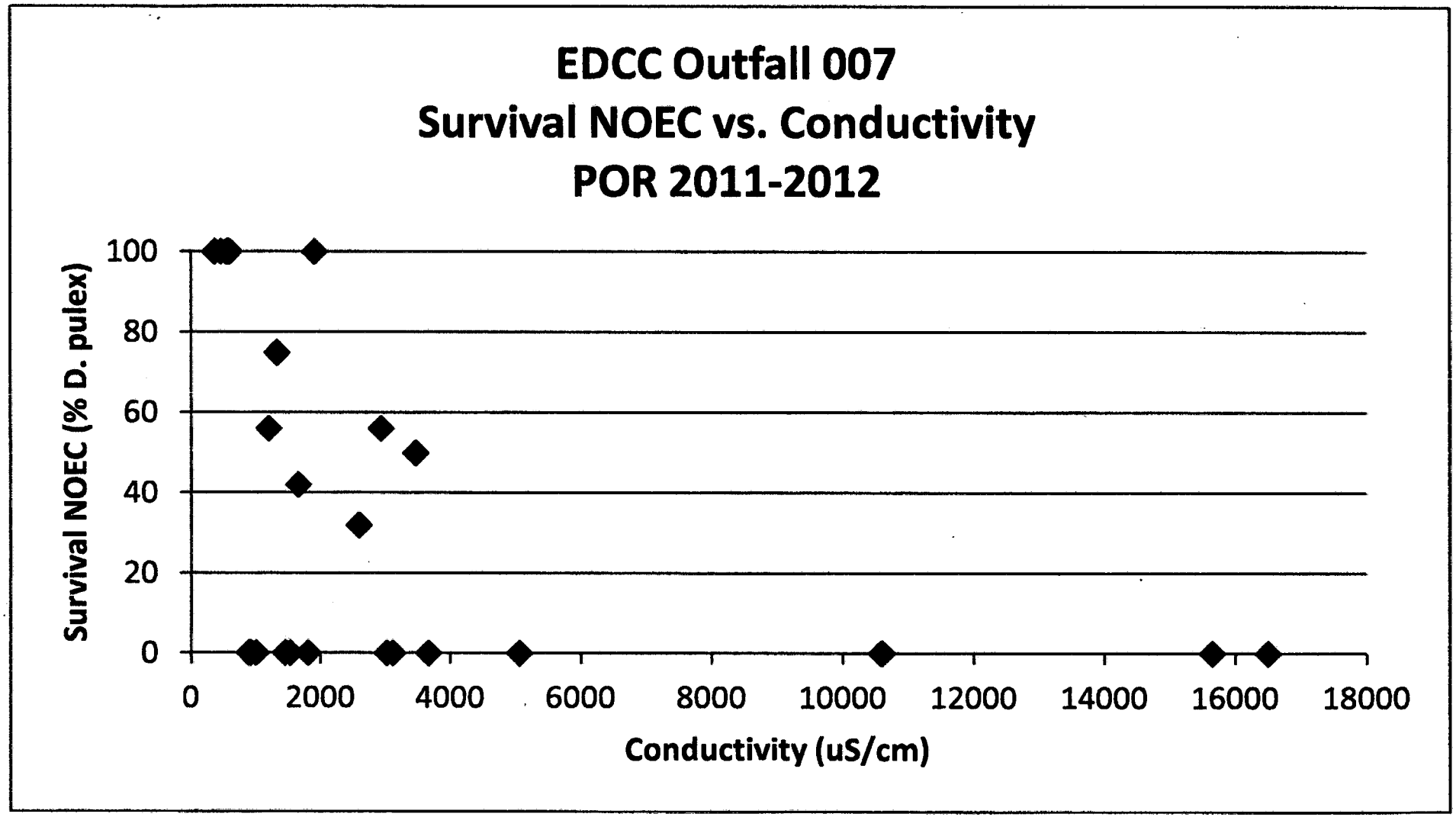

EDCC Outfall 006
Survival NOEC vs. Zinc
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
0
100
200
300
400
500
600
700
800
Zinc (ug/L)

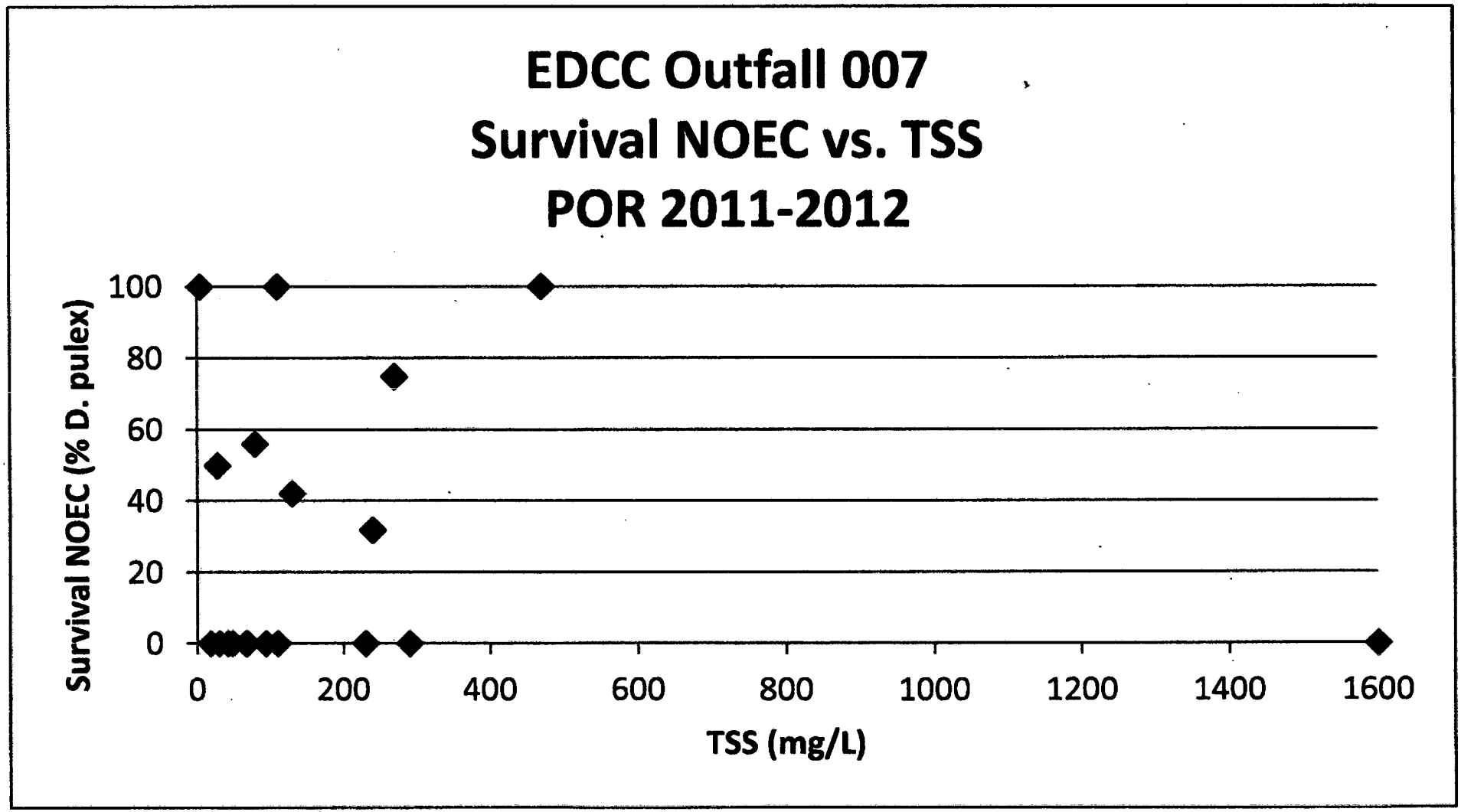

EDCC Outfall 006
Survival NOEC vs. Cadmium
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.5
1.0
1.5
2.0
2.5
Cadmium (ug/L)

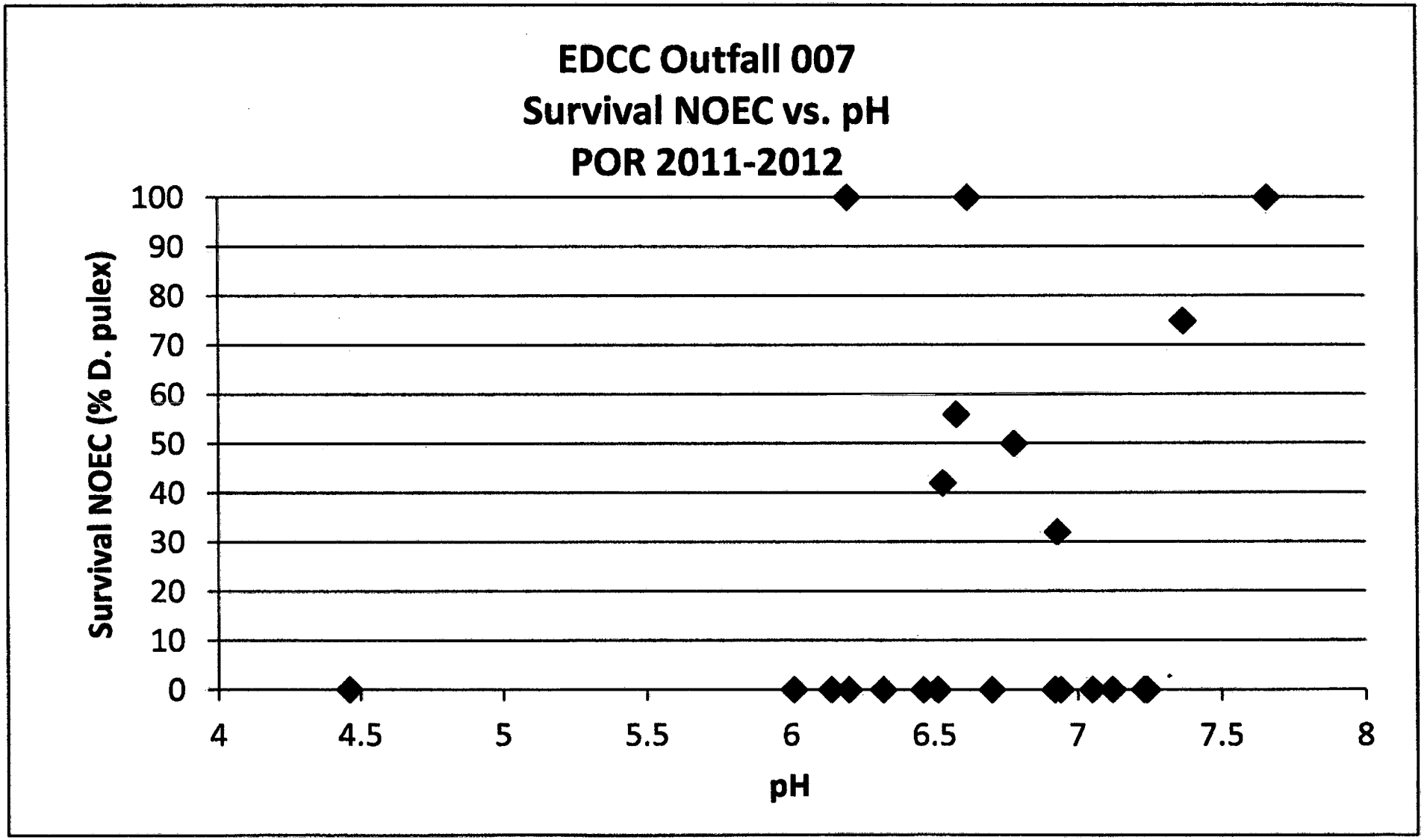

EDCC Outfall 007
Survival NOEC vs. Flow
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
0.0
1.0
2.0
3.0
4.0
5.0
Flow (MGD)

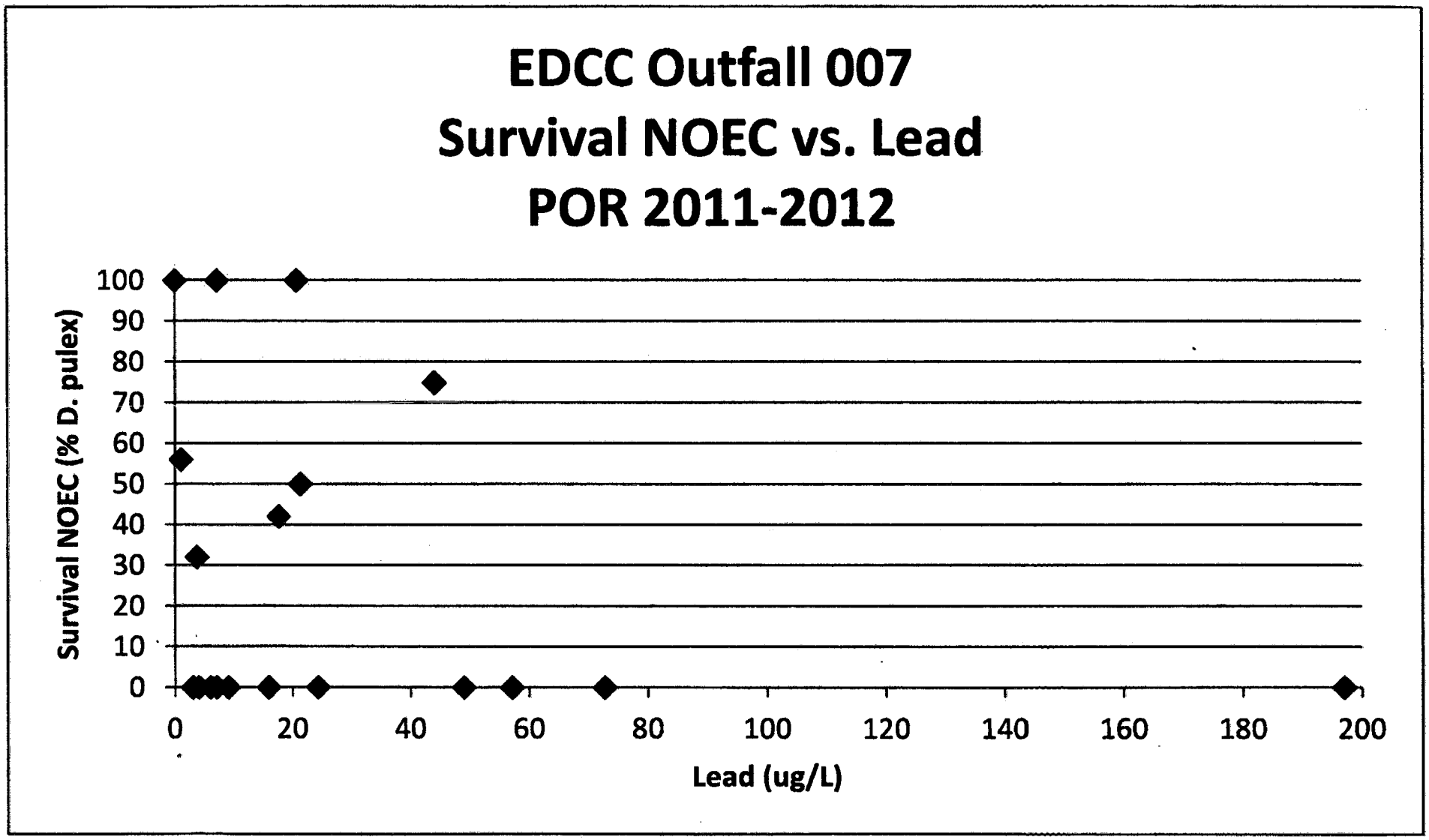

EDCC Outfall 007
Survival NOEC vs. NH3-N
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
0
500
1000
1500
NH3-N (mg/L)

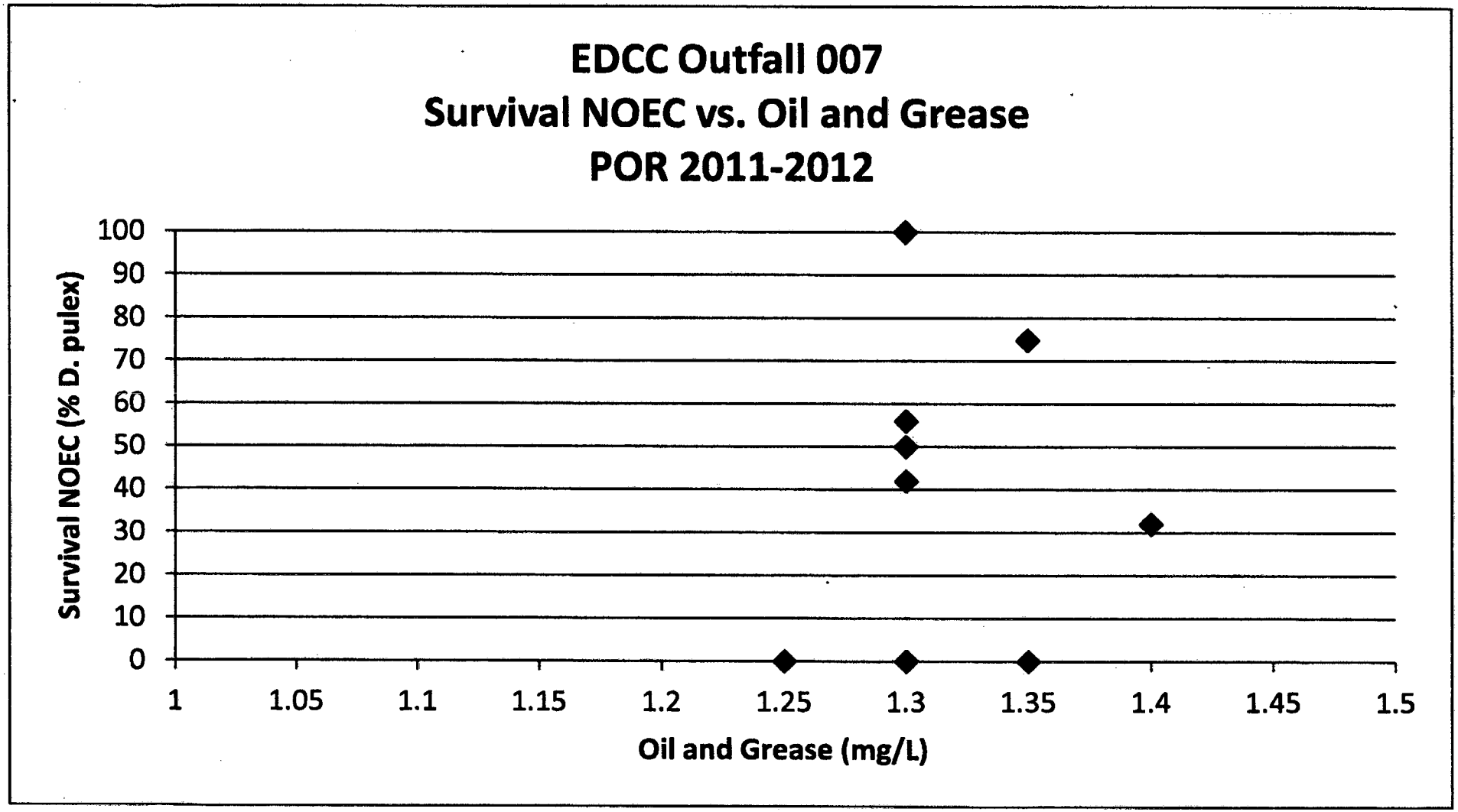

EDCC Outfall 007
Survival NOEC vs. TDS
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
0
1000
2000
3000
4000
5000
TDS (mg/L)

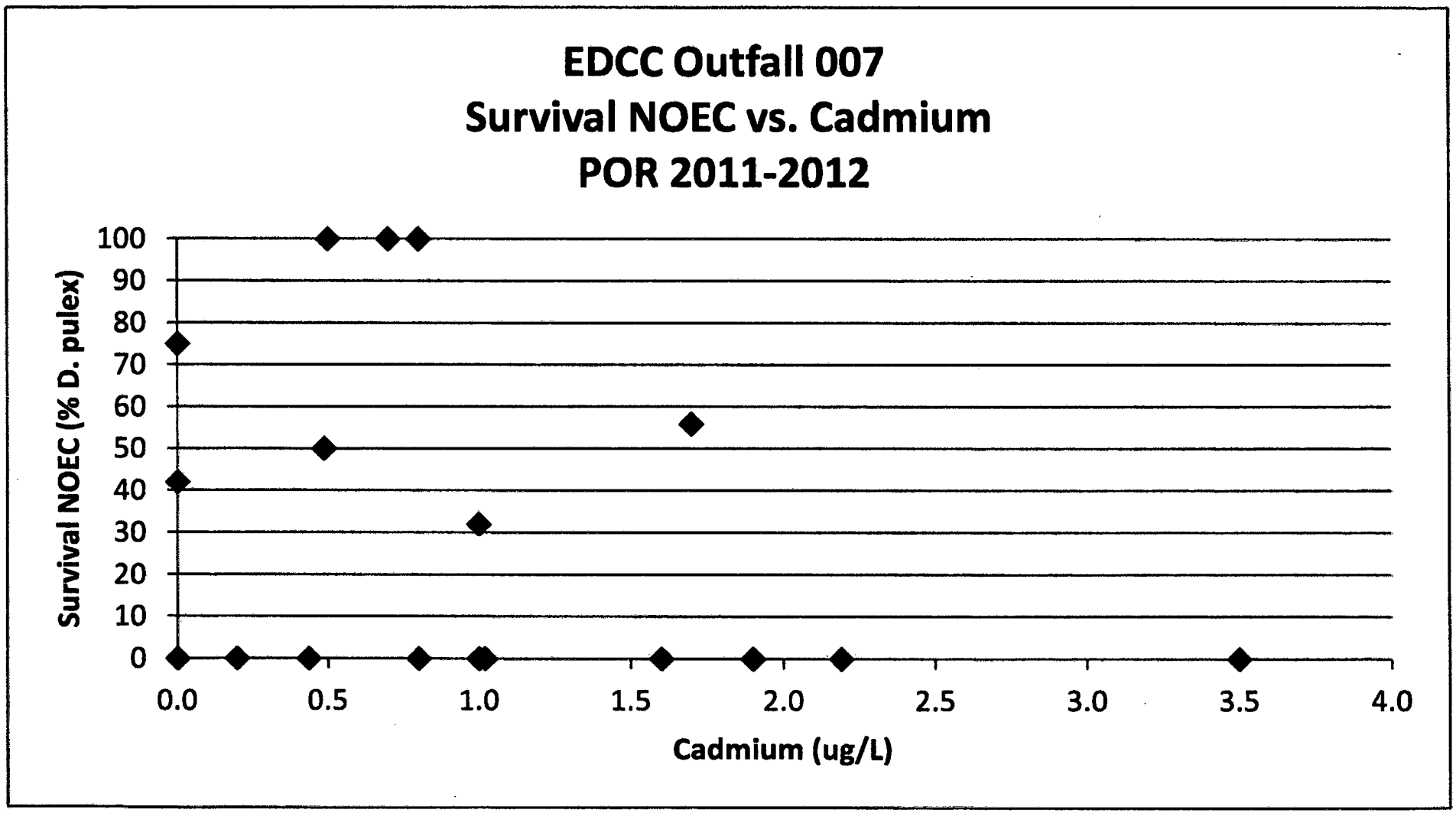

EDCC Outfall 007
Survival NOEC vs. Conductivity
POR 2011-2012
Survival NOEC (% D. pulex)
100
80
60
40
20
0
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
Conductivity (uS/cm)


EDCC Outfall 007
Survival NOEC vs. TSS
POR 2011-2012
Survival NOEC (% D. pulex)
100
80
60
40
20
0
0
200
400
600
800
1000
1200
1400
1600
TSS (mg/L)


EDCC Outfall 007
Survival NOEC vs. pH
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
4
4.5
5
5.5
6
6.5
7
7.5
8
pH

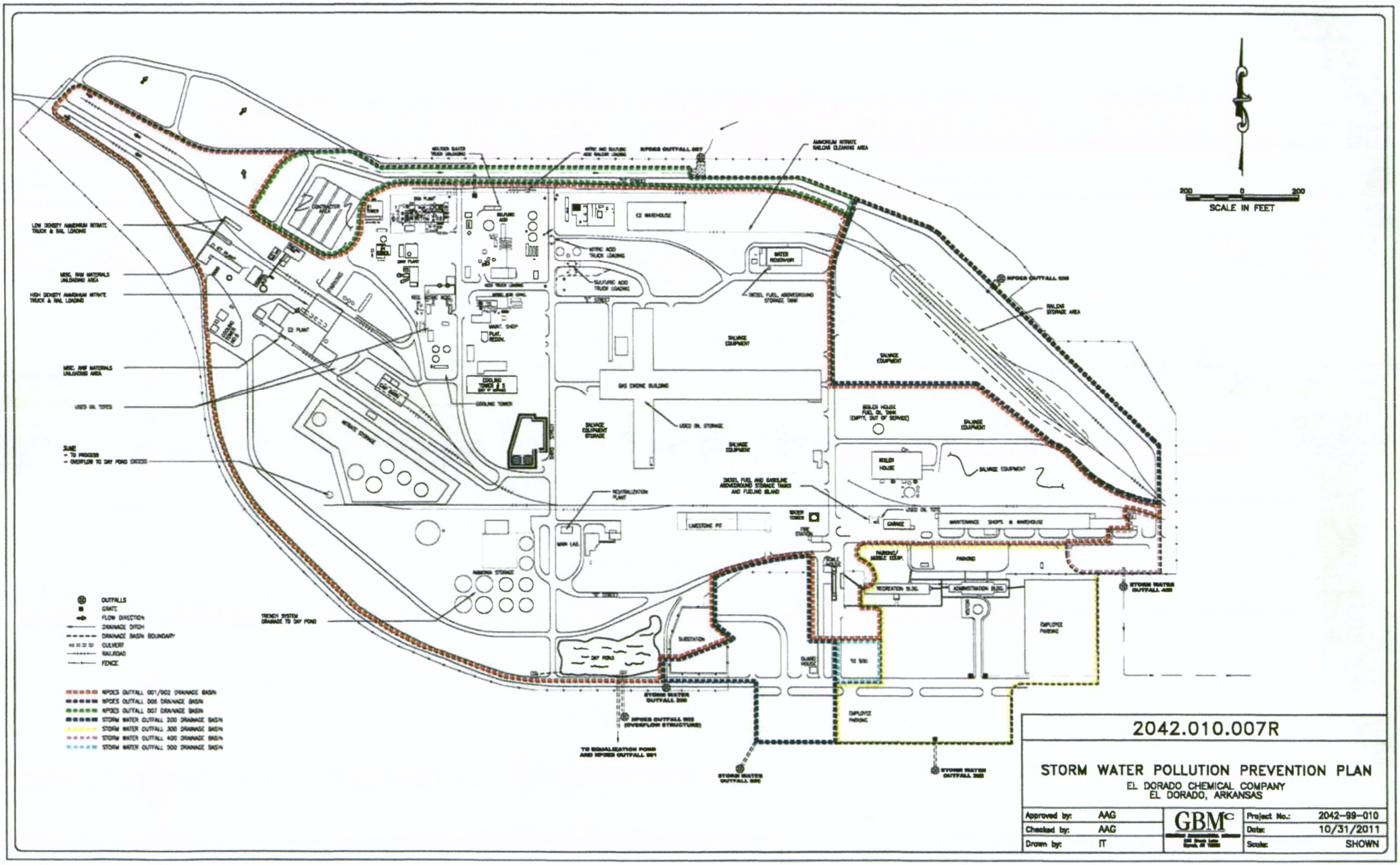

EDCC Outfall 007
Survival NOEC vs. Lead
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
0
20
40
60
80
100
120
140
160
180
200
Lead (ug/L)


EDCC Outfall 007
Survival NOEC vs. Oil and Grease
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
1
1.05
1.1
1.15
1.2
1.25
1.3
1.35
1.4
1.45
1.5
Oil and Grease (mg/L)


EDCC Outfall 007
Survival NOEC vs. Cadmium
POR 2011-2012
Survival NOEC (% D. pulex)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Cadmium (ug/L)

Attachment 3

Facility Drainage Plans
as in
EDCC SWPPP
2011 and 2012

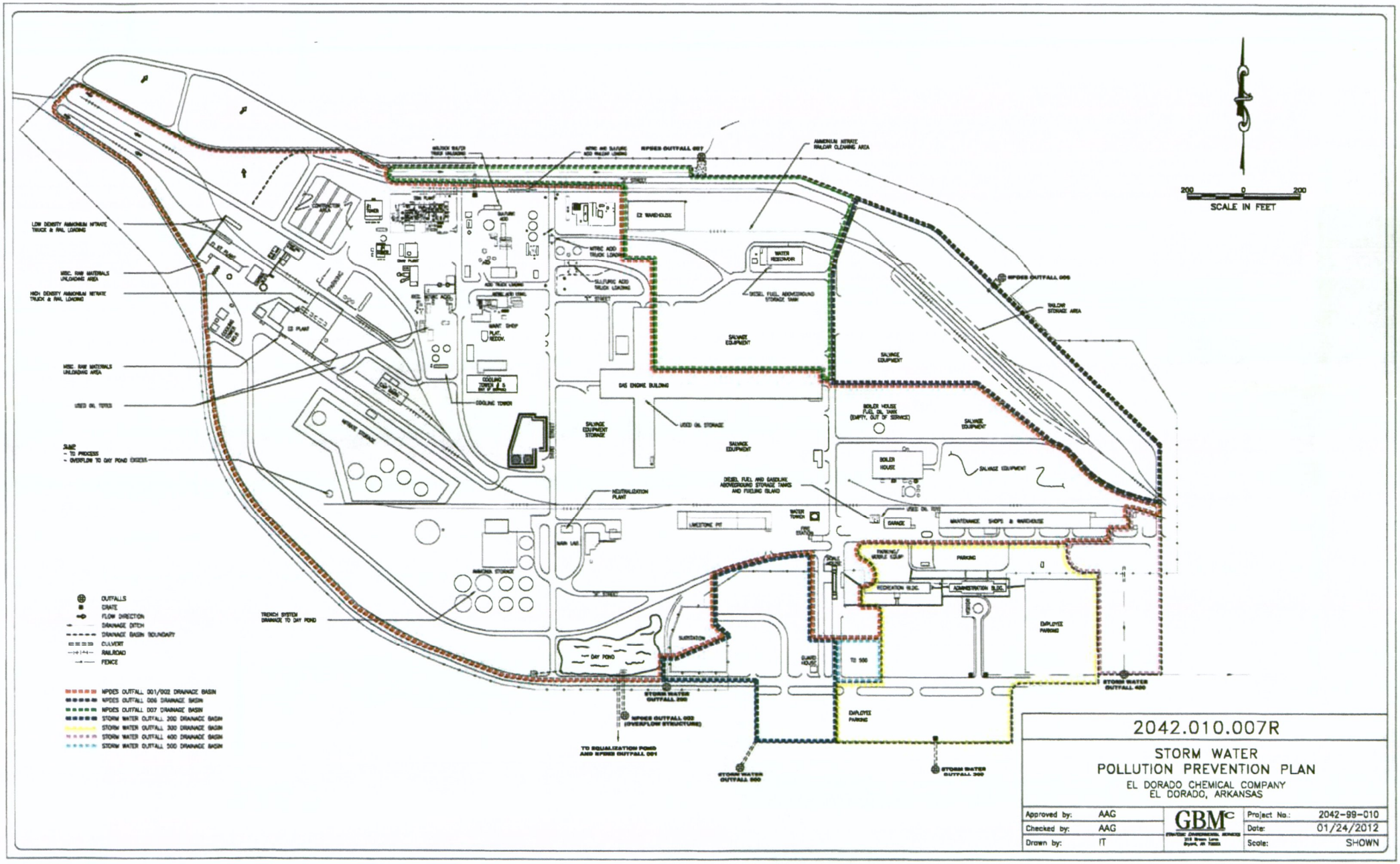


2042.010.007R

STORM WATER POLLUTION PREVENTION PLAN

EL DORADO CHEMICAL COMPANY
EL DORADO, ARKANSAS

Approved by:	AAG	GBMc	Project No.:	2042-99-010
Checked by:	AAG		Date:	10/31/2011
Drawn by:	IT		Scale:	SHOWN



2042.010.007R

STORM WATER POLLUTION PREVENTION PLAN

EL DORADO CHEMICAL COMPANY
EL DORADO, ARKANSAS

Approved by:	AAG	Project No.:	2042-99-010
Checked by:	AAG	Date:	01/24/2012
Drawn by:	IT	Scale:	SHOWN

GBMc

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4500 Northwest Ave.

El Dorado, AR 71730

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ActWgt: 1.0 LB
CAD: 5887030/INET3370

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PO #
Dept #

SHIP TO: (501) 682-0744 BILL SENDER

Mary Barnett
ADEQ - Water Division
5301 NORTHSHORE DR

NORTH LITTLE ROCK, AR 72118

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