Memorandum for Record **May 5, 2025**

Subject: Suitability Determination Memorandum and Antidegradation Assessment for Day Island Yacht Club, University Place, Washington.

Introduction

This suitability determination memorandum (SDM) and antidegradation assessment documents the consensus regarding the suitability of the proposed dredged material for unconfined aquatic disposal and compliance of the post-dredge leave surface as determined by the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers (USACE), Washington Departments of Ecology and Natural Resources, and the U.S. Environmental Protection Agency (EPA)).

Project Description

The Day Island Yacht Club (DIYC) was established in 1949 and is located in the Day Island Waterway on the western shoreline of University Place, WA. Sediment accumulation in the marina berthing basin has resulted in some nearshore floats and dock structures resting on the bottom during low tide. Dredging is required to restore the berthing basin to the authorized water depth of -6 feet (ft) mean lower low water (MLLW). The total dredged material volume in the berthing area to restore the bottom elevation to −6 ft MLLW plus 2 ft of overdepth is estimated at 24,438 cubic yards (cy). The project area and DMMU stations are shown in Figures 1 and 2.

Project Summary

Waterbody	Day Island Waterway, Tacoma Narrows Strait
Water classification	Marine
Project rank	Moderate
Total proposed dredging volume (cy)	24,438
Authorized dredging depth	-6 ft MLLW
Max. proposed dredging depth (includes 2 feet overdepth)	-8 ft MLLW
Proposed disposal location(s)	Non-dispersive open-water disposal
Dredged Material Management Units (DMMUs): No. of stations	2 DMMUs from 6 stations DMMU C1 and DMMU C2
EIM Study ID	DIYC23 and DIYC24
USACE Regulatory Reference Number	TBD
Sampling and Analysis Plan (SAP) Approval Date	SAP: August 31, 2023 (NewFields, 2023) SAP Addendum: April 15, 2024 (NewFields, 2024a)
Sampling Date(s)	September 27-28, 2023 April 16, 2024
Sediment Characterization Report Approval Date	May 5, 2025 (NewFields, 2025)
Testing Parameters	DMMP standard marine COCs plus Dioxins/Furans
Biological Testing	Bioassay and Bioaccumulation
Suitability Outcome	All material found suitable for non-dispersive in-water disposal
Recency Expiration Date: Moderate = 5 years	June 2029
Antidegradation Assessment	In compliance

Sampling and Analysis Description

Sediment sampling activities for chemical analysis and bioassays were conducted in the DIYC from September 27-28, 2023, using Gravity Environmental's research vessel *Ingalls*, a 36-foot aluminum landing craft. Supplemental sediment sampling specifically for bioaccumulation testing was conducted for DMMU C2 on April 16, 2024. The mudline elevation at each sampling location was determined using a lead line. Real-time tidal corrections were applied using a local tide board at DIYC. Vertical accuracy of less than 0.5 feet was achieved. Samples were transported to a shore-side location for processing. Tables 1 and 2 show the sampling station and recovery details for the two sampling events.

When possible, deviations from the approved Sampling and Analysis Plans (Newfields, 2023; Newfields 2024a) were coordinated with the DMMP agencies. Sediment recovery of each retained core met or exceeded the minimum 75 percent of the penetration depth except for two core replicates from DYC-5 during the bioaccumulation testing sampling event. After reviewing the information provided, the DMMP agencies determined that the samples collected were representative of the proposed dredged material and are considered sufficient for decision-making.

Reference sediment samples for the bioassay and bioaccumulation testing activities were collected by Research Support Services (RSS) on October 18, 2023, and March 21, 2024, respectively.

Samples were submitted to Analytical Resources in Tukwila, Washington for chemical and physical analysis. Analyses were performed by Analytical Resources and AmTest Laboratories in Kirkland, Washington. Biological (bioassay and bioaccumulation exposure) testing was performed by EcoAnalysts in Port Gamble, Washington. Tissue analysis from the bioaccumulation exposure was performed by Analytical Resources.

Data Validation

NewFields conducted an EPA Stage 2B review and validation of all sediment and tissue chemistry data. The validation process resulted in some additional J and UJ qualified data (estimated values) and U qualified data (estimated maximum possible concentrations [EMPCs] and analytes associated with method blank detections) beyond those assigned by the lab, based on specified protocol or technical advisory. Due to matrix inference from chlorinated diphenyl ethers in the initial tissue analyses, the instrument underwent extensive maintenance, and the samples were re-analyzed. Due to limited tissue mass for reanalysis, seven of the *Allita virens* samples were analyzed using less than the method specified 10 grams wet weight of tissue. There was not a clear difference in the estimated detection limit (EDL) between samples run with 10 grams of tissue compared to 5 grams of tissue; therefore, the data was deemed suitable for evaluation. The reanalyzed data were used, and the original results were qualified as "Do Not Report" to provide just one reportable result per sample parameter. Completeness was 100%; all reported data are usable as qualified.

Sediment Analytical Testing Results

Table 3 summarizes the analytical results for the two DMMU sample composites alongside the DMMP marine guidelines (DMMP, 2021). Chrysene exceeded the screening level of 1,400 µg/kg dry weight in DMMU C2, which triggered a bioassay analysis on this sample. All other COCs were below SLs except for dioxins/furans (referred to as "dioxin(s)" hereafter), which are discussed below. Due to the chrysene SL exceedance the three Z-layer core samples representing DMMU C2 were analyzed for SVOCs and did not result in any SMS exceedances.

TBT: Tributyltin analysis was not required by the DMMP for this project based on the site history and location of the project.

Dioxins/furans. Dioxin analysis was required by the DMMP for this project. Dioxin data is conveyed as Toxicity Equivalence (TEQ) values which are calculated by multiplying the Toxicity Equivalency Factor (TEF) of each congener by the concentration of the congener and summing the results. When non-detected (ND) values are encountered, the TEQ is calculated by using either using half of the congener detection limit (DL) (ND=1/2DL) or zero (ND=0). Comparison between the two operations may be useful in evaluating the contribution of non-detected values in TEQ summations.

Complete dioxin TEQ results are shown in Table 4. The dioxin TEQ (ND=1/2 DL) values for samples DMMU C1 and C2 were 5.6 and 11.6 parts per trillion (pptr), respectively. The dioxin value for DMMU C1 was above the DMMP disposal site management objective of 4 pptr TEQ and the value for DMMU C2 was above the bioaccumulation trigger of 10 pptr TEQ. Volume-weighted averaging (VWA) for dioxins is allowed for DMMUs with dioxin concentrations between 4 and 10 pptr TEQ as long as the final VWA concentration meets the disposal site management objective of 4 pptr TEQ. Based on these dioxin results a VWA approach was not applicable, and bioaccumulation testing was warranted. The applicant elected to conduct a supplemental bioaccumulation test on sample DMMU C2 only (the location with the greater dioxin value). The dioxin TEQ results for the resampled sediment for the bioaccumulation study are provided in Table 5. While samples were collected in the same location to create the DMMU C2 bioaccumulation test composite, the dioxin TEQ results were lower than the initial collection at 5.0 pptr (ND=1/2 DL). Due to the sequencing of sampling and testing, this data was not available prior to the initiation of the laboratory bioaccumulation exposures; however, the DMMP determined that this sample was representative of the site and adequate to evaluate the potential bioaccumulation of DIYC sediments.

Biological Results

Due to SL exceedances, bioassays were triggered in DMMU C2. The standard suite of three marine bioassays were conducted by EcoAnalysts of Port Gamble, Washington using *Neanthes arenaceodentata* for the infaunal growth test, *Mytilus galloprovincialis* for the larval test, and *Eohaustorius estuarius* for the amphipod test. Detailed results of the bioassay tests are shown in Table 9. All bioassays passed the negative control and reference sediment performance standards. There were no significant water quality deviations.

If a test sediment has two minor (2-hit) hits or a single major (1-hit) hit, then that material is unsuitable for open-water disposal. There were no hits in any of the bioassays, therefore DMMU C2 passed bioassay testing.

Bioaccumulation Evaluation

Five replicates for each species (*M. nasuta* and *A. virens*) were analyzed for the DMMU C2 composite and FoxRef2/4 reference, as well as three pre-test replicates for each species. All tissue replicates were analyzed for total solids, lipids, and dioxins. During the initial round of tissue analysis for dioxins, matrix interference from chlorinated diphenyl ethers (CDPEs) for the reported 2,3,7,8-TCDF concentrations resulted in six results being qualified as rejected during data validation. The replicate tissue samples were reanalyzed for dioxins and that data was reported used for the following interpretations.

A weight-of-evidence approach, outlined in the DMMP User Manual (DMMP 2021b), was used to evaluate the bioaccumulation study tissue data. The factors included:

- Statistical comparison to reference.
- The magnitude of the bioaccumulation from DMMU sediments compared to reference sediments.
- Evaluation of tissue concentrations relative to Practical Quantitation Limits (PQLs).
- Evaluation of the impact of non-detects on tissue total TEQ values.
- Comparison of tissue total TEQ values to those of comparable species found in the vicinity of the Commencement Bay DMMP disposal site.

Statistical Comparisons to Reference

The mean dioxin total TEQs in tissues exposed to DMMU C2 (Table 6 and 7) were compared with the mean dioxin total TEQs in tissues exposed to the Carr Inlet reference (FoxRef2/4) using a one-sided t-test and an alpha level of 0.1. The t-tests were conducted using BioStat (USACE 2007) and evaluated the null hypothesis that mean tissue dioxin total TEQ for the test sediment was less than or equal to the mean tissue dioxin total TEQ for the reference.

The tissue total TEQs for *M. nasuta* for DMMU C2 were considered statistically different from the FoxRef2/4 reference for ND=0. However, the *M. nasuta* tissue total TEQs for both DMMU C2 and the Carr Inlet reference were near zero (ND=0) and the statistical difference was due to low sample variance within each population. For *M. nasuta* dioxin total TEQs using ND=1/2*EDL, DMMU C2 was not statistically different from the FoxRef2/4 reference.

Conversely, the tissue total TEQs for *A. virens* for DMMU C2 were not statistically different from the FoxRef2/4 reference for ND=0 but were statistically different for ND=1/2*EDL. The statistical significance for ND=1/2*EDL was driven primarily by the highest total TEQ for one *A. virens* tissue replicate (A.v. DIYC24-C2-S R1 at 3.4 pptr), which is an outlier (Grubbs' test) when compared to the lower total TEQs for the other replicates for DMMU C2 (1.1 – 1.6 pptr).

Because statistically significant differences between test tissues and reference were observed, several additional factors were considered to determine whether DIYC dredged material is suitable for open-water disposal.

Magnitude of Bioaccumulation Compared to Reference

The statistical comparison presented identified significant differences between DIYC and reference sediment bioaccumulation, but not the magnitude of these differences. Therefore, relative percent differences (RPDs) were calculated for the mean dioxin TEQ tissue values between the DMMU sample and the reference.

The RPDs for the *M. nasuta* samples were 83.6% (ND=0) and 0.44% (ND=1/2*EDL) for DMMU C2 relative to the FoxRef2/4 reference. Expressed differently, the mean *M. nasuta* TEQ for DMMU C2 was 2.44 times greater (ND=0) and 1.00 times greater (ND=1/2*EDL) than the mean *M. nasuta* TEQ exposed to the FoxRef2/4 reference material. However, these results should be considered in context of the absolute TEQ differences. Despite having an RPD of 83.6%, the mean dioxin TEQs (ND=0) were very low in *M. nasuta* tissues for both DMMU C2 and FoxRef2/4, with an absolute difference of only 0.023 pptr. The low RPD (0.44%) for *M. nasuta* using ND=1/2*EDL reflects the very little difference between the

mean dioxin TEQs for DMMU C2 and FoxRef2/4 of less than 0.01 pptr. Regardless of how non-detects are treated, *M. nasuta* tissues of DMMU C2 experienced negligible bioaccumulation relative to the reference.

The RPDs for the *A. virens* samples were 30.8% (ND=0) and 51.8% (ND=1/2*EDL) for DMMU C2 relative to the FoxRef2/4 reference. Expressed differently, the mean *A. virens* TEQ for DMMU C2 was 1.36 times greater (ND=0) and 1.7 times greater (ND=1/2*EDL) than the mean TEQ of *A. virens* exposed to the FoxRef2/4 reference material. Like the *M. nasuta* tissues, the mean dioxin TEQs (ND=0) were very low in *A. virens* tissues and the absolute difference in means between DMMU C2 and FoxRef2/4 was only 0.004 pptr. The RPD for *A. virens* when ND=1/2*EDL was 51.8%, which reflected an absolute difference in mean dioxin TEQs between DMMU C2 and FoxRef2/4 of 0.7 pptr. However, the difference in *A. virens* dioxin TEQ means was strongly influenced by one outlier result for *A. virens* replicate A.v. DIYC24-C2-S R1 (3.4 pptr TEQ). If the initial analysis results for A.v. DIYC24-C2-S R1 are used (1.5 pptr TEQ), the RPD for *A. virens* samples using ND=1/2*EDL decreases by almost half (27.9%), or an absolute difference in mean total TEQ of 0.33 pptr.

Evaluation of Tissue Concentrations Relative to PQLs

The practical quantitation limit (PQL) is the lowest concentration of an analyte that can be reliably measured within specified limits of precision and accuracy under routine laboratory operating conditions. Concentrations reported above the PQL can be considered with a high degree of confidence, while concentrations below the PQL are typically considered estimated values. Therefore, PQLs are an important consideration for evaluating data when concentrations are low. The PQL for each dioxin congener for this project was defined as the lowest method calibration standard used by ARI to calibrate its instruments.

For *M. nasuta*, the mean total TEQ as well as the total TEQs for four of the five replicates analyzed for DMMU C2 (ND=1/2*EDL) were less than Ecology PQL of 1 pptr TEQ, and all were less than the project-specific PQL of 1.58 pptr TEQ. However, these TEQs do not reflect the significant influence of non-detected congeners in all *M. nasuta* tissue replicates evaluated. For *A. virens*, the mean total TEQ as well as the total TEQs for the five replicates analyzed for DMMU C2 (ND=1/2*EDL) were above the Ecology PQL but three of the five replicates analyzed were below the project-specific calibration standard PQL. Consideration of the significant contribution of non-detected congeners to the *A. virens* tissue replicates is warranted when comparing total TEQs (ND=1/2*EDL) to the Ecology PQL and the project-specific PQL. If the project-specific PQL was defined as the sum of TEF-weighted average EDL of each congener for each organism, the total TEQs for all *M. nasuta* tissue replicates and four of the five A. virens tissue replicates would be lower than EDL-defined project-specific PQL.

Comparison of tissue total TEQs to the Ecology PQL, or project-specific PQL defined by either calibration standards or EDLs, is complicated by the significant fraction of non-detects that contribute to the total TEQs.

Influence of Non-Detects on the Total TEQ

The tissue total dioxin TEQs were strongly influenced by non-detected congeners. For *M. nasuta* tissues, an average of 75.3% of the congeners were not detected in DMMU C2 samples, and an average of 91.8% of the congeners were not detected in FoxRef2/4 samples. For *A. virens* tissues, an average of 83.5% of the congeners were not detected in DMMU C2 samples, and an average of 90.6% of the congeners were not detected in the FoxRef2/4 samples.

The influence of the non-detected dioxin congeners on TEQs was evaluated based on their toxic equivalency factor (TEF)-weighted concentrations. The TEQ contribution of non-detected congeners to total TEQs (ND=1/2*EDL) for each sample is summarized in Table 8 and displayed in Figures 4 and 5. Non-detected congeners contributed 91.5% to 95.7% of the total TEQ for M. nasuta in DMMU C2 when ND=1/2*EDL, with an average contribution of 93.6%. Congeners reported and validated as EMPCs had a small impact, contributing between 0% and 3.3% of the total TEQ for M. nasuta in DMMU C2 when calculated as half of the reported concentration. EMPCs are detections of a congener that meet the signal-to-noise ratio criteria defined by the analytical method but do not meet the ion abundance ratio criteria necessary for positive identification. An EMPC represents a conservative maximum concentration that the congener could have. The DMMP User Manual notes that EMPCs should be qualified as non-detected ("U") and reported at the level the analyte was detected (i.e., the maximum possible concentration). The combined contribution of non-detected and EMPC congeners averaged 95% of the total TEQ for *M. nasuta* tissues in DMMU C2 when the EMPC fraction of the Total TEQ was calculated using one-half the reported EMPC result (i.e., Total TEQ = ½*maximum possible concentration).

For *A. virens* in DMMU C2, non-detected congeners contributed approximately 96.7% to 99.0% of the total TEQ when ND=1/2*EDL and an average of 98.1%. EMPCs contributed between 0% and 2.6%. The combined contribution of non-detected and EMPC-designated congeners averaged 99%.

Greater than 90% of total TEQs (ND=1/2*EDL) for all *M. nasuta* and *A. virens* tissue replicates in the DMMU C2 and FoxRef2/4 samples are driven by the summation of non-detected dioxin congeners reported at half of the EDL. In this dataset, the total TEQs derived from the inclusion of non-detected congeners does not accurately reflect the presence of bioaccumulated dioxins, but rather analytical limitations to accurately measure very low concentrations. Consideration of the substantial contributions of non-detected congeners to total TEQ of DIYC test tissues is necessary to compare the DIYC bioaccumulation results to other tissue datasets. Eliminating non-detects from the TEQ summation (ND=0) is an appropriate means of assessing the sensitivity of results to frequently non-detected congeners.

Tissue Concentrations of Comparable Species in Commencement Bay

Comparing DIYC tissue total TEQ values to those measured in comparable species at the Commencement Bay DMMP disposal site provides additional evidence to evaluate the potential for DIYC material to cause unacceptable adverse ecological impacts at the site. In 2007, the DMMP conducted a special D/F study at the unconfined open water dredged material disposal sites in Puget Sound (SAIC 2008). Organisms were collected in the vicinity of the DMMP sites and analyzed for dioxin congeners. At the Commencement Bay DMMP site, three genera of polychaetes (*Glyceridae*, *Maldanidae*, and *Travisia*) and one genera of bivalve (*Compsomyax*) were collected from six offsite stations in the vicinity of the disposal site boundary (perimeter and transect stations).

Figures 5 through 8 present comparisons of the DIYC dioxin tissue total TEQs (ND=0 and ND=1/2*EDL) to tissue total TEQs from species found in the vicinity of the Commencement Bay disposal site. Comparison of the *M. nasuta* bioaccumulation results to the *Compsomyax* tissue in Commencement Bay is not considered to be appropriate due to the different feeding strategies of these two species of clams. The *Compsomyax* clam has a relatively short siphon and is typically a filter feeder that lives exclusively in the subtidal (Lauzier 1997), compared to the *Macoma* clam which has adapted to a broad range of depths

and substrate types and is primarily a deposit feeder (Hylleberg and Gallucci 1975). Therefore, comparison of the *M. nasuta* bioaccumulation results to the Commencement Bay polychaete species was deemed a more appropriate comparison. Observed dioxin TEQ values in DIYC test organisms are generally comparable to that observed in polychaete tissues collected from the vicinity of the Commencement Bay DMMP disposal site.

DMMP Determinations

Suitability Determination

The bioaccumulation testing data can be summarized as follows. Dredged material samples from the DIYC resulted in tissue concentrations that were statistically greater than reference, however the accumulated concentrations were very low. Statistical comparisons were driven by the low measured variance among reference replicates, resulting in even small differences between test and reference being statistically significant.

In addition to bioaccumulated concentrations being very low, the calculated TEQs were driven to a large extent by non-detects and EMPCs. Lastly, the test results were within the range of tissue concentrations found in the vicinity of the Commencement Bay disposal site (perimeter and transect stations) during testing in 2007.

The DMMP dioxin guidelines allow for case-by-case determinations to be made based on consideration of the individual aspects of a dredging project. After careful evaluation, the DMMP agencies find that the weight of evidence supports a determination that placement of the DIYC material at the Commencement Bay site will not result in adverse effects. Therefore, the DMMP agencies concluded that all 24,438 cy proposed for dredging from DIYC are suitable for open-water disposal at the Commencement Bay non-dispersive site.

Antidegradation Determination

The sediment to be exposed by dredging must either meet the State of Washington Sediment Management Standards (SMS) or the State's Antidegradation Standard (Ecology, 2013) as outlined by DMMP guidance (DMMP, 2008). Due to the chrysene SL exceedance in the DMMU C2 composite sample, three Z-layer core samples were analyzed for the full suite of semi-volatile organic compounds and did not result in any SMS exceedances. Additionally, since the surface DMMUs had D/F concentrations above 4.0 pptr TEQ, two Z-layer composite samples (one representing each DMMU) were analyzed for D/Fs. The results were less than the surface and below the DMMP guideline of 4 pptr TEQ. The proposed post-dredge surface is considered compliant with the State of Washington Antidegradation Standard.

Debris Management

The DMMP agencies implemented a debris management requirement following the 2015 SMARM to prevent the disposal of debris (natural or anthropogenic) greater than 12 inches in any dimension at open-water disposal sites in Puget Sound. Debris screens shall be used for this project unless it can be demonstrated that debris is unlikely to be present or that the debris is large woody debris that can be easily observed and removed by other means during dredging. Debris screen usage, or detailed justification for not using one, must be included in the dredging quality assurance plan.

Notes and Clarifications

The decisions documented in this memorandum do **not** constitute final agency approval of the project. During the public comment period that follows a public notice, resource agencies will provide input on the overall project. A final decision will be made after full consideration of agency input, and after an alternatives analysis is done under section 404(b)(1) of the Clean Water Act.

A pre-dredge meeting with DNR, Ecology and the Corps of Engineers is required at least 7 days prior to dredging. A dredging quality control plan must be developed and submitted to the USACE Seattle District's Regulatory Branch and Ecology. Refer to the USACE permit and Ecology 401 certification for project-specific submittal requirements and timelines.

Projects proposing to use one of the DMMP open-water disposal sites must submit their application for a Site Use Authorization (SUA) to the Washington State Department of Natural Resources (DNR) at least 4 weeks prior to dredging. Applications submitted less than 4 weeks prior to dredging may be subject to delays.

References

DMMP, 2008. *Quality of Post-Dredge Sediment Surfaces (Updated).* A Clarification Paper Prepared by David Fox (USACE), Erika Hoffman (EPA) and Tom Gries (Ecology) for the Dredged Material Management Program, June 2008.

DMMP, 2021a. Suitability Determination Memorandum and Antidegradation Assessment for Maintenance Dredging of the Port of Tacoma Blair Waterway Berth Areas in Tacoma, Washington (NWS-2020-1017-WRD). April 16, 2021. https://usace.contentdm.oclc.org/utils/getfile/collection/p266001coll1/id/10407

DMMP, 2021b. *Dredged Material Evaluation and Disposal Procedures (User Manual)*. Dredged Material Management Program, updated July 2021.

Ecology. 2021. Sediment Cleanup User's Manual (SCUM): Guidance for Implementing the Cleanup Provisions of the Sediment Management Standards, Chapter 173-204-WAC. December 2021.

Ecology, 2013. *Sediment Management Standards – Chapter 173-204 WAC*. Washington State Department of Ecology, February 2013.

Hylleberg, J., Gallucci, V.F. Selectivity in feeding by the deposit-feeding bivalve *Macoma nasuta*. *Mar. Biol.* 32, 167–178 (1975).

Lauzier, R. 1997. A review of the biology of the Pacific milky venus clam (*Compsomyax subdiaphana*) and the fisheries of related subtidal species. Fisheries and Oceans Canada, Nanaimo, B.C. Research Document 97/136.

Newfields. 2023 Day Island Yacht Club Dredged Material Characterization University Place, Washington Sampling and Analysis Plan. Final. August 31, 2023.

NewFields 2024a. Day Island Yacht Club Dredged Material Characterization University Place, Washington Bioaccumulation Study Sampling and Analysis Plan – Addendum Final. April 15, 2024

NewFields 2025. Day Island Yacht Club Dredged Material Characterization and Bioaccumulation Testing University Place, Washington. Data Report. Final. May 2025.

USACE. 2007. Bioassay Statistics Software (BioStat) 2.0. David Fox, David Gustafson, and Travis Shaw. U.S. Army Corps of Engineers, Seattle District. Updated August 3, 2007.

The signed copy is on file in the Dredged Material Management Office, Seattle District U.S. Army Corps of Engineers

Agency Signatures

_____	_____
Date	Brian Hester – U.S. Army Corps of Engineers, Seattle District
_____	_____
Date	Sarah Burgess – U.S. Environmental Protection Agency, Region 10
_____	_____
Date	Laura Inouye, PhD. – Washington State Department of Ecology
_____	_____
Date	Shannon Soto – Washington State Department of Natural Resources

Copies Furnished:
DMMP agencies
John Nakayama, NewFields
DMMO File

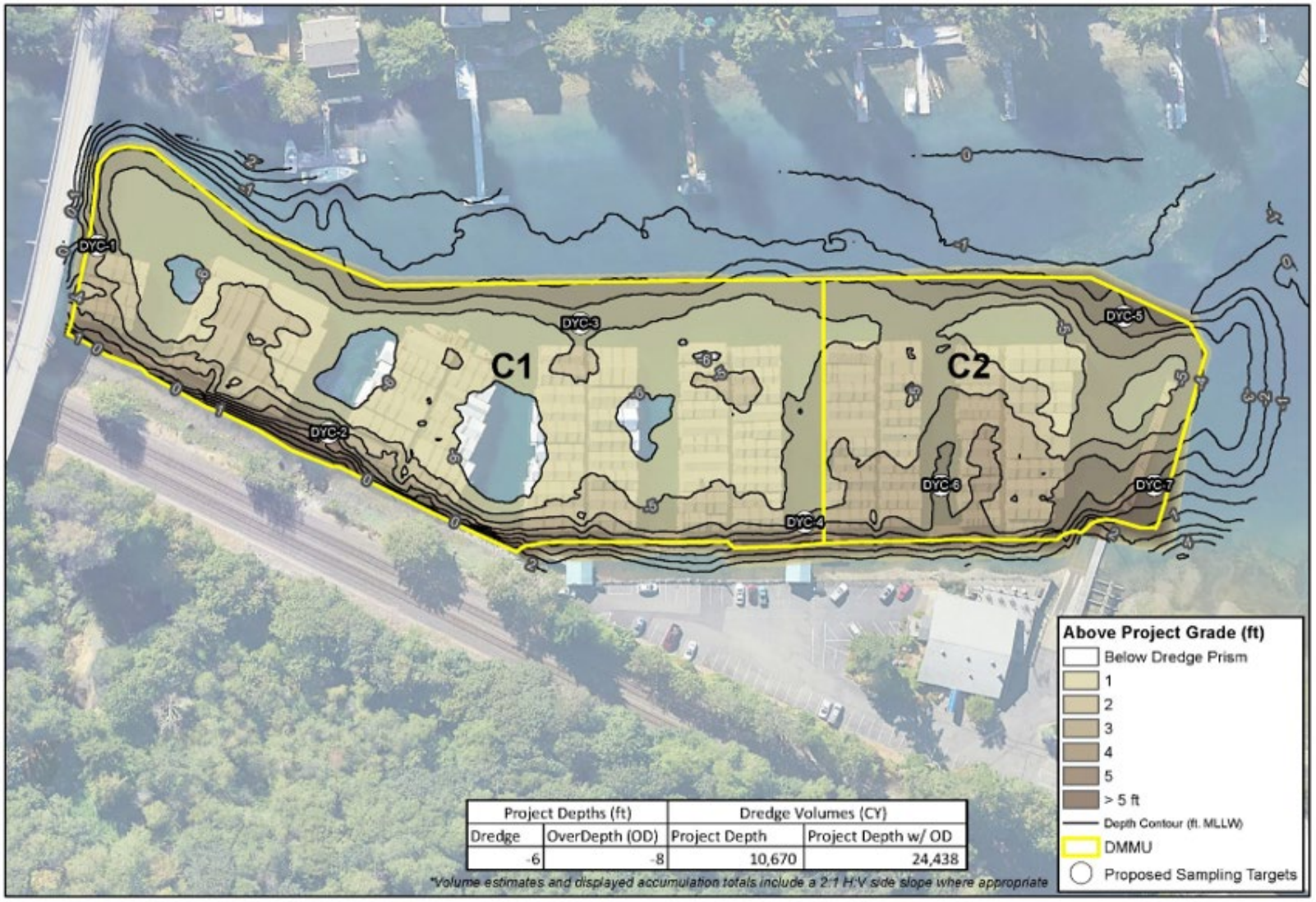


Figure 1. Day Island Yacht Club Sediment Accumulation and Dredged Volume Estimates

NewFields

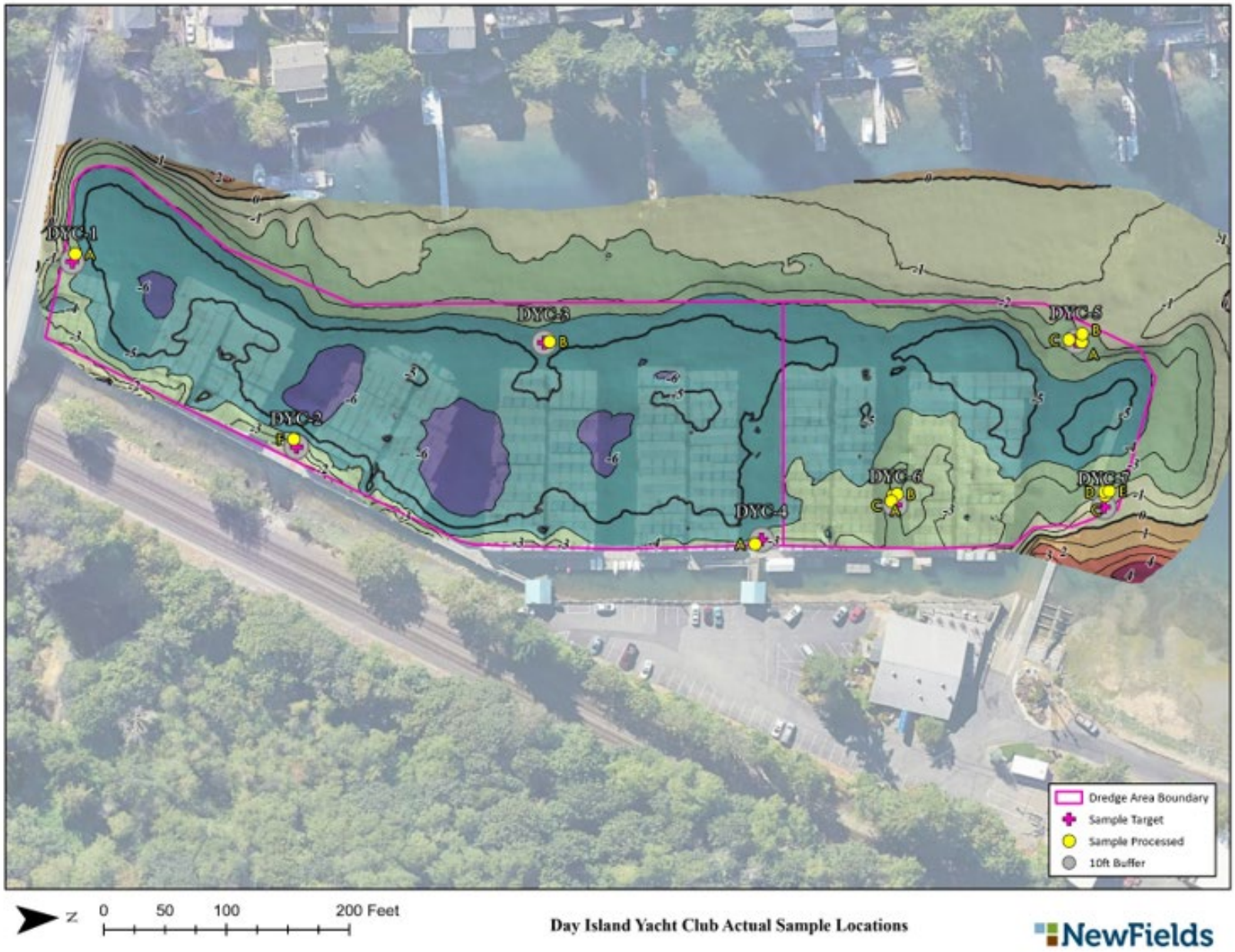


Figure 2. Day Island Yacht Club DMMP Characterization Actual Sample Locations (September 2023)

Table 1. DMMP Characterization DMMUs, Sample Locations, Actual Sampling Coordinates, and Mudline Elevations (DIYC23)

Surface DMMU	Estimated Volume (cy)	Z-Layer Samples (DIYC23-)	Sample Location	Core Replicate Processed	Date (mm/dd/yyyy)	Time (hh:mm)	Latitude (N) WGS84	Longitude (W) WGS84	Core Penetration (ft.)	Core Recovery (ft.)	Recovery (percent)	Measured Water Depth (ft.)	Tidal Height (ft.)	Mudline (ft. MLLW)	Surface DMMU (ft. MLLW)		Z-sample (ft. MLLW)	
															Top	Bottom	Top	Bottom
DIYC23-C1	14,240	DYC-1-Z	DYC-1	A	09/28/2023	08:36	47.23830736	122.56103039	6.8	6.5	96	-8.7	+5.3	-3.4	-3.4	-8.0	-8.0	-9.9
			DYC-2	F	09/27/2023	18:13	47.23877394	122.56038789	6.0	4.5	75	-15.5	+13.8	-1.7	-1.7	-6.2		
		DYC-3-Z	DYC-3	B	09/28/2023	09:31	47.23935533	122.56066431	8.0	8.0	100	-7.4	+3.0	-4.4	-4.4	-8.0	-8.0	-10.0
		DYC-4-Z	DYC-4	A	09/27/2023	14:55	47.23979119	122.55996783	5.0	5.0	100	-15.9	+12.1	-3.8	-3.8	-8.0	-8.0	-8.8
DIYC23-C2	10,320	DYC-5-Z	DYC-5	A	09/28/2023	11:50	47.24054253	122.56057500	2.0	2.0	100	-3.5	+1.8	-1.7	-1.7	-3.0	-3.0	-3.7
				B	09/28/2023	12:03	47.24054469	122.56060169	2.0	1.5	75	-3.5	+1.8	-1.7	-1.7	-2.4	-2.4	-3.2
				C	09/28/2023	12:20	47.24051461	122.56058431	1.5	1.3	85	-3.5	+2.0	-1.5	-1.5	-2.3	-2.3	-2.8
		DYC-6-Z	DYC-6	A	09/28/2023	10:16	47.24010439	122.56010469	2.0	1.9	95	-4.6	+2.0	-2.6	-2.6	-3.7	-3.7	-4.5
				B	09/28/2023	10:24	47.24011356	122.56010747	2.0	1.9	95	-4.3	+1.7	-2.6	-2.6	-3.5	-3.5	-4.5
				C	09/28/2023	11:27	47.24010003	122.56008522	2.5	2.5	100	-3.9	+1.5	-2.4	-2.4	-3.4	-3.4	-4.9
		DYC-7-Z	DYC-7	C	09/28/2023	13:19	47.24057725	122.56006853	2.0	2.0	100	-6.3	+4.3	-2.0	-2.0	-3.2	-3.2	-4.0
				D	09/28/2023	13:30	47.24057628	122.56008086	2.0	2.0	100	-6.8	+4.9	-1.9	-1.9	-3.1	-3.1	-3.9
				E	09/28/2023	13:46	47.24058733	122.56008244	2.0	1.5	75	-7.3	+5.5	-1.8	-1.8	-3.0	-3.0	-3.3

Notes:

- A Z-layer sample was not obtained at DYC-2 due to the vibracore encountering refusal before reaching the target elevation. Six coring attempts were made at DYC-2.
- Core sample collection for C2 (locations DYC-5, DYC-6 and DYC-7) encountered refusal at approximately two feet of penetration. In consultation with the DMMO, triplicate cores were collected at each location to obtain adequate sediment volumes for testing (see Section 2.8).
- WGS84 = World Geodetic System 1984

Table 2. Bioaccumulation Testing Sample Locations, Actual Sampling Coordinates, and Mudline Elevations (DIYC24)

Surface DMMU	Z-Layer Samples (DIYC24-)	Sample Location	Core Replicate Processed	Date (mm/dd/yyyy)	Time (hh:mm)	Latitude (N) WGS84	Longitude (W) WGS84	Core Penetration (ft.)	Core Recovery (ft.)	Recovery (percent)	Measured Water Depth (ft.)	Tidal Height (ft.)	Mudline (ft. MLLW)	Surface DMMU (ft. MLLW)		Z-sample (ft. MLLW)	
														Top	Bottom	Top	Bottom
DIYC24-C2	DYC-5-Z	DYC-5	A	04/16/2024	14:48	47.24055264	122.56058633	1.2	1.2	100	-9.0	+6.4	-2.6	-2.6	-3.5	-3.5	-3.8
			B	04/16/2024	15:06	47.24053394	122.56056675	3.0	1.7	57	-9.2	+5.9	-3.3	-3.3	-4.4	-4.4	-5.0
			C	04/16/2024	15:28	47.24053086	122.56055217	1.0	1.0	100	-8.6	+5.3	-3.3	-3.3	-4.3		
			D	04/16/2024	15:38	47.24051781	122.56056736	1.2	1.2	100	-8.2	+5.1	-3.1	-3.1	-3.7	-3.7	-4.3
			E	04/16/2024	16:10	47.24054189	122.56061158	1.0	0.5	50	-6.6	+4.3	-2.3	-2.3	-2.8		
			F	04/16/2024	16:37	47.24053269	122.56060153	1.0	0.9	90	-6.6	+3.6	-3.0	-3.0	-3.7	-3.7	-3.9
	DYC-6-Z	DYC-6	A	04/16/2024	11:41	47.24010281	122.56008428	1.0	1.0	100	-12.3	+9.1	-3.2	-3.2	-3.9	-3.9	-4.2
			B	04/16/2024	11:52	47.24010297	122.56007883	1.5	1.4	93	-12.2	+9.1	-3.1	-3.1	-3.8	-3.8	-4.5
			C	04/16/2024	12:24	47.24010442	122.56006675	1.0	1.0	100	-12.3	+9.0	-3.3	-3.3	-4.0	-4.0	-4.3
			E	04/16/2024	13:12	47.24011275	122.56010600	1.8	1.7	94	-11.8	+8.5	-3.3	-3.3	-4.1	-4.1	-5.0
			F	04/16/2024	13:27	47.24011022	122.56010308	1.2	1.2	100	-11.6	+8.3	-3.3	-3.3	-4.1	-4.1	-4.5
			G	04/16/2024	17:54	47.24010508	122.56010878	1.5	1.2	80	-5.3	+2.1	-3.2	-3.2	-3.8	-3.8	-4.4
	DYC-7-Z	DYC-7	A	04/16/2024	08:35	47.24056300	122.56001981	2.0	1.5	75	-8.6	+7.8	-0.8	-0.8	-1.8	-1.8	-2.3
			B	04/16/2024	09:03	47.24056058	122.56003628	1.5	1.2	80	-9.7	+8.0	-1.7	-1.7	-2.3	-2.3	-2.9
			C	04/16/2024	09:17	47.24056292	122.56004572	1.5	1.3	87	-10.0	+8.1	-1.9	-1.9	-2.7	-2.7	-3.2
			D	04/16/2024	09:34	47.24057414	122.56005872	1.5	1.2	80	-10.5	+8.2	-2.3	-2.3	-3.1	-3.1	-3.5
			E	04/16/2024	09:53	47.24057225	122.56007208	1.5	1.3	87	-10.6	+8.4	-2.2	-2.2	-3.1	-3.1	-3.5
			F	04/16/2024	17:38	47.24056381	122.56004789	1.5	1.3	87	-4.3	+2.6	-1.7	-1.7	-2.3	-2.3	-3.0

Notes:

- A Z-layer sample aliquot was not obtained for two core replicates at DYC-5 (DYC-5-C and DYC-5-E) due to the vibracore encountering refusal.
- Five cores were targeted for collection at each location to obtain adequate sample volume for all proposed analyses. During core collection, the amount of sediment collected appeared less than anticipated, so a sixth core was collected and processed at each location.
- Although cores DYC-5-B and DYC-5-E obtained less than 75% recovery, both cores hit refusal and surface sediment was obtained in the cores. Both cores were retained and processed for the DMMU C2 composite.
- WGS84 = World Geodetic System 1984

Table 3. DIYC23 Sediment Chemistry Results

		Date Sampled			9/27/23		9/28/23		9/28/23		9/23/23		9/28/23	
Compound	Units	SL	DMMP BT	ML	DIYC23-C1-S	VQ	DIYC23-C2-S	VQ	DIYC23-DYC-5-Z	VQ	DIYC23-DYC-6-Z	VQ	DIYC23-DYC-7-Z	VQ
Conventionals														
Total Solids	%	---	---	---	61.45		57.76							
Total Volatile Solids	%	---	---	---	5.49		6.3							
Total Organic Carbon	%	---	---	---	1.54	J	1.88	J						
Total Sulfides	mg/kg dw	---	---	---	145		423							
Ammonia	mg/kg dw	---	---	---	37.2		19.3							
Gravel	%	---	---	---	4.7		8.4							
Sand	%	---	---	---	34.3		56.9							
Silt	%	---	---	---	42.1		23.4							
Clay	%	---	---	---	18.9		11.4							
Grain Size (Fines)	%	---	---	---	61.0		34.8							
Metals and Metalloid														
Antimony	mg/kg dw	150	---	200	0.33	UJ	0.33	UJ						
Arsenic	mg/kg dw	57	507.1	700	8.77		6.56							
Cadmium	mg/kg dw	5.1	---	14	0.68		0.52							
Chromium	mg/kg dw	260	---	---	32		24.9							
Copper	mg/kg dw	390	---	1,300	43.3		43.6							
Lead	mg/kg dw	450	975	1,200	30.4		27.9							
Mercury	mg/kg dw	0.41	1.5	2.3	0.125		0.117							
Selenium	mg/kg dw	---	3	---	1.06		0.85							
Silver	mg/kg dw	6.1	---	8.4	0.13	J	0.12	J						
Zinc	mg/kg dw	410	---	3,800	80.3		79.3							
Butyltins														
Tributyltin ion	ug/kg dw	---	73	---	12.5		26.9							
SVOCs														
PAHs														
Naphthalene	ug/kg dw	2,100	---	2,400	67.7		201		2.27	J	4.09	J	3.73	J
Acenaphthylene	ug/kg dw	560	---	1,300	13.4	J	42.4		1.19	J	1.24	J	1.36	J
Acenaphthene	ug/kg dw	500	---	2,000	20.1		29.5		0.82	J	0.77	J	1.13	J
Fluorene	ug/kg dw	540	---	3,600	22.6		61.9		0.95	J	4.92	U	1.27	J
Phenanthrene	ug/kg dw	1,500	---	21,000	157		368		2.75	J	2.28	J	5.46	

Compound	Units	Date Sampled	DMMP		9/27/23		9/28/23		9/28/23		9/23/23		9/28/23	
		SL	BT	ML	DIYC23-C1-S	VQ	DIYC23-C2-S	VQ	DIYC23-DYC-5-Z	VQ	DIYC23-DYC-6-Z	VQ	DIYC23-DYC-7-Z	VQ
Anthracene	ug/kg dw	960	---	13,000	49.1		285		0.99	J	4.92	U	2.35	J
2-Methylnaphthalene	ug/kg dw	670	---	1,900	15.9	J	35.8	J	1.17	J	4.92	UJ	4.77	UJ
Total LPAH	ug/kg dw	5,200	---	29,000	329.9	J	987.8		8.97	J	8.38	J	15.3	J
Fluoranthene	ug/kg dw	1,700	4,600	30,000	358		422		6.44		3.38	J	15.1	
Pyrene	ug/kg dw	2,600	11,980	16,000	409		452		5.86		3.13	J	22.6	
Benzo(a)anthracene	ug/kg dw	1,300	---	5,100	144		650		2.17	J	4.92	U	4.23	J
Chrysene	ug/kg dw	1,400	---	21,000	227		1480		2.83	J	1.24	J	7.05	
Benzofluoranthenes	ug/kg dw	3,200	---	9,900	413		2740		7.26	J	9.84	U	16.3	
Benzo(a)pyrene	ug/kg dw	1,600	---	3,600	191	J	1360	J	2.69	J	0.63	J	5.69	
Indeno(1,2,3-c,d)pyrene	ug/kg dw	600	---	4,400	62.3		312		1.81	J	4.92	U	3.71	J
Dibenzo(a,h)anthracene	ug/kg dw	230	---	1,900	17.8	J	125		4.98	U	4.92	U	0.97	J
Benzo(g,h,i)perylene	ug/kg dw	670	---	3,200	57.6		279		2.71	J	4.92	U	5.08	
Total HPAH	ug/kg dw	12,000	---	69,000	1735.7		7820		31.8	J	8.38	J	80.7	J
Chlorinated Hydrocarbons														
1,4-Dichlorobenzene	ug/kg dw	110	---	120	20.0	U	19.9	U						
1,2-Dichlorobenzene	ug/kg dw	35	---	110	20.0	U	19.9	U						
1,2,4-Trichlorobenzene	ug/kg dw	31	---	64	20.0	U	19.9	U						
Hexachlorobenzene	ug/kg dw	22	168	230	20.0	U	19.9	U						
Phthalates														
Dimethyl phthalate	ug/kg dw	71	---	1,400	20.0	U	5.3	J						
Diethyl phthalate	ug/kg dw	200	---	1,200	50.0	U	49.9	U						
Di-n-butyl phthalate	ug/kg dw	1,400	---	5,100	20.0	U	6.7	J						
Butyl benzyl phthalate	ug/kg dw	63	---	970	20.0	U	19.9	U						
Bis(2-ethylhexyl)phthalate	ug/kg dw	1,300	---	8,300	50.0	U	49.9	U						
Di-n-octyl phthalate	ug/kg dw	6,200	---	6,200	6.2	J	19.9	U						
Phenols														
Phenol	ug/kg dw	420	---	1,200	22.8		27.3							
2-Methylphenol	ug/kg dw	63	---	77	20.0	U	19.9	U						
4-Methylphenol	ug/kg dw	670	---	3,600	16.9	J	133							
2,4-Dimethylphenol	ug/kg dw	29	---	210	20.0	UJ	4.0	J						
Pentachlorophenol	ug/kg dw	400	504	690	99.9	UJ	99.7	UJ						
Miscellaneous Extractables														

		Date Sampled			9/27/23		9/28/23		9/28/23		9/23/23		9/28/23	
		DMMP			DIYC23-		DIYC23-		DIYC23-		DIYC23-		DIYC23-	
Compound	Units	SL	BT	ML	C1-S	VQ	C2-S	VQ	DYC-5-Z	VQ	DYC-6-Z	VQ	DYC-7-Z	VQ
Benzyl alcohol	ug/kg dw	57	---	870	20.0	U	19.9	U						
Benzoic acid	ug/kg dw	650	---	760	72.4	J	87.9							
Dibenzofuran	ug/kg dw	540	---	1,700	20.0		36.5							
Hexachlorobutadiene	ug/kg dw	11	---	270	5.0	U	5.0	U						
N-Nitrosodiphenylamine	ug/kg dw	28	---	130	20.0	U	19.9	U						
Pesticides and PCBs														
4,4'-DDD	ug/kg dw	16	---	---	1.00	UJ	1.00	UJ						
4,4'-DDE	ug/kg dw	9	---	---	0.88	J	1.00	U						
4,4'-DDT	ug/kg dw	12	---	---	1.00	UJ	1.00	UJ						
Total 4,4'-DDX	ug/kg dw	---	50	69	0.88	J	1.00	UJ						
Aldrin	ug/kg dw	9.5	---	---	1.78	U	0.50	U						
Total Chlordane	ug/kg dw	2.8	37	---	1.00	U	1.00	U						
Dieldrin	ug/kg dw	1.9	---	1,700	1.00	U	1.00	U						
Heptachlor	ug/kg dw	1.5	---	270	0.50	U	0.50	U						
Total PCBs	ug/kg dw	130		3,100	40.7	J	19.9	U						
Total PCBs	mg/kg OC		38		2.6	J	1.1	U						
Dioxins/Furans														
2,3,7,8-TCDF	ng/kg dw	---	---	---	1.29		1.65							
2,3,7,8-TCDD	ng/kg dw	---	---	---	0.293	UJ	0.434	UJ						
1,2,3,7,8-PeCDF	ng/kg dw	---	---	---	1.01		1.05							
2,3,4,7,8-PeCDF	ng/kg dw	---	---	---	0.937	J	1.06							
1,2,3,7,8-PeCDD	ng/kg dw	---	---	---	1.32		1.3							
1,2,3,4,7,8-HxCDF	ng/kg dw	---	---	---	1.93		3.47							
1,2,3,6,7,8-HxCDF	ng/kg dw	---	---	---	1.37	U	1.59							
2,3,4,6,7,8-HxCDF	ng/kg dw	---	---	---	1.27		1.32							
1,2,3,7,8,9-HxCDF	ng/kg dw	---	---	---	0.411	UJ	0.854	UJ						
1,2,3,4,7,8-HxCDD	ng/kg dw	---	---	---	1.53		2.81							
1,2,3,6,7,8-HxCDD	ng/kg dw	---	---	---	5.74		8.45							
1,2,3,7,8,9-HxCDD	ng/kg dw	---	---	---	3.81		5.46							
1,2,3,4,6,7,8-HpCDF	ng/kg dw	---	---	---	31.5		81.4							
1,2,3,4,7,8,9-HpCDF	ng/kg dw	---	---	---	1.83	U	5.14							
1,2,3,4,6,7,8-HpCDD	ng/kg dw	---	---	---	147		465							
OCDF	ng/kg dw	---	---	---	77.8		347							

Compound	Units	Date Sampled	DMMP		9/27/23		9/28/23		9/28/23		9/23/23		9/28/23	
		SL	BT	ML	DIYC23-C1-S	VQ	DIYC23-C2-S	VQ	DIYC23-DYC-5-Z	VQ	DIYC23-DYC-6-Z	VQ	DIYC23-DYC-7-Z	VQ
OCDD	ng/kg dw	---	---	---	1270		5200							
Total TEQ (ND = 0)[1]	ng/kg dw	4	10	---	**5.4**		**11.3**							
Total TEQ (ND = ½*EDL)[2]	ng/kg dw	4	10	---	**5.6**		**11.6**							
Total TCDF	ng/kg dw	---	---	---	17.2		17.2							
Total TCDD	ng/kg dw	---	---	---	10.0		11.0							
Total PeCDF	ng/kg dw	---	---	---	18.7		15.5							
Total PeCDD	ng/kg dw	---	---	---	12.0		12.3							
Total HxCDF	ng/kg dw	---	---	---	43.1		104							
Total HxCDD	ng/kg dw	---	---	---	72.0		302							
Total HpCDF	ng/kg dw	---	---	---	93.9		381							
Total HpCDD	ng/kg dw	---	---	---	664		5590							

Compound	Units	Date Sampled	DMMP		9/27/23		9/28/23		10/18/23	
		SL	BT	ML	DIYC23-C1-Z	VQ	DIYC23-C2-Z	VQ	CARR29-23-REF	VQ
Conventionals										
Total Solids	%	---	---	---	73.41		83.95		73.61	J
Total Volatile Solids	%	---	---	---					1.38	J
Total Organic Carbon	%	---	---	---	0.68		0.08		0.14	J
Total Sulfides	mg/kg dw	---	---	---					10.7	J
Ammonia	mg/kg dw	---	---	---					10.1	J
Gravel	%	---	---	---	0.7		20.9		0.0	U
Sand	%	---	---	---	58.0		44.4		73.8	
Silt	%	---	---	---	32.6		25.2		22.9	
Clay	%	---	---	---	8.7		9.5		3.3	
Grain Size (Fines)	%	---	---	---	41.3		34.7		26.2	
Dioxins/Furans										
2,3,7,8-TCDF	ng/kg dw	---	---	---	0.230	U	0.472	J		
2,3,7,8-TCDD	ng/kg dw	---	---	---	0.196	U	0.303	UJ		
1,2,3,7,8-PeCDF	ng/kg dw	---	---	---	0.221	U	0.817	J		
2,3,4,7,8-PeCDF	ng/kg dw	---	---	---	0.187	U	0.693	J		
1,2,3,7,8-PeCDD	ng/kg dw	---	---	---	0.222	U	0.998	UJ		
1,2,3,4,7,8-HxCDF	ng/kg dw	---	---	---	0.269	U	0.961	J		
1,2,3,6,7,8-HxCDF	ng/kg dw	---	---	---	0.278	U	0.809	UJ		
2,3,4,6,7,8-HxCDF	ng/kg dw	---	---	---	0.300	U	0.895	UJ		
1,2,3,7,8,9-HxCDF	ng/kg dw	---	---	---	0.349	U	0.766	J		
1,2,3,4,7,8-HxCDD	ng/kg dw	---	---	---	0.371	U	0.695	J		
1,2,3,6,7,8-HxCDD	ng/kg dw	---	---	---	0.877	UJ	1.02	U		
1,2,3,7,8,9-HxCDD	ng/kg dw	---	---	---	0.434	U	1.30	U		
1,2,3,4,6,7,8-HpCDF	ng/kg dw	---	---	---	22.6	U	2.51	U		
1,2,3,4,7,8,9-HpCDF	ng/kg dw	---	---	---	0.984	UJ	0.657	J		
1,2,3,4,6,7,8-HpCDD	ng/kg dw	---	---	---	38.3	U	9.02	U		
OCDF	ng/kg dw	---	---	---	103		6.86	U		
OCDD	ng/kg dw	---	---	---	415	U	69.5	U		
Total TEQ (ND = 0)[1]	ng/kg dw	4	10	---	**0.031**		**0.53**			
Total TEQ (ND = ½*EDL)[2]	ng/kg dw	4	10	---	**0.80**		**1.4**			

		Date Sampled			9/27/23		9/28/23		10/18/23	
Compound	Units	SL	DMMP BT	ML	DIYC23-C1-Z	VQ	DIYC23-C2-Z	VQ	CARR29-23-REF	VQ
Total TCDF	ng/kg dw	---	---	---	1.00	U	0.882	J		
Total TCDD	ng/kg dw	---	---	---	0.997	J	1.28			
Total PeCDF	ng/kg dw	---	---	---	1.00	U	1.81			
Total PeCDD	ng/kg dw	---	---	---	1.00	U	0.225	J		
Total HxCDF	ng/kg dw	---	---	---	10.8		2.72			
Total HxCDD	ng/kg dw	---	---	---	3.25		2.69			
Total HpCDF	ng/kg dw	---	---	---	82.0		7.07			
Total HpCDD	ng/kg dw	---	---	---	97.8		25.3			

Exceeds SL	Exceeds BT

1. ND=0; EMPC =0
2. ND = ½*EDL; EMPC = ½*Reported

Validation Qualifiers (VQ):

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Table 4. DIYC23 Sediment Dioxin/Furan Congener Total TEQ Calculations

		DIYC23-C1-S		DIYC23-C2-S		DIYC23-C1-Z		DIYC23-C2-Z	
Dioxins/Furans (ng/kg dw)	TEFs	ND=0	ND=1/2DL	ND=0	ND=1/2DL	ND=0	ND=1/2DL	ND=0	ND=1/2DL
2,3,7,8-TCDF	0.1	0.129	0.129	0.165	0.165	0	0.0115	0.0472	0.0472
2,3,7,8-TCDD	1	0	0.1465	0	0.217	0	0.098	0	0.1515
1,2,3,7,8-PeCDF	0.03	0.0303	0.0303	0.0315	0.0315	0	0.003315	0.02451	0.02451
2,3,4,7,8-PeCDF	0.3	0.2811	0.2811	0.318	0.318	0	0.02805	0.2079	0.2079
1,2,3,7,8-PeCDD	1	1.32	1.32	1.3	1.3	0	0.111	0	0.499
1,2,3,4,7,8-HxCDF	0.1	0.193	0.193	0.347	0.347	0	0.01345	0.0961	0.0961
1,2,3,6,7,8-HxCDF	0.1	0	0.0685	0.159	0.159	0	0.0139	0	0.04045
2,3,4,6,7,8-HxCDF	0.1	0.127	0.127	0.132	0.132	0	0.015	0	0.04475
1,2,3,7,8,9-HxCDF	0.1	0	0.02055	0	0.0427	0	0.01745	0.0766	0.0766
1,2,3,4,7,8-HxCDD	0.1	0.153	0.153	0.281	0.281	0	0.01855	0.0695	0.0695
1,2,3,6,7,8-HxCDD	0.1	0.574	0.574	0.845	0.845	0	0.04385	0	0.051
1,2,3,7,8,9-HxCDD	0.1	0.381	0.381	0.546	0.546	0	0.0217	0	0.065
1,2,3,4,6,7,8-HpCDF	0.01	0.315	0.315	0.814	0.814	0	0.113	0	0.01255
1,2,3,4,7,8,9-HpCDF	0.01	0	0.00915	0.0514	0.0514	0	0.00492	0.00657	0.00657
1,2,3,4,6,7,8-HpCDD	0.01	1.47	1.47	4.65	4.65	0	0.1915	0	0.0451
OCDF	0.0003	0.02334	0.02334	0.1041	0.1041	0.0309	0.0309	0	0.001029
OCDD	0.0003	0.381	0.381	1.56	1.56	0	0.06225	0	0.010425
Total TEQ (ND = 0)		**5.4**		**11.3**		0.031		0.53	
Total TEQ (ND = ½*EDL)			**5.6**		**11.6**		0.80		1.4
	Exceeds SL	Exceeds BT							

Notes:

1. ND=0: ND=0, EMPC =0
2. ND=1/2*EDL: ND=1/2*EDL; EMPC=1/2*Reported

Table 5. DIYC24 Sediment Chemistry Results for Bioaccumulation Testing

Compound	Units	Date Sampled DMMP SL	BT	ML	4/16/24 DIYC24-C2-S	VQ	3/21/24 FoxRef2/4	VQ
Conventionals								
Total Solids	%	---	---	---	53.37		49.48	
Total Volatile Solids	%	---	---	---	6.79		4.24	
Total Organic Carbon	%	---	---	---	2.98	J	0.97	
Total Sulfides	mg/kg dw	---	---	---	279	J	218	J
Ammonia	mg/kg dw	---	---	---	14.8		13.5	
Gravel	%	---	---	---	3.8		0.8	
Sand	%	---	---	---	56.8		44.8	
Silt	%	---	---	---	28.8		33.6	
Clay	%	---	---	---	10.7		20.8	
Grain Size (Fines)	%	---	---	---	39.5		54.4	
Dioxins/Furans								
2,3,7,8-TCDF	ng/kg dw	---	---	---	1.16	U	1.36	U
2,3,7,8-TCDD	ng/kg dw	---	---	---	0.291	UJ	0.14	U
1,2,3,7,8-PeCDF	ng/kg dw	---	---	---	0.785	J	0.677	J
2,3,4,7,8-PeCDF	ng/kg dw	---	---	---	0.914	J	0.778	J
1,2,3,7,8-PeCDD	ng/kg dw	---	---	---	1.31	U	1.09	
1,2,3,4,7,8-HxCDF	ng/kg dw	---	---	---	2.18		1.48	J
1,2,3,6,7,8-HxCDF	ng/kg dw	---	---	---	1.25		0.696	J
2,3,4,6,7,8-HxCDF	ng/kg dw	---	---	---	1.45		0.93	UJ
1,2,3,7,8,9-HxCDF	ng/kg dw	---	---	---	0.804	J	0.34	U
1,2,3,4,7,8-HxCDD	ng/kg dw	---	---	---	1.14	J	0.724	UJ
1,2,3,6,7,8-HxCDD	ng/kg dw	---	---	---	5.33		3.28	
1,2,3,7,8,9-HxCDD	ng/kg dw	---	---	---	3.25	U	1.92	
1,2,3,4,6,7,8-HpCDF	ng/kg dw	---	---	---	28.2		12.2	
1,2,3,4,7,8,9-HpCDF	ng/kg dw	---	---	---	1.81		0.852	J
1,2,3,4,6,7,8-HpCDD	ng/kg dw	---	---	---	164		45.1	
OCDF	ng/kg dw	---	---	---	66.3	J	24.3	
OCDD	ng/kg dw	---	---	---	1630		330	
Total TEQ (ND = 0)[1]	ng/kg dw	4	10	---	**4.0**		**2.8**	
Total TEQ (ND = ½*EDL)[2]	ng/kg dw	4	10	---	**5.0**		**3.0**	
Total TCDF	ng/kg dw	---	---	---	13.4		5.8	
Total TCDD	ng/kg dw	---	---	---	8.61		8.52	
Total PeCDF	ng/kg dw	---	---	---	10.8		8.46	
Total PeCDD	ng/kg dw	---	---	---	4.14		5.81	
Total HxCDF	ng/kg dw	---	---	---	43.3		15.6	
Total HxCDD	ng/kg dw	---	---	---	63.1		34.4	
Total HpCDF	ng/kg dw	---	---	---	95.3		33.3	
Total HpCDD	ng/kg dw	---	---	---	614		96	

Notes:

1. ND=0: ND=0, EMPC =0
2. ND=1/2*EDL: ND=1/2*EDL; EMPC=1/2*Reported

Exceeds SL | Exceeds BT

Table 6. *M. nasuta* Tissue Chemistry Results[1]

Sample ID / Analyte	M.n. Pretest Rep 1	VQ	M.n. Pretest Rep 2	VQ	M.n. Pretest Rep 3	VQ	M.n. DIYC24-C2-S Rep 1	VQ	M.n. DIYC24-C2-S Rep 2	VQ	M.n. DIYC24-C2-S Rep 3	VQ	M.n. DIYC24-C2-S Rep 4	VQ	M.n. DIYC24-C2-S Rep 5	VQ
Conventionals (%)																
Percent Lipids	1.0		0.93		0.68		0.79		0.9		0.86		0.77		1.1	
Total Solids	16.67		15.52		15.35		15.36		15.8		16.79		15.59		16.67	
Dioxin/Furan (ng/kg ww)																
2,3,7,8-TCDF	0.323	U	0.212	U	0.361	U	0.663	U	0.800	U	0.534	U	0.813	U	0.502	U
2,3,7,8-TCDD	0.294	U	0.235	U	0.416	UJ	0.402	U	0.521	U	0.295	U	0.423	U	0.316	U
1,2,3,7,8-PeCDF	0.410	U	0.259	U	0.418	U	0.500	U	0.562	U	0.375	U	0.475	U	0.436	U
2,3,4,7,8-PeCDF	0.397	U	0.268	U	0.409	U	0.473	U	0.546	U	0.371	U	0.486	U	0.405	U
1,2,3,7,8-PeCDD	0.614	U	0.57	U	0.703	U	0.667	U	0.767	U	0.512	U	0.710	U	0.559	U
1,2,3,4,7,8-HxCDF	0.385	U	0.375	U	0.362	U	0.51	U	0.558	U	0.264	U	0.373	U	0.328	U
1,2,3,6,7,8-HxCDF	0.388	U	0.357	U	0.351	U	0.485	U	0.550	U	0.256	U	0.362	U	0.333	U
2,3,4,6,7,8-HxCDF	0.412	U	0.385	U	0.408	U	0.517	U	0.543	U	0.266	U	0.360	U	0.330	U
1,2,3,7,8,9-HxCDF	0.547	U	0.494	U	0.583	U	0.699	U	0.693	U	0.365	U	0.451	U	0.433	U
1,2,3,4,7,8-HxCDD	0.671	U	0.414	U	0.631	U	0.561	U	0.708	U	0.366	U	0.618	U	0.526	U
1,2,3,6,7,8-HxCDD	0.663	U	0.413	U	0.647	U	0.473	UJ	0.735	U	0.361	U	0.654	U	0.519	U
1,2,3,7,8,9-HxCDD	0.724	U	0.449	U	0.694	U	0.603	U	0.784	U	0.394	U	0.691	U	0.567	U
1,2,3,4,6,7,8-HpCDF	0.409	U	0.307	U	0.424	U	0.338	UJ	1.18	UJ	1.15	UJ	0.499	UJ	0.933	J
1,2,3,4,7,8,9-HpCDF	0.743	U	0.505	U	0.714	U	0.665	UJ	0.811	J	0.450	UJ	0.608	UJ	0.392	J
1,2,3,4,6,7,8-HpCDD	0.711	U	0.626	U	0.899	U	3.49	J	4.37	J	3.07	UJ	3.97	UJ	3.54	J
OCDF	1.14	U	0.584	U	1.04	U	1.33	J	1.85	UJ	1.41	UJ	2.85	J	1.09	UJ
OCDD	2.73	U	1.23	U	1.16	U	28		33.4		22.7		31.2		27.4	
Total TEQ (ND=0)[2]	**0.0**		**0.0**		**0.0**		**0.044**		**0.054**		**0.0068**		**0.010**		**0.053**	
Total TEQ (ND=1/2*EDL)[3]	**0.74**		**0.61**		**0.84**		**0.89**		**1.1**		**0.64**		**0.90**		**0.74**	
Total TCDF	0.996	U	0.999	U	0.997	U	0.996	U	0.998	U	0.538	J	0.996	U	0.649	J
Total TCDD	0.996	U	0.999	U	0.997	U	0.996	U	0.998	U	0.995	U	0.996	U	0.999	U
Total PeCDF	0.996	U	0.999	U	0.997	U	0.996	U	0.998	U	0.995	U	0.996	U	0.999	U
Total PeCDD	0.996	U	0.999	U	0.997	U	0.996	U	0.998	U	0.995	U	0.996	U	0.999	U
Total HxCDF	0.996	U	0.999	U	0.997	U	0.996	U	0.745	J	0.995	U	0.996	U	0.999	U
Total HxCDD	0.996	U	0.999	U	0.997	U	0.996	U	0.998	U	0.995	U	0.996	U	0.999	U
Total HpCDF	0.996	U	0.999	U	0.997	U	0.996	U	0.998	U	0.995	U	1.80		2.36	
Total HpCDD	0.996	U	0.999	U	0.997	U	3.49		16.5		7.00		8.95		13.1	

Table 6. *M. nasuta* Tissue Chemistry Results[1] (continued)

Sample ID / Analyte	M.n. FoxRef 2/4 Rep 1	VQ	M.n. FoxRef 2/4 Rep 2	VQ	M.n. FoxRef 2/4Rep 3	VQ	M.n. FoxRef 2/4 Rep 4	VQ	M.n. FoxRef 2/4 Rep 5	VQ
Conventionals (%)										
Percent Lipids	0.83		1.0		0.84		0.78		0.98	
Total Solids	16.27		15.74		16.23		16.66		16.44	
Dioxin/Furan (ng/kg ww)										
2,3,7,8-TCDF	0.968	U	0.625	U	0.878	U	0.517	U	0.398	U
2,3,7,8-TCDD	0.625	U	0.356	U	0.450	U	0.345	U	0.295	U
1,2,3,7,8-PeCDF	0.492	U	0.501	U	0.508	U	0.368	U	0.346	U
2,3,4,7,8-PeCDF	0.483	U	0.463	U	0.495	U	0.372	U	0.361	U
1,2,3,7,8-PeCDD	0.750	U	0.639	U	0.912	U	0.578	U	0.472	U
1,2,3,4,7,8-HxCDF	0.477	U	0.359	U	0.531	U	0.332	U	0.236	U
1,2,3,6,7,8-HxCDF	0.476	U	0.351	U	0.526	U	0.332	U	0.239	U
2,3,4,6,7,8-HxCDF	0.486	U	0.385	U	0.507	U	0.344	U	0.256	U
1,2,3,7,8,9-HxCDF	0.595	U	0.483	U	0.725	U	0.461	U	0.33	U
1,2,3,4,7,8-HxCDD	0.706	U	0.64	U	0.684	U	0.414	U	0.467	U
1,2,3,6,7,8-HxCDD	0.729	U	0.643	U	0.717	U	0.42	U	0.506	U
1,2,3,7,8,9-HxCDD	0.780	U	0.697	U	0.762	U	0.453	U	0.529	U
1,2,3,4,6,7,8-HpCDF	0.493	U	0.433	U	0.549	U	0.314	U	0.335	UJ
1,2,3,4,7,8,9-HpCDF	0.765	UJ	0.640	UJ	0.857	UJ	0.513	UJ	0.392	UJ
1,2,3,4,6,7,8-HpCDD	2.03	J	0.971	UJ	0.986	UJ	0.652	UJ	1.14	J
OCDF	0.868	U	0.667	U	1.04	U	0.598	U	0.566	J
OCDD	14.2		9.15	U	9.31	U	7.83	U	8.78	U
Total TEQ (ND=0)[2]	**0.025**		**0.0**		**0.0**		**0.0**		**0.012**	
Total TEQ (ND=1/2*EDL)[3]	**1.1**		**0.80**		**1.0**		**0.70**		**0.61**	
Total TCDF	0.997	U	0.999	U	0.999	U	0.995	U	0.788	J
Total TCDD	0.997	U	0.846	J	0.999	U	0.995	U	0.998	U
Total PeCDF	0.997	U	0.462	J	0.999	U	0.995	U	0.998	U
Total PeCDD	0.997	U	0.999	U	0.999	U	0.995	U	0.998	U
Total HxCDF	0.997	U	0.999	U	0.999	U	0.995	U	0.998	U
Total HxCDD	0.997	U	0.999	U	0.999	U	0.326	J	0.998	U
Total HpCDF	1.55	U	0.999	U	0.999	U	0.995	U	0.956	J
Total HpCDD	2.03		1.35		0.999	U	1.43		2.65	

Notes:

1. This table presents the initial *M. nasuta* analysis results for lipids, total solids, and the dioxins/furans for pre-test tissues, and the dioxin/furan reanalysis results for DMMU C2 and the Carr Inlet reference. The initial dioxin/furan analysis results for DMMU C2 and Carr Inlet are provided in Appendix D.
2. ND=0: ND=0, EMPC =0
3. ND=1/2*EDL: ND=1/2*EDL; EMPC=1/2*Reported

Validation Qualifiers (VQ):

- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample
- U The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Table 7. *A. virens* Tissue Chemistry Results[1]

Sample ID / Analyte	A.v. Pretest Rep 1	VQ	A.v. Pretest Rep 2	VQ	A.v. Pretest Rep 3	VQ	A.v. DIYC24-C2-S Rep 1	VQ	A.v. DIYC24-C2-S Rep 2	VQ	A.v. DIYC24-C2-S Rep 3	VQ	A.v. DIYC24-C2-S Rep 4	VQ	A.v. DIYC24-C2-S Rep 5	VQ
Conventionals (%)																
Percent Lipids	1.5		1.3		1.2		1.4		1.4		1.2		0.97		1.1	
Total Solids	17.9		17.18		16.81		16.75		16.84		16.47		15.74		15.42	
Dioxin/Furan (ng/kg ww)																
2,3,7,8-TCDF	1.47	UJ	2.55	UJ	1.10	U	1.72	U	0.518	U	0.454	UJ	0.357	UJ	0.467	U
2,3,7,8-TCDD	0.506	U	0.337	U	1.10	U	1.46	U	0.491	U	0.361	U	0.453	U	0.387	U
1,2,3,7,8-PeCDF	0.667	U	0.428	U	1.34	U	1.74	U	0.668	U	0.511	U	0.441	U	0.632	U
2,3,4,7,8-PeCDF	0.73	U	0.448	U	1.37	U	1.81	U	0.804	U	0.644	U	0.556	U	0.865	U
1,2,3,7,8-PeCDD	1.36	U	0.757	U	2.54	U	3.03	U	1.16	U	0.978	U	1.14	U	1.75	U
1,2,3,4,7,8-HxCDF	0.746	U	0.425	U	1.43	U	1.46	U	0.624	U	0.569	U	0.614	U	0.969	U
1,2,3,6,7,8-HxCDF	0.75	U	0.424	U	1.47	U	1.41	U	0.665	U	0.586	U	0.599	U	0.988	U
2,3,4,6,7,8-HxCDF	0.774	U	0.473	U	1.53	U	1.56	U	0.544	U	0.493	U	0.571	U	0.843	U
1,2,3,7,8,9-HxCDF	1.02	U	0.672	U	2.01	U	1.92	U	0.676	U	0.603	U	0.694	U	0.956	U
1,2,3,4,7,8-HxCDD	1.04	U	0.693	U	2.22	U	2.70	U	1.00	U	0.872	U	0.937	U	1.14	U
1,2,3,6,7,8-HxCDD	1.09	U	0.695	U	2.29	U	2.72	U	1.12	U	0.932	U	0.958	U	1.25	U
1,2,3,7,8,9-HxCDD	1.15	U	0.754	U	2.45	U	2.95	U	1.15	U	0.981	U	1.03	U	1.30	U
1,2,3,4,6,7,8-HpCDF	0.731	U	0.558	U	1.49	U	1.13	U	0.512	U	0.316	U	0.479	U	0.565	U
1,2,3,4,7,8,9-HpCDF	1.16	U	0.873	U	2.48	U	1.78	UJ	0.717	UJ	0.402	UJ	0.705	UJ	0.760	UJ
1,2,3,4,6,7,8-HpCDD	2.35	UJ	1.98	J	2.89	U	1.7	UJ	1.49	UJ	1.03	UJ	1.37	UJ	0.934	UJ
OCDF	1.46	U	0.898	U	3.20	U	2.73	U	0.641	J	0.579	U	0.696	U	0.952	U
OCDD	16.5	J	9.70	U	16.0	J	12.7	J	10.3	U	11.0	J	7.69	U	7.72	U
Total TEQ (ND=0)[2]	**0.0050**		**0.020**		**0.0048**		**0.0038**		**0.00019**		**0.0033**		**0.0**		**0.0**	
Total TEQ (ND=1/2*EDL)[3]	**1.5**		**0.98**		**2.8**		**3.4**		**1.3**		**1.1**		**1.2**		**1.6**	
Total TCDF	1.99	U	0.996	U	4.93	U	1.41	J	1.75	J	1.98	U	1.99	U	1.99	U
Total TCDD	1.99	U	0.996	U	4.93	U	2.00	U	1.99	U	1.98	U	1.99	U	1.99	U
Total PeCDF	1.99	U	1.18		4.93	U	2.00	U	0.627	J	1.98	U	1.99	U	1.99	U
Total PeCDD	1.99	U	0.996	U	4.93	U	2.00	U	1.99	U	1.98	U	1.99	U	1.99	U
Total HxCDF	1.99	U	0.996	U	4.93	U	2.00	U	1.99	U	1.98	U	1.99	U	1.99	U
Total HxCDD	1.99	U	0.996	U	4.93	U	2.00	U	1.99	U	1.98	U	1.99	U	1.99	U
Total HpCDF	1.99	U	0.996	U	4.93	U	2.00	U	1.99	U	1.98	U	1.99	U	1.99	U
Total HpCDD	1.99	U	1.98		4.93	U	1.7	J	2.39		1.98	U	1.99	U	0.934	J

Table 7. *A.virens* Tissue Chemistry Results[1] (continued)

Sample ID / Analyte	A.v. FoxRef 2/4 Rep 1	VQ	A.v. FoxRef 2/4 Rep 2	VQ	A.v. FoxRef 2/4Rep 3	VQ	A.v. FoxRef 2/4 Rep 4	VQ	A.v. FoxRef 2/4 Rep 5	VQ
Conventionals (%)										
Percent Lipids	1.3		1.3		1.0		0.9		1.0	
Total Solids	15.82		15.34		15.96		16.31		15.36	
Dioxin/Furan (ng/kg ww)										
2,3,7,8-TCDF	1.19	UJ	0.424	U	0.406	U	0.517	U	1.49	UJ
2,3,7,8-TCDD	0.482	U	0.253	U	0.351	U	0.393	U	0.289	U
1,2,3,7,8-PeCDF	0.471	U	0.451	U	0.558	U	0.485	U	0.432	U
2,3,4,7,8-PeCDF	0.498	U	0.536	U	0.601	U	0.569	U	0.474	U
1,2,3,7,8-PeCDD	1.02	U	0.825	U	0.786	U	1.09	U	1.10	U
1,2,3,4,7,8-HxCDF	0.411	U	0.469	U	0.448	U	0.588	U	0.523	U
1,2,3,6,7,8-HxCDF	0.408	U	0.493	U	0.423	U	0.576	U	0.514	U
2,3,4,6,7,8-HxCDF	0.421	U	0.421	U	0.394	U	0.568	U	0.494	U
1,2,3,7,8,9-HxCDF	0.494	U	0.475	U	0.507	U	0.684	U	0.593	U
1,2,3,4,7,8-HxCDD	0.624	U	0.544	U	0.649	U	0.81	U	0.839	U
1,2,3,6,7,8-HxCDD	0.669	U	0.62	U	0.693	U	0.825	U	0.847	U
1,2,3,7,8,9-HxCDD	0.703	U	0.633	U	0.729	U	0.888	U	0.916	U
1,2,3,4,6,7,8-HpCDF	0.359	U	0.41	UJ	0.381	U	0.482	J	0.498	U
1,2,3,4,7,8,9-HpCDF	0.564	UJ	0.426	UJ	0.509	UJ	0.666	UJ	0.707	UJ
1,2,3,4,6,7,8-HpCDD	0.605	UJ	0.905	UJ	0.607	UJ	1.02	UJ	0.729	UJ
OCDF	0.885	U	0.477	U	0.667	U	0.936	U	0.642	U
OCDD	4.98	U	8.51	U	4.38	U	4.33	U	6.71	U
Total TEQ (ND=0)[2]	**0.0**		**0.0**		**0.0**		**0.0**		**0.0**	
Total TEQ (ND=1/2*EDL)[3]	**1.1**		**0.84**		**0.89**		**1.1**		**1.1**	
Total TCDF	0.996	U	0.452	J	1.10	U	1.99	U	0.582	J
Total TCDD	0.996	U	0.999	U	1.10	U	1.99	U	1.99	U
Total PeCDF	0.996	U	0.769	J	1.10	U	1.99	U	1.99	U
Total PeCDD	0.996	U	0.999	U	1.10	U	1.99	U	1.99	U
Total HxCDF	0.996	U	0.999	U	1.10	U	1.99	U	1.99	U
Total HxCDD	0.996	U	0.999	U	1.10	U	1.99	U	1.99	U
Total HpCDF	0.996	U	0.999	U	1.10	U	0.482		1.99	U
Total HpCDD	0.996	U	2.36		1.10	U	1.99	U	1.99	U

Notes:

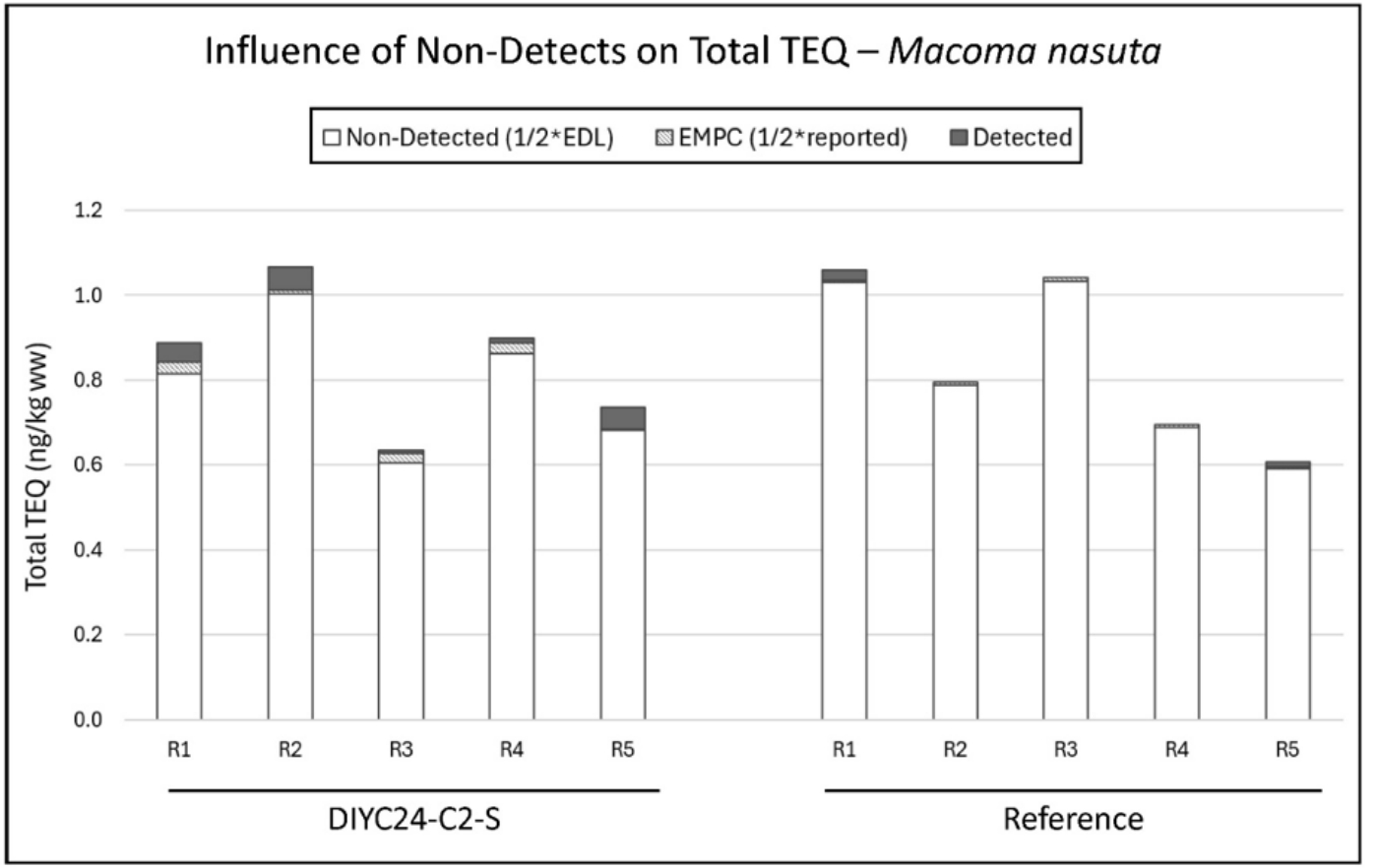
1. This table presents the initial *A. virens* analysis results for lipids, total solids, and the dioxins/furans for pre-test tissues, and the dioxin/furan reanalysis results for DMMU C2 and the Carr Inlet reference. The initial dioxin/furan analysis results for DMMU C2 and Carr Inlet are provided in Appendix D.
2. ND=0: ND=0, EMPC =0
3. ND=1/2*EDL: ND=1/2*EDL; EMPC=1/2*Reported

Validation Qualifiers (VQ):

- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample
- U The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

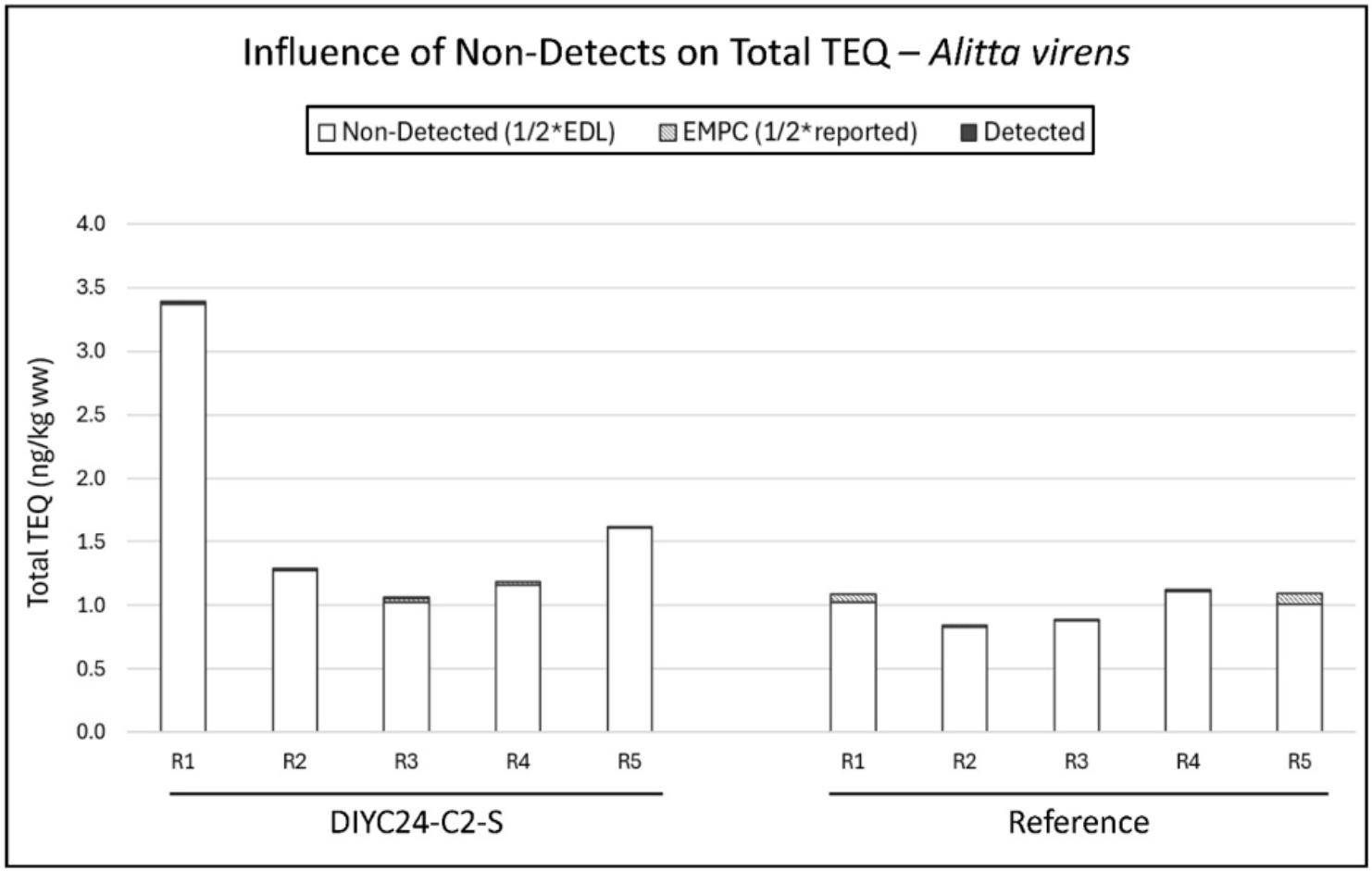
Table 8. Percent Contribution of Non-Detected Congeners and EMPCs on the Total TEQ (ND = ½*EDL) Calculated for Each Test Species

Sample	Non-Detected			EMPC		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean
M. nasuta						
DMMU C2	91.5%	95.7%	93.6%	0.0%	3.3%	1.8%
FoxRef 2/4	97.0%	98.8%	98.0%	0.0%	0.6%	0.3%
A. virens						
DMMU C2	96.7%	99.0%	98.1%	0.0%	2.6%	1.0%
FoxRef2/4	92.2%	98.7%	96.2%	0.0%	7.1%	2.6%



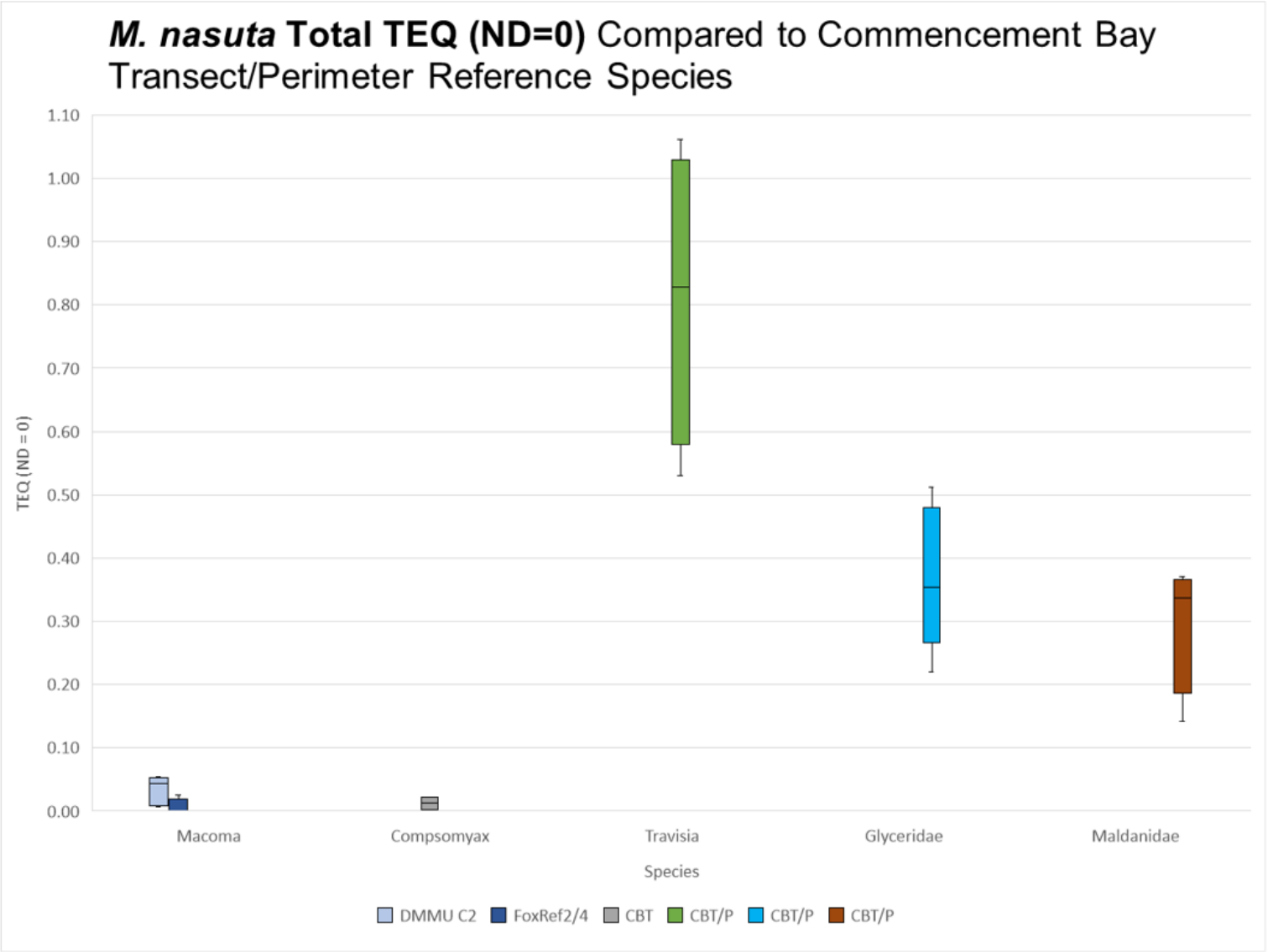
Notes:
EDL = estimated detection limit EMPC = estimated maximum possible concentration TEQ = toxic equivalent

Figure 3. Influence of Non-Detects on Total TEQ for *M. nasuta*



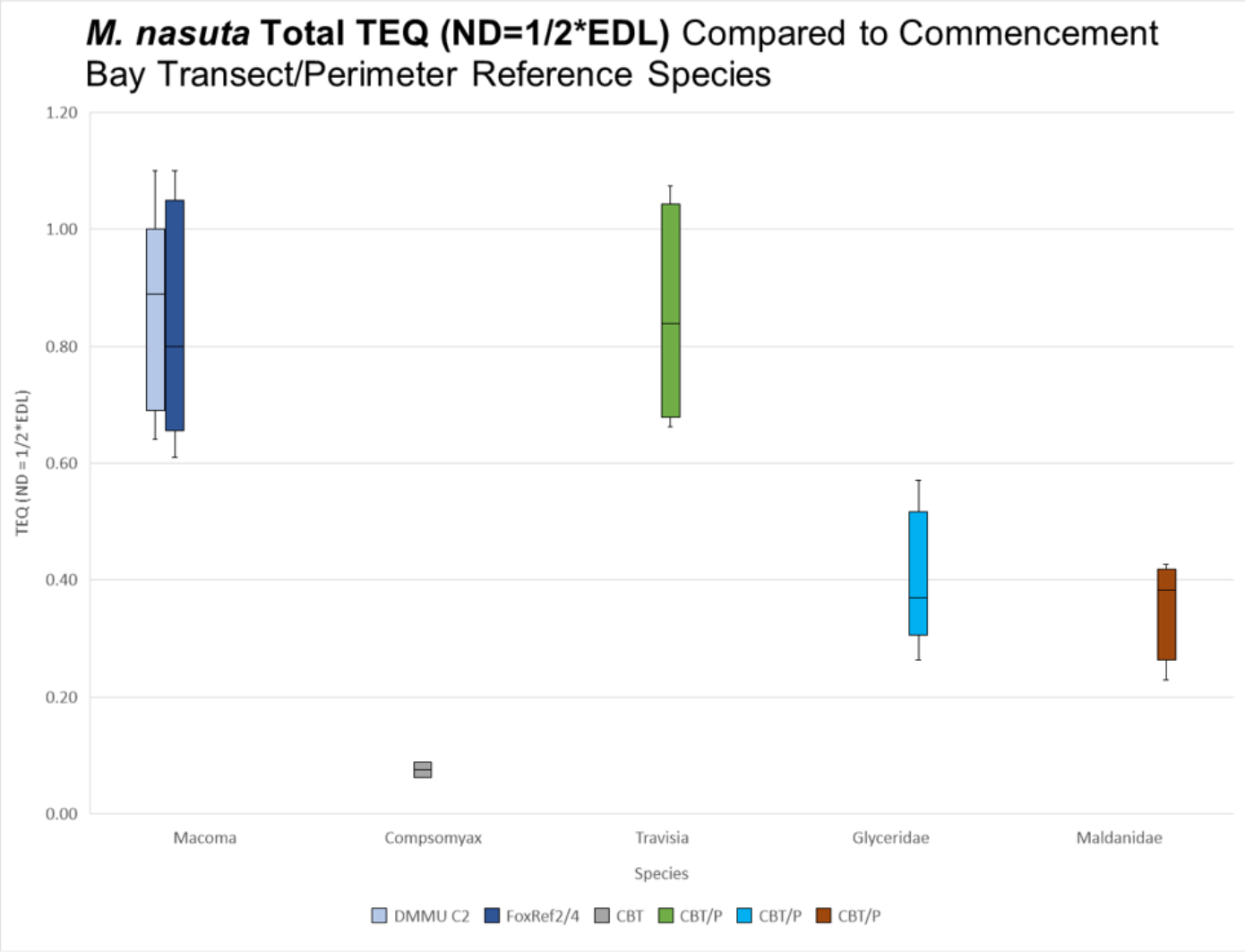
Notes:
EDL = estimated detection limit EMPC = estimated maximum possible concentration TEQ = toxic equivalent

Figure 4. Influence of Non-Detects on Total TEQ for *A. virens*



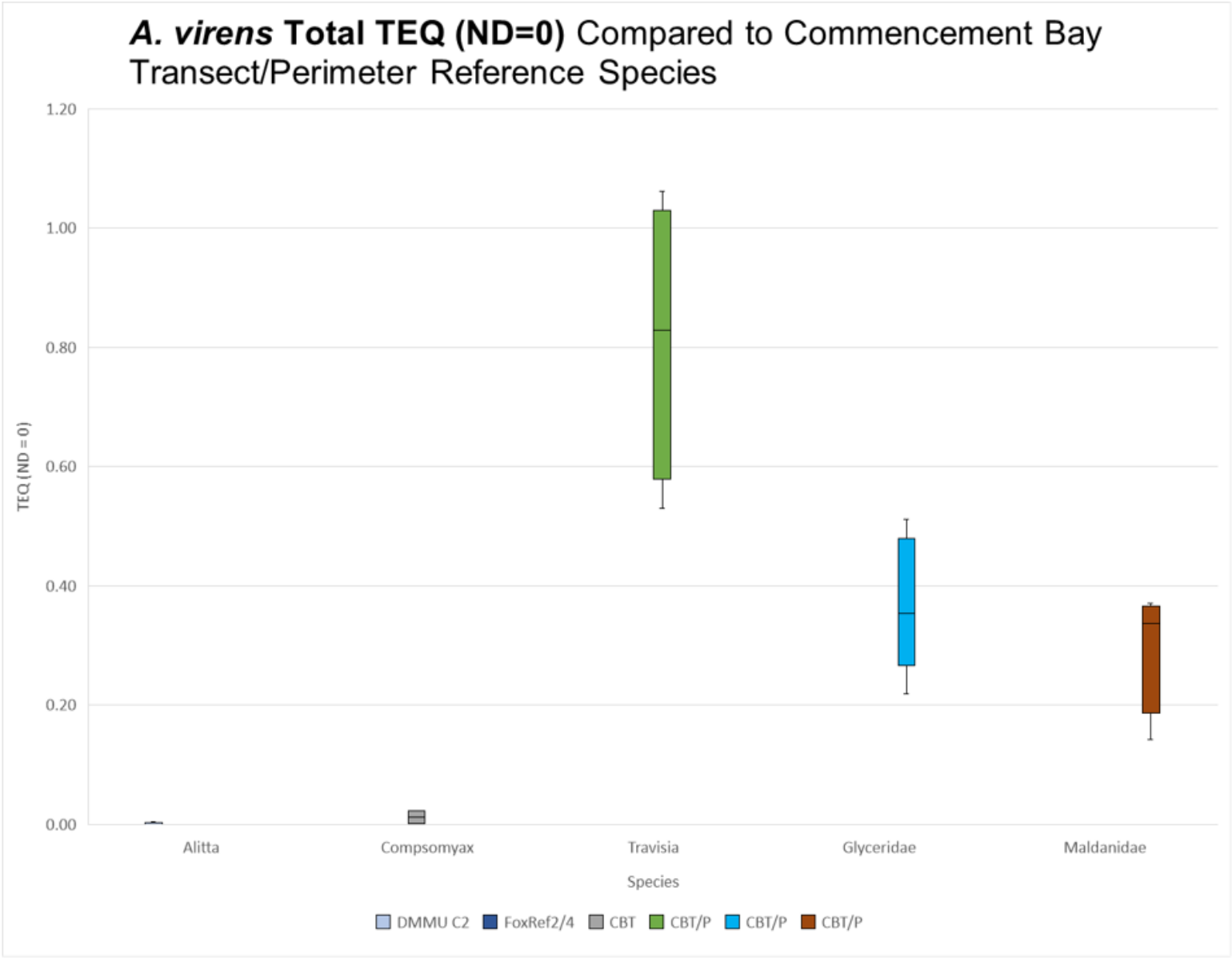
Notes:
EDL = estimated detection limit ND = not detected TEQ = toxic equivalent

Figure 5. *M. nasuta* Dioxin/Furan Total TEQ (ND=0) Compared to Commencement Bay DMMP Site Tissues



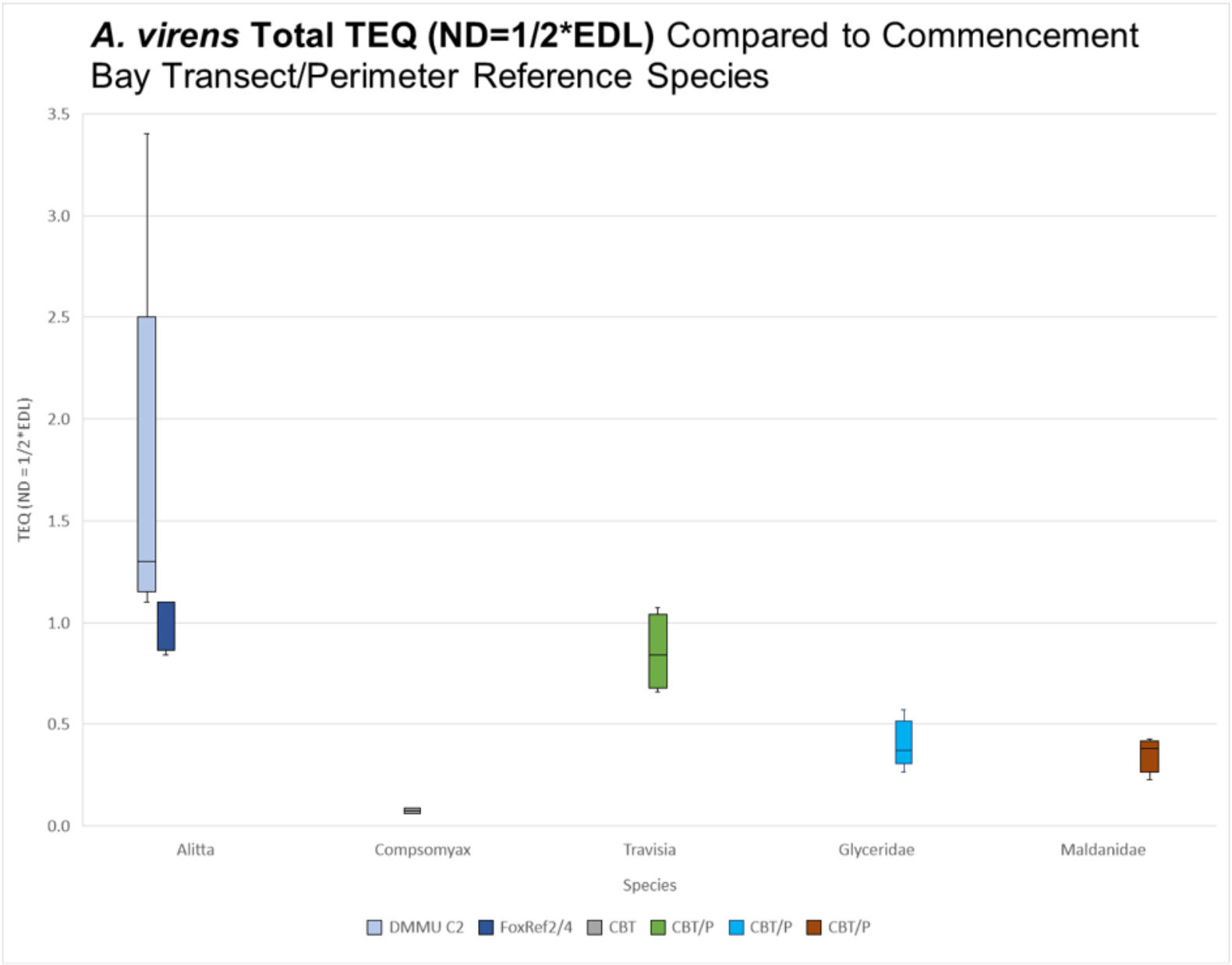
Notes:
EDL = estimated detection limit ND = not detected TEQ = toxic equivalent

Figure 6. *M. nasuta* Dioxin/Furan Total TEQ (ND=1/2*EDL) Compared to Commencement Bay DMMP Site Tissues



Notes:
EDL = estimated detection limit ND = not detected TEQ = toxic equivalent

Figure 7. *A. virens* Dioxin/Furan Total TEQ (ND=0) Compared to Commencement Bay DMMP Site Tissues



Notes:
EDL = estimated detection limit ND = not detected TEQ = toxic equivalent

Figure 8. *A. virens* Dioxin/Furan Total TEQ (ND=1/2*EDL) Compared to Commencement Bay DMMP Site Tissues