

Town Lake WQ Quality Assurance Project Plan

Project #1

Introduction

The monitoring protocols presented in this QAPP were established by committee in October 2003 and will be reviewed in 2006 following next Town Lake data report.

This QAPP only addresses water sampling. See other related QAPP for sediment, algae and VIP sampling information.

Project Management

1. Who is the project manager?
Mary Gilroy
2. Who is the WMA team representative?
Chris Herrington
3. What other WPDRD staff are on the committee for this project?
Mateo Scoggins, Martha Turner, Leila Gosselink
4. When will the annual WMA review be completed?
November (following completion of second annual non-release sampling event)
5. When will the project begin/end?
City of Austin monitoring of Town Lake began in 1991 and is on-going.

Data Objectives

6. What are the study objective(s)?
 - Monitor long-term temporal trends in Town Lake water quality
 - Continue to assess spatial differences between Town Lake sites
 - Compare differences between surface and at-depth water quality in Town Lake.
 - Assess Town Lake water quality using TCEQ screening levels/water quality standards
7. In addition to the project committee, who else is interested in the data?
n/a
8. What decision(s) will be made from the information obtained? When will the decision(s) be made?
If ERM data shows that Town Lake is of concern for secondary parameters or exceeding water quality standards based on TCEQ screening levels/standards, then a letter will be drafted detailing the condition to TCEQ staff. This decision will be made biannually following the completion/analysis of Town Lake data.

9. What has been done in the past? Describe project history, list previous related reports or available data.
Refer to 2004 version of the Town Lake Report (volume I and II) for complete summary.
10. What could be done in the future? List and prioritize potential special studies.
1. Develop a Town Lake Receiving Water Integrity Index combining water, sediment and biological data into an integrated index reflecting the status of Town Lake.
 2. Test use of composite sampling tool for depth-integrated (composite depth profile) samples for nutrients
 3. Measure velocity transects in the lake at varying flows (Martha)
 4. Measure light extinction coefficients (Martha)
 5. Multiple datasonde/thermister deployment to match areas of low DO at the Basin (Chris)

Data generation

11. Describe the sampling. What sites will be sampled? In addition to the core parameter list in the SOP manual, what other parameters will be collected? When will sampling occur?

Three sites will be sampled on Town Lake:

FSDB #	Site Name	TCEQ Site #
1	Town Lake @ Basin (AC)	12476
2	Town Lake @ 1st St (CC)	14067
5	Town Lake @ Red Bud Isle (EC)	12486

Four samples will be collected per year under non-storm influenced conditions (following EII sampling criteria as defined in the SOP manual). Two samples will be collected under storm flow conditions, as defined below (Question 12). Storm sampling will be conducted by USGS beginning February 2005.

Condition	Months	# Samples	Notes
Release, Non-Storm	July – September	2	One sediment sample in this time period
Release, Storm	April – June	1	Storm samples to be collected by USGS beginning February 2005
Non-Release, Non-Storm	October – November	2	One sediment sample in this time period
Non-Release, Storm	February – March	1	Storm samples to be collected by USGS beginning February 2005

Field parameters will be collected at every site along a depth profile (0.2 meters from surface, 0.2 meters from bottom, and at every 1 meter interval between).

Parameter	Lab	Depth?
Field parameters by Hydrolab	Field	Depth profile
Secchi Disk Depth	Field	n/a
Chlorophyll-a	W/WW	Surface only
COD	W/WW	Surface only
TSS	W/WW	Surface only
E coli bacteria	W/WW	Surface only
Nutrients (NO ₃ +NO ₂ , TKN, NH ₃ , TP, OP, SO ₄)	W/WW	Surface and bottom
Total metals (As, Cu, Fe, Pb, Zn)	W/WW	Surface only*

*Total metals sampled only at Basin only two times per year in conjunction with sediment sampling event.

Bottle list (for each site).

See below, #12

12. Describe special sample conditions. List only deviations from routine non-storm conditions as described in the SOP manual.

Samples will be collected under non-release (generally October 15-March 15) and release conditions (generally March 15-October 15) separately. Changes in release patterns due to antecedent rainfall or LCRA water management strategy alterations can change targeted sampling months, but deviations from established months must be documented.

Samples in the same season (release/non-release) must be separated by a time interval no less than the current estimated residence time of Town Lake. Residence time will be estimated by dividing the volume of the lake (6,596 ac-ft from 1999 TWDB study converted to 287,321,763 ft³) by the flow of the Colorado River at Austin gage (USGS 08158000, available on the web at http://waterdata.usgs.gov/tx/nwis/uv?dd_cd=02&format=gif&period=7&site_no=08158000). Estimated time for a range of flow conditions is presented below:

Q (cfs)	Time (days)
100	33.3
150	22.2
200	16.6
250	13.3
300	11.1
400	8.3
500	6.7
600	5.5
700	4.8
800	4.2
900	3.7
1000	3.3
2000	1.7
5000	0.7

Storm sampling will target “first flush”—within 24 hours of beginning of rain event totaling more than 0.5 inches with no rain in the 7 days prior to the sampling event.

The bottles required for each sampling site are:

# Bottles	Bottle Volume	Bottle Type	Preservative	Analysis Requested	Depth Comment
1	100mL	Bac-T	Ice	ECOLI	Surface
1	1L	Amber Plastic	Ice	CHL-A	Surface
1	1L	Cubitaner	Ice	As,Cu,Fe,Pb,Zn	Surface*
1	1L	Plastic	Ice	TSS	Surface
1	500mL	Plastic	H2SO4	NH3,NO3+NO2,TKN,TP,COD	Surface
1	500mL	Plastic	Ice	ORTHO-P,SO4	Surface
1	500mL	Plastic	H2SO4	NH3,NO3+NO2,TKN,TP	Bottom
1	500mL	Plastic	Ice	ORTHO-P,SO4	Bottom

*Metals only twice per year and only at the surface of the Basin

13. Describe special collection methods. List only deviations from routine sample collection methods as listed in the SOP manual.
At-depth samples will be collected by Kimmerer.
14. List special laboratory analytical methods. Include details on CRP requirements, non-EPA approved methods and in-house analyses (Ohmicron).
All analytical methods must be CRP-compliant.
15. Where will the samples be analyzed?
Laboratory samples will be analyzed at W/WW.
16. How much will samples cost?

Parameter	Method	Cost/Sample
Chlorophyll-a	EPA 445	\$23.05
COD	SM 5220 D	5.25
TSS	SM 2540D	5.25
E coli bacteria	SM 9222 G	12.30
NO3+NO2	EPA 353.2	15.70
NH3	SM 4500-NH3	6.30
TKN	EPA 351.2	15.00
TP	SM 4500-P BF	16.75
TOP	SM 4500-P F	15.35
SO4	EPA 300	19.90
As	EPA 200.7	9.45
Cu	EPA 200.7	9.45
Pb	EPA 200.7	9.45
Fe	EPA 200.7	9.45
Zn	EPA 200.7	9.45

There is a \$7.35 digestion fee for metals sampling. The per sample cost is \$134.85 without metals and \$189.45 with metals. The estimated annual cost for baseflow samples is \$2,401.65.

17. What possible problems may arise in sample collection and what actions can be taken to mitigate their impact?
Boat or weather problems may prevent completion of sampling run. In case of boat failure or if weather becomes unsafe during a sampling run, all samples will be discarded and the event will be re-scheduled once the boat is operating again.

Validation

18. What type, how often and where will QA/QC samples will be collected? Include QA/QC samples names in the FSDB if applicable.
One field blank will be collected per year and labeled "36 Town Lake @ River St."

One replicate will be collected during each sampling run at Red Bud and labeled "8 Town Lake @ Pedestrian Bridge."
19. In addition to the automated data flagging process, how will QA/QC results be used to validate data quality?
n/a
20. In case of QA/QC failure, what corrective action will be taken?

Data collection procedures will be re-evaluated by staff prior to next sampling event.\

Assessment

21. By what specific methods will the data be analyzed?

Kruskal-Wallis (non-parametric ANOVA) will be used to compare differences between sites, seasons, and depths. Results from datasets with high % of non-detect values will be verified by SOP methods for censored data.

Linear regression will be used to test for temporal trends, with Cox proportional hazards regression used for censored datasets. Multiple linear regression with season (non-release, release) to account for flow variation may be used.

Concentrations and mean values will be compared to current TCEQ screening levels available from the TCEQ website by SWQM methods.

22. What hypotheses will be tested?

There is no trend over time at any site, accounting for seasonal variation.

There is no difference between sites.

Concentrations are below TCEQ screening levels and water quality standards.

23. When and/or how often will the data be analyzed?

Data will be analyzed once every two years, and next in 2006.

24. How will it be determined that the study objectives have been met?

Successful completion of data collection and development of a Town Lake index.

Reporting

25. When and what type of reports will be generated? Who will generate the report?

Data reports will be generated by Chris Herrington and Mary Gilroy once every two years with the next report to be completed in 2006.

26. Who will review the reports prior to publication?

Reports will be reviewed by committee and section manager.

References

n/a