

Memo

Date: Wednesday, August 25, 2021

Project: Water Availability Model (WAM) Update – Phase 1 – Neches River Basin

To: Kathy Alexander, Ph.D., TCEQ
Steven Mahr, TCEQ

From: Zach Stein, PE

Subject: Responses to TCEQ Comments

Background

A review of the Neches WAM update was performed by Texas Commission on Environmental Quality (TCEQ) staff. The review focused on quality control of the following draft documents submitted to TCEQ staff on 15 July 2021.

1. Draft Report
2. Naturalized Flow and Net Evaporation Workbooks

Comments from TCEQ staff were provided to HDR on 12 August 2021 and are shown herein in bold and italic format followed by HDR responses.

Draft Report

1. ***Revise the first paragraph of the Executive Summary and the first paragraph in Chapter 1 Introduction. House Bill 723 did not specify a period of record for the naturalized flow extension, it only required TCEQ to obtain or develop updated water availability models for certain river basins.***

Report text has been revised.

2. ***Steven Mahr's name is mis-spelled on page iii.***

Report text has been corrected.

3. ***Pages 31 & 42, Sections 9 & 13, appear to be duplicative.***

Duplicate section has been removed.

4. ***Return flows identified in the following workbooks do not appear in Appendix D - Return Flow Discharge Summary Table:***

- ***SUBBASIN_AN_AL - RF__20-__20AN__20AL__20ED - Copy.xlsm***
- ***SUBBASIN_NE_TB - RF - NE TB ED.xlsm***

The AN_AL return flow workbook listed was developed as part of the original naturalized flow calculations. However, this workbook was not used in the original or

updated naturalized flow calculations and has been removed from the final workbook set to avoid future confusion and error. Note that applicable return flows included in this workbook are also included in the updated return flow workbooks for the ANAL control point and included in Appendix D.

The return flow discharge included in the NETB return flow workbook (City of Jasper - TX0024368) was confirmed to be included in the Appendix D summary table.

5. ***Water rights identified in SUBBASIN_AN_AL - WU__20-__20AN__20AL__20ED - Copy.xlsm do not appear in Appendix C – Water Rights Summary Table.***

The water use workbook listed was developed as part of the original naturalized flow calculations. However, this workbook was not used in the original or updated naturalized flow calculations and has been removed from the final workbook set to avoid future confusion and error. Note that applicable water rights included in this workbook are also included in the updated water use workbook for the AN_AL control point and included in Appendix D.

6. ***For purposes of ensuring that the documentation provided to support the report and updated flows is complete, please review and make any necessary corrections to the following workbooks:***

- ***Neches_Double_Mass_Curves.xlsm***

- ***AN_LU data tab***

Columns F, H & I are values instead of formulas. Multiple values in Column F are different from Staff calculated values for Column E - Column D.

Calculations have been corrected. Updated double mass curve does not affect naturalized flow calculations.

- ***VI_KO data tab***

Columns D & E reference data in NAT_FLOW_NE_EV.xlsm, HISTORICAL & ADJUSTED tabs, respectively, instead of NAT_FLOW_VI_KO.xlsm, HISTORICAL & ADJUSTED tabs.

Calculations have been corrected. Updated double mass curve does not affect naturalized flow calculations.

- ***NECHES_DoubMass_FILL_RELATIONSHIPS.xlsm***

- ***Naturalized Flows tab -***

Column F - Data for MUJA references NAT_FLOW_MU_TY.xlsm, ADJUSTED tab instead of NAT_FLOW_MU_JA.xlsm, ADJUSTED tab.

Calculations have been corrected. Updated MU_JA double mass fill relationships are not used in the final naturalized flow calculations and corrections do not change final naturalized flow values.

- ***Cumulative Naturalized Flows tab -***

Columns B and D (KIBR5/62 and KIBR1/73) contain redundant data form 10/89-12/18.

Redundant data was not used in regression analysis and has been removed for clarity.

- **NECHES_Log_FILL_RELATIONSHIPS.xlsm**
 - **Naturalized Flows tab -**
Column F - Data for MUJA references NAT_FLOW_MU_TY.xlsm, ADJUSTED tab instead of NAT_FLOW_MU_JA.xlsm, ADJUSTED tab.

Calculations have been corrected. Updated MU_JA log fill relationships are not used in the final naturalized flow calculations and corrections do not change final naturalized flow values.

- **AYSA-ANAL tab -**
Graph Series references AYSA:ATCH instead of AYSA:ANAL

Corrected. Series name was incorrect but referenced correct data set.

- **NECHES_FILL_RELATIONSHIPS.xlsm**

- **AYSA-ANAL tab -**
Graph Series references AYSA:ATCH instead of AYSA:ANAL

Corrected. Series name was incorrect but referenced correct data set.

Naturalized Flow and Net Evaporation Calculations

7. **Staff has the following general comments related to the subbasin files, as discussed on August 9, 2021:**

- **INCREMENTAL ADJ. tabs -**
Seven sub-basins have incremental flow adjustments over the period of record that are greater than the negative incremental flows calculated by Staff. Note that the difference in acre-feet is the HDR POR incremental adjustments less the staff-calculated POR incremental adjustments.

Gage	Difference (ac-ft)
NEAL	1,685
NEDI	16,536
NERO	6,388
MUJA	526
ANLU	581
ANSR	3,807
NEEV	328

Refinements to fill relationships and naturalized flow calculations were made following the initial adjustments for negative incremental flows. Following the refinements, HDR reviewed the updated naturalized flows and made adjustments for any new negative incremental flows. However, the refinements resulted in some months requiring less adjustment as those initially made for negative incremental

flows. These overadjustments have been identified and corrected. Additionally, a table has been added to the “ADJ LIST” sheet of the naturalized flow workbooks to identify these overadjustments and to confirm no overadjustments are present in the final calculations.

- ***Gage flow tabs - (FLOWMUD, etc., for RUNOFF calculations)***
No reference or source is given for this data. Some data appears to be inconsistent with, or not included with, the data in NECHESGAGEFLW_07012020.

Staff appears to have referenced an outdated version of the gage flow summary workbook not provided in the draft deliverable package. The most recent version (NECHESGAGEFLW_All_Basin_Gages_01262021.xlsx) has been included in the final deliverable package. Note that runoff calculations use hard pasted flow values and are not linked to the gage flow summary workbook.

8. Staff has noted the following discrepancies in the subbasin files as described below:

- **SUBBASIN_NE_PA**
 - ***OPERATE_ATH.xlsm - OPERATE tab -***
Column J - Monthly Evap Loss values seem high, 900 ac-ft for June 97, for example. The Intermed Content in Column L is reduced by this amount.

Previous year net evaporation rate data was inadvertently used for January 1997-March 1999. These calculations have been corrected and naturalized flows have been updated accordingly for the NEPA and downstream control points.

- **SUBBASIN_NE_AL**
 - ***EVAP.xlsm***

FLOWMUD tab - Values are converted to DSF, confirmed correct calcs
Values for 08/01-12/18 are not consistent with NECHESGAGEFLW_07012020,
Mud Ck - Jcksnvle (new) tab values.

See previous response related to staff reference of outdated gage flow summary workbook.

FLOWEFACU tab -
Values are not consistent with NECHESGAGEFLW_07012020, E Fork Angie - Cshng (new) tab.

See previous response related to staff reference of outdated gage flow summary workbook.

GROVAP tab -
Cell A5 text “= 0.25*E12 + 0.35*F12 + 0.19*E13 + 0.21*F13” should read “= 0.25*E512 + 0.35*E612 + 0.19*E513 + 0.21*E613

Addressed.

- **SUBBASIN_NE_DI**
 - ***RF - NE DI.xlsm 01153.003 tab -***

Data tables to the right have no heading or explanation.

Tables are EPA database output and were initially used to convert data into grid format of naturalized flow calculations. Tables are no longer necessary and have been deleted.

- ***WU - NE DI ED.xlsm 4383 tab -
Data tables to the right have no heading or explanation.***

Tables are were initially used to compare reported water use from TCEQ databases. Tables are no longer necessary and have been deleted.

- **SUBBASIN_MU_TY**

- ***CONTENT3.xlsm ELEV tab -
It is not clear if Tyler East is included data for 01/98-12-18.***

Lake Tyler East is included in data for 01/98-12/2018. Additional documentation has been added for clarity.

- ***EVAP.xlsm and EVAP_COLUMBIA.xlsm FLOWMUD tab - Values are converted to DSF, confirmed correct calcs
Data is inconsistent with NECHESGAGEFLW_07012020, Mud Ck - Jcksnvllle (new) tab data for 07/01-12/18.***

See previous response related to staff reference of outdated gage flow summary workbook.

- ***EVAP_LOSS3.xlsm***

***Operate tab -
Cell B3 units should be Acres, not acre-feet.***

Corrected.

***ACE & AREA tabs -
It is not clear if Tyler East is included in data in the referenced tabs (Area 5-68 to 9-86, AREA 10-86 to 12-96 & ACE).***

Lake Tyler East is included in the data. Additional documentation has been added for clarity.

- **SUBBASIN_EFA_CU**

- ***NAT_FLOW_EFA_CU.xlsm FILLED & SUMMARY tabs -
"Filled in Naturalized Flow" date ranges in the Summary are not consistent with date ranges used in Filled.***

Corrected.

- **SUBBASIN_AN_AL**

- ***EVAP.xlsm***

FLOWMUD tab - Values are converted to DSF, confirmed correct calcs
Data is inconsistent with NECHESGAGEFLW_07012020, Mud Ck - Jcksnvllle
(new) tab data for 08/01-12/18.

See previous response related to staff reference of outdated gage flow summary workbook.

FLOWANG tab - Values are converted to DSF, confirmed correct calcs
Data is inconsistent with NECHESGAGEFLW_07012020, E Fork Angie - Cshng
(new) tab values for 10/15-12/18

See previous response related to staff reference of outdated gage flow summary workbook.

- **SUBBASIN_AY_SA**

- **NAT_FLOW_AY_SA.xlsm FILLED tab -**
Cell F3 has AN_SR mis-spelled.

Corrected.

- **SUBBASIN_AN_SR**

- **NAT_FLOW_AN_HG.xlsm -**
Not used per summary, but NAT_FLOW_AN_SR.xlsm, FILLED tab references
AN_HG data for 01/40-03/51:
"ROUND([NAT_FLOW_AN_HG.xlsm]ADJUSTED!B7*\$G\$1,0)"

Additional documentation has been added to clarify that NAT_FLOW_AN_HG.xlsm was not modified as part of the update but is still used to calculate naturalized flows during the original period of record.

- **NAT_FLOW_AN_SR.xlsm SUMMARY tab - ADDRESSED**
The FILLED IN NATURAL FLOW summary in Cell B20 is not consistent with
the fill relationships in the FILLED tab. NETB-NERO is used in Apr-Sept 1951.
Zavalla is used in 10/51-12/64.

Corrected.

- **NAT_FLOW_AN_ZAV.xlsm -**
Not used per summary, but NAT_FLOW_AN_SR.xls, FILLED tab references
AN_ZV, Filled tab data:
"=ROUND([NAT_FLOW_AN_ZAV.xlsm]FILLED!K18)*\$G\$3,0)"

Additional documentation has been added to clarify that NAT_FLOW_AN_ZAV.xlsm was not modified as part of the update but is still used to calculate naturalized flows during the original period of record.

- **SUBBASIN_NE_TB**

- **Copy of Steinhagen_Storage_Estimate_20210129.xlsm Calculation_2000 tab -**
Drainage area in Cell O7 references Rayburn data (Sediment_Calcs tab, Cell
E23).

The contributing drainage area of Sam Rayburn Reservoir is used to determine the uncontrolled contributing drainage area of Lake Steinhagen for sediment accumulation rate estimates. Existing calculations were confirmed to be correct.

- ***EVAP.xlsm PRECIP_713 tab -
There's a 5 fold increase in Evap from old to new in Dec 2018 and others.
This seems high.***

HDR could not identify the large increase in evaporation from old to new data for 2018. Staff may have inadvertently compared precipitation data to gross evaporation data for 2018 which would result in about a 5 fold increase.

- ***SUMMARY tab -
The 3 formulas in the MONTHLY RAINFALL FORMULAS: section (Cells C29-31) do not appear to be applied anywhere.***

The rainfall formulas were used in the original net evaporation calculations. As part of the update, quadrangle precipitation data was used in lieu of individual station data. As a result, the rainfall formulas are no longer applied and have been deleted for clarity.

- **SUBBASIN_VI_KO**

- ***NAT_FLOW_VI_KO.xlsm Filled tab -
Reference for 01/40-12/65 is Adjusted data, but reference for 01/67-12/18 is Natural data.***

References have been corrected. The correction did not change the resulting naturalized flow values.