Version History of LA-QUAL

11.02 - a) corrected spelling of a code word (N PRERER --> N PREFER) in Periphyton Constants (Data Type 7)
b) added travel time as an option on plots
c) corrected concentrations displayed for last downstream element when writing to sequencing unit
d) modified stream configuration and reach summary reports to add additional information
e) modified formatting of various reports
f) added the ability to choose portrait or landscape orientation for rich-text reports
g) added additional error checking for junction cards (Data Type 23) to prevent duplicate upstream elements
h) modified preferences menu
i) added Clear Recent File History to file menu
11.01 - a) added additional error checking for reach id cards (Data Type 8) to prevent crash from reach with zero elements
11.00 - a) changed warning to error when sequencing a model where last reach is highly dispersive
b) output from sequenced files now takes precedence over initial conditions when input as headwaters
10.06 - a) added slope to HYDR-1 data type for the velocity/depths hydraulic formula option
b) added program control options to "ignore wasteloads" and "ignore chlorophyll a in initial conditions"
c) added a notice if one of the data types is misspelled
d) changed ocean exchange ratio default for advective streams
e) corrected error in stream loading report
10.05 - a) changed how output from sequenced files is managed on input as headwaters
b) added option to preferences for special reports
c) rearranged preferences format
d) added DO summary report of minimum and maximum in each stream
10.04 - a) corrected deprecated 'MACROPHY' model option code name
b) added a final warning message that gives the number of warnings
c) corrected length of code word in LBC error messages
d) modified capsule report
e) added option to preferences for outputting a tab-delimited file
f) corrected plot issue that plotted standard criteria outside of lower range
g) added warning when sequencing a model where last reach is highly dispersive
h) changed flows to double precision so flow totals would be more accurate
i) added warning for misspelled card types
10.03 - a) corrected problem with warning flags not being reset
b) allow execution to proceed as a warning even if rate inhibition nonconvergence occurs
10.02 - a) added a second set of standards criteria to the overlay plot
b) added option to display rich-text output report immediately after execution
c) added control card enabling program preference for state default to be overridden
10.01 - a) corrected problem with plot not using requested scale
10.00 - a) add effective concentrations capability for nonconservative material
b) added comma-delimited output file options
c) enhanced stream summary report
d) added some additional error checking
e) reordered plot menu
f) reformatted some reports
g) added calculation of performance measures
h) correct error in coliform calculations from non-point sources
9.39 - a) increase maximum number of plots from 12 to 21
b) added "flow" to initial constituent to display in additional preferences
c) added ability to choose initial plot to display in additional preferences
d) added ability to display plot abbreviations rather than numbers in plotting window
9.38 - a) correct issue with evaporation error checking
b) correct issue with overlay file error checking
c) no longer requires an overlay file for every plot
9.37 - a) add additional error checking for invalid formats in plot cards
b) correct issue with some plot preferences not keeping changes
c) increase maximum observed values from 100 to 200
d) increase maximum number of plots from 9 to 12
e) increase number of recent files opened from 9 to 15
f) add option to increase line width of predicted profile on plot

9.36 - a) Correct loading table issues with NH3 in withdrawls and BOD1 in phytoplankton and periphyton death
b) Add error checking for dam in first reach
c) Correct evaporation calculation when advective flow is extremely low.
d) Increase maximum observed values from 80 to 100
e) Add flow, width, and depth to allowable initial views for plot in additional preferences
f) Add warning when negative flows occur in an advective element that may have insufficient depth
g) Enable output of a tab-delimited data file
h) Correct issue with overlay values plotting outside plot limits

9.35 - a) Add nonpoint source loadings for salinity, conservative material #1, and conservative material #2
b) Implement a program switch to allow batch run without the GUI interface
c) Implement batch mode to allow the user to supply an input file name on the command line
d) Correct issue with PO4 nonpoint source loading
e) Correct some loading table issues
f) Add additional sensitivities.

9.34 - a) correct error in loading report when reach is not being modeled (i.e., initial temp = 0)
b) correct issue with saving loading report preferences

9.33 - a) increased maximum number of dams from 20 to 30
b) fix river distance formatting on plots

9.32 - a) added additional error checking information for reach id cards (Data Type 8)

9.31 - a) increased number of allowable stations in overlay from 50 to 80
b) added nonpoint input for NH3, NO3, PO4, and associated sensitivities
c) fix line wrapping in rich-text output

9.30 - a) corrected error in calculation of constituent CM-2 related to wasteloads (error originated in LA-QUAL v.9.10)
b) added sensitivities for dam coeffiecients
c) corrected labeling of plot legend when displaying multiple sensitivity parameters per set

9.29 - a) added additional information concerning warnings
b) added HELP menu item to access Users Manual

9.28 - a) added additional error checking information
b) corrected issue with preferences for labeling of filename on plot
c) corrected issue with effective concentration adjustments when chlorophyll a is included in headwaters
d) added table to show adjustment of concentrations when using effective concentrations

9.27 - a) added additional error checking and method for reading legacy overlay cards

9.26 - a) add rich-text file format option to output report

9.25 - a) corrected input echo in output report for dispersive hydraulic parameters (HYDR-2)

9.24 - a) added additional error checking for plot cards (Data Type 30)
b) increased number of allowable reaches per RCH card to 40 (Data Type 30)
c) added ability to show tributary locations on plots
d) added ability to specify different programs for viewing and editing

9.23 - a) corrected display issue in the File dialog menu when more than 9 files had been opened

9.22 - a) corrected issue with reading HDWTR-2 values in sequenced files
b) added additional error checking for overlay cards
c) corrected dimensioning of RSENS from MXH to MXR

9.21 - a) made some unit conversions more precise

9.20 - a) added evaporation component to hydraulics
b) corrected problem with width going negative during flow reversals
c) corrected some sensitivity problems (incorrect array dimension; crashed when mixing 1 and 2 columns per set)
d) default of .inp extension added to open list options
e) added option to KTIDE to set all dispersion to 0
f) added salinity to loading table
g) added additional tidal information to final report

9.14 - a) added error message when no reaches are specified for a plot

9.13 - a) corrected factor when using English units
b) added flow in both English and metric units on some output reports

9.12 - a) added code to close sequential files after they are read

9.11 - a) increased number of stations that the model could handle in the overlay

9.10 - a) changed river kilometers to double precision so model could handle large river kilometers and small element lengths
b) corrected sensitivity runs for dispersion sensitivity when using dispersion equation 1
c) corrected immediate display of reports and sensitivity table when "Run Sensitivity" selected in Preferences
d) corrected sensitivity exclusion issue for headwaters and wasteloads
e) added sensistivity exclusion capability for reach hydraulics (depth, width, velocity)
f) added width parameter to sensitivity
g) added additional dam reaeration equations
h) added error message for Evans and Butts dam equation for depths greater than 4.6 meters
9.09 - a) corrected sensitivity parameter descriptions in sensitivity report
9.08 - a) corrected program crash when the maximum 9 overlay plots were used
9.07 - a) corrected how physical coefficients plotted in sensitivity runs
b) enhanced reaeration rate plot and legend
9.06 - a) changed how physical coefficients plotted
b) added ability to change some labels and fonts on plot
c) added some error checking to headwaters and wasteloads related to sensitivity
9.05 - a) changed some output format in capsule summary
b) corrected how nitrogen preference is selected when phytoplankton is not being simulated
c) corrected some error checking
d) added ability to name plot image capture file to Preferences
9.04 - a) added additional error checking for plot cards
9.03 - a) added deprecated NBOD OXY code word in Data Type 1
b) added ability to alter phytoplankton self-shading coefficients/exponents (now in Data Type 6)
9.02 - a) corrected spelling of KL MINIM code word in Data Type 3
9.01 - a) corrected initialization of CCONT(2) for periphyton
9.00 - a) added Organic Phosphorus constituent
b) corrected KSETT for phytoplankton
c) fixed problem with english/metric conversion of settling rate
d) changed some THETA, SENS, OPTION, PROGRAM code words to avoid confusion
e) added "Effective Concentration" option and corrected some conversions
f) added hydrolysis from BOD2 to BOD1
g) changed how denitrification is handled
h) added algae death term
i) combined input parameters for available settled SOD
j) changed how periphyton are modeled
k) simplified plot card input
8.11 - a) corrected error checking for light limitation equation in INDATA
8.10 - a) corrected algae/macrophyte growth rate equation
b) added solar information output report
c) added option for no light limitation in algae/macrophyte growth calculation
8.01 - a) added ability to change temperature equation for atmospheric attenuation
b) added ability to change temperature equation for atmospheric longwave radiation
c) added bank shading coefficient to temperature and algae simulations
8.00 - a) made major changes to temperature simulation
b) added ability to exclude specific wasteloads for WSL FLOW sensitivities
c) added ability to exclude specific headwaters for HDW FLOW sensitivities
7.04 - a) added ability to change sensitivity color preferences
7.03 - a) corrected number of allowable cards from 11 to 12 in DATA TYPE 5
b) corrected a minKL plotting problem
c) added k2 value before applying minKL on reaeration plot
d) corrected error message for missing Chl a card in LBC Data Type 27
e) increased allowable sensitivities to 100
f) added sensitivities LBC Salinity, Wind Velocity, Pressure, Dry Bulb Temp, Wet Bulb Temp
7.02 - a) corrected model sequencing for BOD2

7.01 - a) corrected DOSENS sensitivities from 67 to 90
b) allow comments in overlay file
c) corrected initialization of certain LBC concentrations
d) added ability to print out wasteload names on plots
e) added ability to open previous files in Open dialog
f) corrected problems in loading summary
g) corrected fatal error termination when there was an error junction input
h) added additional options for nutrient limitations
i) added additional options for nutrient limitations
j) added option to calculate dispersion as a function of mean velocity
k) changed default KL min from 0.6 to 0.7 to reflect Louisiana defaults
l) corrected wasteload locations on plot
m) added ability to show reaches on plot
6.20 - made code modifications to allow compilation under Intel IVF 8.1
6.11 - added check for observed values to make sure minimum & maximum are not reversed
6.10 - a) added dispersion through headwater to allow second boundary condition
b) corrected problem with reading certain sensititivies
c) changed address/email for LaDEQ in About box
6.03 - a) removed generation of debug.txt file
b) corrected error in reading of Data Type 6/7 input
c) corrected problem with detection of errors in overlay cards
d) added ability to turn max/min DO text on or off on plots
6.02 - corrected a Lower Boundary problem if no boundary conditions were present
6.01 - corrected a dimension problem in the plots if there were exactly 3000 elements
6.00 - a) added inhibition to organic nitrogen for use as NBOD
b) added BOD#2 constituent
c) corrected temperature correction for phosphorus source and some defaults
d) corrected some sensitivity factors
e) added sensitivity factors for non-point source
f) added ability to specify oxygen inhibition equations for each inhibited constituent
g) added ability to specify oxygen threshhold in equations for each inhibited constituent
h) added short names for use in plot menu push-buttons and in certain columns of output
5.02 - corrected problem with echoing of input data for wasteload flows
5.01 - a) corrected certain problems in preferences
b) added option to select editor in preferences and set colors back to default
c) added title to sensitivity table
d) corrected problems with English/Metric option
e) modified format in some reports
5.00 - added dam capability and corrected sensitivity table problem
4.13 - added shelter coefficient for wind driven reaeration
4.12 - a) Corrected coliform temperature correction theta
b) Corrected NCM oxygen inhibition iterative technique
c) Corrected program crash for non-convergence
4.11 - a) Corrected variable and column alignment in 20 deg rate reporting in final summary
b) Corrected coefficient in Owen-Gibbs <5fps reaeration equation (option 4)
4.10 - a) Corrected input/output fields to allow more that 1000 elements
b) Moved report options to "Preferences"
c) Added optional colors to graphic display
d) Added crossbar option to ranges of observed values
e) Added option to show wasteload locations on graphic display
f) Added option to view graphics, reports, or sensitivity table after execution
g) Removed flow augmentation and line printer plots
4.00 - a) Modified the intermediate, final, and capsule summary reports by extending the decimal place holder on many of the fields.
b) Added a header to the sensitivity analysis report.
c) Corrected zip code to address field
3.03 - corrected DO in intermediate report
3.02 - added extra error detection in input
3.01 - corrected temperature correction constants
3.00 - added sensitivity table

2.00a - a) Address & phone number change
b) Temperature Correction Constants for Reaeration, BOD Decay, NCM Decay, Benthal, and Organic Nitrogen changed to Louisiana Technical Procedures Manual Defaults
c) Default of .in extension added to load list options and .txt moved to top choice.
d) Moved Exit, Print, and Capture buttons to left side of screen
e) Modified to accept 9 plots instead of 5

1.00b - added dlguninit() to winplot

1.00a - original version

Modifications that were made during the development of LA-QUAL from QUAL-TX are listed as follows:

1) Conformance of the core code to American National Standard Fortran 90 (ANSI X.198-1992) and International Standards Organization standard ISO/IEC 1539-1991(E).
2) Development of a Windows graphical interface.
3) Development of on-screen graphic output showing predicted profiles and observed data.
4) Development of on-screen graphic output for sensitivity analysis
5) Allowing hydraulics to be based on width/depth input in addition to velocity/depth input.
6) Allowing settling rates to be input on a per day basis in addition to a settling velocity basis.
7) Addition of new reaeration equations that more closely fit Louisiana conditions.
8) Addition of low dissolved oxygen concentration inhibition of NCM decay rates.
9) Corrections to certain errors in coding related to reaeration rate equations, settling rates, and effective BOD in lower boundary conditions.
10) Corrections to certain errors in coding related to the coliform temperature correction theta, the NCM oxygen inhibition technique, and nonconvergence problems
11) Corrections to the Owens-Edwards-Gibbs reaeration equation in option 4 of Data Type 12 (<5fps, 1964).
12) Temperature Correction Defaults changed to values listed in the LTP.
13) Addition of a Special Report Sensitivity Table.
14) Modified the number of significant digits reported for many of the fields in the capsule summary, intermediate report, and final report.
15) Corrections to variable and column alignment in 20 deg rate reporting in final report.

Modifications that were made during the conversion of QUAL-II to QUAL-TX are listed as follows:

1) Removal of the dynamic capability because of the steady-state hydraulic assumptions and numerical dispersion inherent with the solution technique.
2) Addition of more diagnostics to identify errors in the input data and format.
3) Addition/modification of various output reports including the creation of line printer plots and overlays.
4) Allowing input/output of metric units.
5) Allowing nitrification, BOD decay, and benthal demand inhibition at low dissolved oxygen concentrations.
6) Addition of sensitivity analyses for modeling runs.
7) Addition of macrophytes as a water quality constituent.
8) Combining of nitrite nitrogen and nitrate nitrogen into a single nitrite-nitrate nitrogen constituent.
9) Ability to alter many of the constants utilized in the model.
10) Removal of the flag field to facilitate adding or deleting waste loads
11) Allowing computational element size to vary from reach to reach.
12) Removing the limit in the number of computational elements per reach.
13) Ability to handle highly dispersive systems as well as adective systems.
14) Changes to reaeration equations including the ability to specify the maximum allowable reaeration rates and use tidal velocities in reaeration equations and the addition of new reaeration equations.
15) Conversion of benthal rates and settling rates to more conventional units.
16) Allowing settled BOD, algae, and conservative materials to be converted to sediment oxygen demand.
17) Allowing settled organic nitrogen to be converted to ammonia benthos source rate.
18) Addition of denitrification and anaerobic BOD decay as processes.
19) Inclusion of photo-inhibitation, self-shading, a preference factor for ammonia or nitrate nitrogen, and a new convergence technique in the algae simulation.
20) Allowing multiple waste loads to be input into a single computational element including headwater and junction elements.
21) Accommodation of flow reversals due to withdrawals in tidal areas.
22) Addition of lower boundary conditions for dispersive systems and systems with flow reversals at the lower boundary.
23) Ability to link several separate models together in sequence to simulate very large, very detailed, or bifurcated systems.
24) Restructuring of the program to make it compatible with DOS-based personal computers.