**DRAFT**

**CRSS: Key Modeling Assumptions**

April 2017 Model

* Reservoir initial conditions were based on 35 simulations of December 31, 2017 conditions, for all modeled reservoirs, using the April 2017 Mid-term Probabilistic Operations Model (MTOM) initialized with the beginning of April hydrology forecasts (April 4, 2017 forecast). The ranges for the initial conditions at Powell and Mead are:
  + Powell: 3,613.88 – 3675.10 ft
  + Mead: 1,076.44 – 1086.13 ft
* Powell’s WY 2017 and October – December 2017 releases were also based on MTOM results and varied across the 35 MTOM simulations.

**Other Assumptions:**

* Future water demands referred to collectively as the “2007 Demands”:
  + Future water demands for the Upper Division States per the 2007 Upper Colorado River Commission schedule.
  + Future water demands for the Lower Division States (during Normal Conditions) are according to the schedules provided for the 2007 FEIS for the Colorado River Interim Guidelines modeling with updates to Nevada’s demands in December 2016.
* Run duration 2018 – 2060
  + Interim Guidelines (IG) are assumed to extend through 2060
  + Rules that revert to the no-action alternative (NA) starting in 2027 are included
* The January 2017 run uses the Observed Resampled hydrology. Hydrologic inflow files included in the package include:
  + Observed Resampled or Direct Natural Flow (DNF) – Index Sequential Method (ISM) used on observed historical period of record (1906-2014)
* 1,680,000 tons of salinity control in 2035 per the Triennial Review 2014 Full Plan of Implementation.

**Changes to the model and ruleset since the January 2017 CRSS model:**

* The model and ruleset are saved in RiverWare version 7.0.1
* Model now uses initial conditions based on 35 MTOM simulations of December 31, 2017 conditions found in the $CRSS\_DIR/dmi/InitialConditions/april\_2017 folder
* The Observed Resampled hydrology now consists of 109 traces of hydrology (1906-2014)
* A groundwater storage object is now linked to the Navajo Indian Irrigation Project (NIIP) diversion object. A relationship between the NIIP diversion, depletion, and the amount of water that returns to the river or stays in the groundwater basin was developed and is incorporated into this area of the model. An additional relationship was developed to determine the amount of water returning to the river from the groundwater basin. This change is necessary to coordinate the changes made to the Natural Flow and Salt model that produced the 1906-2014 hydrology.
  + Hydrology developed from the 1906-2014 natural flow data should not be used in CRSS models prior to this April 2017 model that do not include the groundwater object. Similarly, hydrology developed from the 1906-2012 natural flow should not be used in the April 2017 (or future) CRSS models.
* FlamingGorgeData.MinReleaseTrigger and FlamingGorgeData.AbsoluteMinRelease were updated based on recent Green River model updates
* The Taylor Park elevation-volume table was fixed
* All of the DMIs that used Perl were converted to “trace based” DMIs that no longer rely on any additional programs. Perl is no longer necessary to run CRSS!
  + Old models still require Perl to run. To completely remove the dependency on Perl, the DMIs in the old models can be converted to trace based DMIS. To do this, please see the attached “CreatingTraceDirectoryDMIs.docx”.
* The monthly distributions from LTEMP were incorporated into CRSS. Many functions were updated to use the new Powell.MonthlyReleaseTable slot. The logic incorporated here was merged directly from the version of CRSS used to evaluate the LTEMP alternatives.
  + Details of all of the updated functions are available to view through a RiverWare model report. Navigate to the Output Manager, highlight Powell Functions, and then click Generate to produce this report. It will create an HTML file in $CRSS\_DIR/rules
* MeadFloodControlData.hydrologyIncrement is now imported with the natural flow DMIs. This should help mitigate any differences that can occur due to inadvertent model saves. This also means that old natural flow DMI folders cannot be utilized with this new model unless the MeadFloodControlData.hydrologyIncrement files are added to the folders. Please contact us if you need this files for any old DMI.
* Two new slots were added to the model: HydrologyParameters.SupplyScenario and HydrologyParameters.TraceNumber. The natural flow DMIs also set these slots. The slots do not affect model results, but they do inform the user which trace and supply scenario are currently loaded in the model. The Supply Scenario uses the current mapping of supply scenarios to numbers:
  + 1 = Observed Resampled
    - For the observed resampled, the digits in the decimals represent the start and end year of the data. For example 1.19062014 indicates that the 1906-2014 data were used to create the hydrology files.
  + 2 = Direct Paleo Resampled
  + 3 = Paleo-conditioned
  + 4 = CMIP3 Downscaled GCM Projected
* The default control file (Output.control) should no longer produce warnings when running any of the MRM configurations.