800.3

EWA Long-Term Modeling Ideas
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- Study flexibility, not biology. Rather than attempting to correlate biology, we could place an upper bound on EWA capability (for any given set of assets) using the following methodology. I believe that since the EWA does not change delivery patterns, we may model the upper boundaries of EWA actions with relatively minor modifications in the monthly models. Basically, we will create an EWA accounting subroutine within the models, then assume that the EWA takes actions each year up to the limits allowed by its collateral.

- We will need two runs of the monthly model. The first run will include all projected activity other than the EWA: b2, the CVP share of JPOD, etc. It will not include the EWA share of JPOD, the 500 cfs, or other rights given to the EWA. Thus, RUN 1 should assume that:

    - All AFRP targets are met
    - WQCP deductions are made from the b2 account.
    - Offset/ Reset is calculated properly.
    - Any remaining b(2) is applied to the CVP after the peak in winter CVP storage. Alternatively, a certain percentage of b2 could be applied in advance of any filling of CVP SLR.
    - 50% of JPOD is available for the CVP to pump excess water once the SWP share of SLR is full.
    - 100% of JPOD is available for the CVP to move storage across the Delta.
    - Use D 1641, except use the 1:1 ratio for export pumping during the VAMP period.

- RUN 1 will be used solely to derive baseline CVP and SWP export and delivery patterns.

- Create a subroutine to keep track to EWA assets and changes to operations. Use assets as defined in the Framework. Start with 200 kaf of groundwater storage.

- Now run the monthly model again in its iterative mode. RUN 2 will have the following characteristics.
    - Use delivery values from RUN 1. Do not calculate deliveries within the model.
    - Add in EWA assets such as 50% of JPOD for surplus flows, the 500 cfs right, and the CVP credit for moving from the 1:1 to 2:1 during the VAMP period.
    - Carryover storages will change.

- RUN 2A will be used simply to generate data to estimate EWA assets and collateral. Thus, RUN 2A will not make any export cuts. It will simply run through the year to allow calculation of
    - Future collateral: exports through the 500 cfs and capacity for moving EWA purchases across the Delta (it may move through the 500 cfs in many years).
    - SLR projected carryover storage at the end of the year.

- Run 2B will use this information to make EWA export cuts and to transfer EWA assets to the Projects.

    - Each spring, RUN 2B will estimate EWA collateral using two time horizons.
        - <u>Low-point in the current year</u>. This will include only water that can be reasonably relied upon from February 1 through the end of August. Such resources would include
            - South-of Delta purchase rights for this year
            - A fraction of upstream purchase rights, if the year is dry (data comes from RUN 2A)
            - Projected export of excess flows through the EWA's 500 cfs at Banks from July – September (data comes from RUN 2A)
            - Water in EWA groundwater storage or in SLR.
        - <u>Low-point in the following year</u>. Same collateral as for "current year", but now add any export area purchases available in the following year (e.g., assume to be 150 kaf each year).

- To estimate the export cut made by EWA each year after the high point in SLR:
    - Take the maximum of
        - (This year's projected SLR lowpoint) – (Minimum lowpoint allowable)[1], and
        - Collateral for this year's low-point.
        - Let this value be "X"
    - Now take the minimum between "X" and collateral for next year's low point. This is the export cut to be assumed.

- EWA will not necessarily give up assets to meet these export cuts, however. The EWA only gives up assets to avoid a low-point problem in the current year. Subtract only those EWA assets need to keep SLR low point at its minimum value (e.g., 200 kaf after source shifting is included) and add them to Project storage in SLR in the following order until a low point problem is averted:

    - EWA water in San Luis Reservoir
    - Use of 500 cfs to capture excess flows.
    - Upstream purchases that can be transferred through the Delta each year.
    - Export area purchases scheduled for this year.
    - Groundwater storage

- All remaining EWA assets, except for storage, are now converted into EWA storage. This account may run a surplus, but will frequently be negative. Initially the storage sits in SLR. However, if SLR nears full, then deposit as much water as is available into groundwater storage, up to groundwater storage capacity. Keep track of groundwater storage capacity for next year.

- Use actual carryover SLR storages as the input into next year. That is, if EWA has lowered or raised SLR storages, that is the value to use.

- In the winter each month, transfer from CVP storage in SLR to the EWA, an amount equivalent to (1) the amount given to CVP from JPOD during Run 1 + 50% of any additional JPOD above 200% of JPOD calculated in RUN 1.

- EWA storage in SLR will spill to the extent that Project storage + EWA storage is greater than SLR capacity.

- EWA debt in SLR will be reduced to the extent that Project storage + EWA debt is greater than SLR capacity.

- That is all there is to it. Each year, the EWA will make export cuts and may pay some or all of its available assets over to the Projects. The export cuts will drop carryover storage. JPOD will tend to bring the storage levels back. One difficulty not described above will be developing routines for keeping EWA subaccounts for the CVP and the SWP. As much as possible, we should try to just lump these together, and simply assume that surpluses and debts are held in the side where they do the most good to the EWA. The end result will show changed operational patterns. This will represent an upper bound on possible EWA activity. Once the model is working, we can also use it to estimate improvements in EWA capacity generated by new assets or changes in asset definitions.

[1] This value would normally be 300 kaf. But owing to the right to use 100 kaf of source shifting, the value should probably be set at 200 kaf.