Trinity Reservoir Management-maximize reservoir elevations

- Incorporate recommendations from Bender (2012) for minimum carryover storage
- Explicit drought plan that outlines diversion amounts, river release amounts, and reservoir elevation based on inflow and a starting reservoir elevation at the beginning of the water year. A matrix could be used for this approach that incorporates probabilities of successive years of drought.
- Add temperature control device
- Annual consultation with NMFS Arcata office and tribes regarding planned EOS storage and annual diversion amounts. This was not taking place in 2012-2016.
- Implement structural or operation changes to Lewsiton Dam/Reservoir to negate the 2°F water temperature increase in Lewiston Reservoir in the summer months (Lewiston Appraisal Study).
- Increase winter storage thresholds, re-examine flood control curve, and implement reservoir optimization scheme.

1. Utilize a better temporal segregation of spring and fall run chinook salmon for spawning
    a. Advantages
        i. More distinct run timing
        ii. Preservation of important life history diversity
        iii. Resiliency for the species in the face of stochastic events
        iv. More opportunity to tailor management actions to each run with greater separation in run timing between the two-e.g. could set up a conservation standard for spring-run Chinook salmon harvest.
        v. Could identify juveniles based on length if there were greater separation in spawn timing
        vi. Possibly less susceptibility to disease in the Lower Klamath River because there would be less fish entering the river in August
        vii. Better separation in holding habitat and on the spawning grounds for hatchery fish spawning in the wild
        viii. Less need for fall flows
    b. Disadvantages
        i. Skew run timing outside of optimal environmental conditions
        ii. Would not have enough fish to meet broodstock goals
        iii. Reduced genetic diversity/inbreeding concerns
    c. Refinement-Start a fall run chinook salmon hatchery downstream, focus Trinity River Hatchery on spring run chinook salmon. Would also decrease the competition interactions in the upper Trinity River between wild and hatchery adults and juveniles.
2. Remove Lewiston Dam and use a segregation weir
    a. Advantages
        i. Higher productivity of all wild fish if hatchery fish were segregated, would help meet adult salmonid goals
        ii. No inbreeding of spring and fall run chinook salmon

iii. Accurate census of the area above the weir, including downstream juveniles, with the data yielding smolts produced per spawner, helping to isolate river productivity from ocean productivity.
iv. Temperature advantages-access to colder water for Trinity River, colder water exported to Whiskeytown (if there were pipe or canal conveyance to Carr Tunnels). Would also help ameliorate climate change impacts.
v. Could limit upstream brown trout and other predator migration to the area

b. Disadvantages
    i. Would create artificial spawning downstream of the weir for fish that would not go through the weir
    ii. Handling stress
    iii. Operational concerns including operation during high flows, maintaining the structure, etc.
    iv. Cost

c. Refinement-Using a canal or tunnel to the Carr tunnel intakes would allow for power peaking at both Trinity and Carr power plants.

3. Develop a Trinity Reservoir specific drought plan-use a matrix approach that incorporates successive years of drought.
    a. Advantages
        i. Greater certainty for species management, temperature control, and water exports if drought operations were not ad-hoc between water years (planning is already within water year, but planning is needed across water years).
        ii. Would help incorporate differences between Trinity and Sacramento basin precipitation and hydrologic conditions
        iii. Would help fit into climate change planning
    b. Disadvantages
        i. Effort/cost
    c. Refinement-Utilize experts on reservoir optimization as well as BOR Technical Service Center staff.