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Comments: I appreciate the time and attention that has been given to an ecologically-oriented and adaptive approach to forest management in the planning documents. This is an improvement over the 1980s plan it will replace.

I am deeply concerned, however, over the minimal attention paid in the plan to the changing climate and the impact this is having now, and will continue to have on what is arguably the most valuable resource associated with the National Forests in the arid West: the water supply not only for our forest and grassland ecosystems, but also for the larger Colorado River basin below our forests, where 40 million mostly urban water users depend on the river's water to some extent, and farmers and ranchers irrigating five million acres of land produce a huge portion of the year-round food supply supply for the nation, not to mention the millions from around the world that have recreational adventures on or near the river.

A recent Colorado River Basin study by the Western Water Assessment at the University of Colorado/Boulder\* found that 90 percent of the water in the Colorado River originates in the winter snowpack above 8,000 feet elevation of its half-dozen or so major tributary basins on the West Slopes of the Southern Rockies (of which the Gunnison River basin is one). All of these headwaters basins are almost entirely part of the National Forest system, including the GMUG National Forests which encompass nearly all of the headwaters of the Gunnison River. Since 90 percent of the river's total water starts in the GMUG, this surely implies a responsibility to the larger river basin as well as to the local ecosystems.

Another important finding of the WWA study: the estimated precipitation that falls annually over the Colorado River Basin is ~170 million acre-feet, more than half of which falls in the aforementioned headwaters region above 8,000 feet. But only about 10 percent of that total precipitation makes it into the river itself; the other 90 percent mostly re-enters the atmosphere through sublimation (~30 percent loss of our snowfall, almost entirely in the headwaters region/National Forests), evaporation and plant transpiration (increasing as elevation decreases). Studies of the Colorado River Basin water supply show that over the past 30 years, the average of annual flows have diminished nearly 20 percent from 20th-century averages. At least half of this loss is presumed to be not due to "temporary" drought, but to increased evaporation and transpiration under the higher temperatures caused by the anthropogenic addition of "greenhouse gases" to the atmosphere; this is considered a permanent loss. Research indicates that for every one degree Fahrenheit increase in average ambient temperature, the river system will lose an additional 5-7 percent of its water to evapotranspiration.

Given that the Colorado River is probably the most heavily used and stressed river system in the nation, maybe the world, the factors described above, taken together, suggest that planning for the National Forests in the headwaters region of the Colorado River is delinquent if it does not assume some primary responsibility for, at the very least, maintaining current flows in the streams and rivers emerging below the forests, and if possible, actively doing what can be done to increase those flows through careful and creative forest management with a priority focus on the organic charge to "to secure favorable conditions of water flows," rather than the apparent assumption that the water supply will be okay if the forests are well managed for timber and recreation resources. This suggestion, or plea, is not inconsistent with responsible ecosystemic management of the local forests and grasslands of the headwaters/National Forests. Given the almost dead certainty that the water supply will be diminishing through the time it takes forest trees to mature in the Southern Rockies, consider:

- We know that our over-mature and probably overstocked forested land is currently suffering from a water deficit, leading to insect infestations and other forest traumas. When the current forest is either harvested, or worse case, burned, what will be the appropriate restocking density to account for the water deficit, which is more likely to grow than not? The plan displays a standard restocking table, with a reduced density only for mixed conifer in warm dry areas. Will the rest of the forest be restocked as though it were still 1983?

- A large portion of the snowpack lost to sublimation in the headwaters (~30 percent of the total snowfall) is lost through snow caught on tree limbs in a dense canopy; most of that gets "cooked off" the branches by the sun. Reducing density to get more snow down on the ground (still with enough density to shelter and shade the

snowpack from wind and sun) increases the snowpack that will be part of the runoff. This involves management decisions for the precommercial and commercial thinnings as well as the restocking phase.

- Do we have too much forested land? Pictures from the pre-settlement time indicate that more of the land is covered with trees now than was the case a century and a half ago. Recreational trails that alternate between forested reaches and open meadows are more enjoyable than long unbroken reaches of trees, especially near ridges. Grassy meadows are more vulnerable than forested land to erosion in extreme summer storm events, but savannah type management of previously dense forest land can increase stream flows, and it increases wildlife activity.

In summary, management of forested land for the "securing of favorable conditions of water flows" is tightly coupled to timber management; sometimes choices have to be made between them. But I can find no place in the plan where this is acknowledged and discussed. There is only a vague objective to "trend at least 15 percent of subwatersheds toward improved watershed conditions" over the life of the plan, mostly through stream restoration. Fifteen percent? This is inadequate.

The Environmental Impact Statement for the GMUG Forest Plan states that, despite citizen requests for it, "climate change" is not one of the issues around which the plan was developed because of uncertainty about carbon sequestration: "Given the scientific uncertainty, this alternative is not carried forward for detailed analysis." There are also unknowns about the dynamic relationship between forested land and water yield - with lots of research going on - but there is no reason why some of that uncertainty could not be illuminated with test plots and trial silvicultural alternatives right here. To wait until others have answered all the questions seems almost like a dereliction of responsibility, given the increasingly desperate state of the Colorado River region with its 40 million people and five million acres of irrigated land producing a huge portion of the nation's food.