

Vegetative Management Aspects of Flood Control and Water Projects¹

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In June, 1980, the California Water Commission held a workshop in Sacramento on vegetative management in watersheds. Testimony was received from the U. S. Forest Service (USFS), the National Park Service (NPS), the Bureau of Land Management (BLM), the California State Office of Planning and Research, the University of California - Davis (UCD), the California Departments of Water Resources (DWR), Forestry (CDF), Fish and Game (DFG), and Food and Agriculture (DFA), the California Air Resources Board (ARB), and Santa Barbara County.

At that meeting the Northern California Grindstone Project of the Forest Service was discussed. We learned that this experimental brush conversion project was begun in the 1950's to convert selected brush areas to grass by prescribed burning to improve range and wildlife habitat. By 1972, 2,000 acres had been converted. In 1973, the Forest Service and Fish and Game agreed to develop and demonstrate techniques for coordinating wildlife habitat needs with fuel modification programs. Under this agreement, 12,000 acres of brush were burned. The benefits included increased water yield, fuel reduction, and decreased likelihood of catastrophic wildfire.

Estimates of the increased water yield were made by UCD researchers using data from this brush conversion project. This data showed an increased yield of about 5 inches following brush conversion in the experimental watersheds near Hopland (Mendocino County) and Lincoln (Placer County). This amount declined to zero over a period of several years unless suppression of brush growth continued. Since the increase does not entirely coincide with the pattern of water use, brush conversion would be

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Abstract: The Department of Water Resources has initiated a program of prescribed burning in watersheds above State Water Project reservoirs and adjacent watersheds. The Department sees its role as a catalyst and guide to accelerate the work of the California Department of Forestry, the U. S. Forest Service, and the Bureau of Land Management. The California Water Commission supports vegetative management as an integral part of existing and future flood control and water conservation projects. Vegetative management in the watersheds above flood control reservoirs could be a part of Governor Brown's resources investment program to break the fire/flood cycle which has occurred historically.

most beneficial in watersheds above reservoirs. Brush removal on steep or unstable slopes, however, could cause sediment problems that would counter the benefits of increased runoff.

The cost of prescribed burning given in the 1979 Mendocino National Forest report, using the "Heli-torch" and jellied gas, is approximately \$5 per acre. Using hand crews, costs averaged \$10 to \$30 per acre, depending on accessibility of needs of ignition. Subsequent maintenance with prescribed burning is claimed to cost less than \$1 per acre. Using these figures and the yield of 0.45 acre foot per year, the cost of increasing runoff by brush conversion averages between \$3 and \$7 per acre foot per year over a ten-year period.

Significant Environmental Effects and Mitigation Measures

An initial increase in erosion from rainfall and runoff, with consequent increase in turbidity and sediment loads, generally occurs following prescribed burning. However, this adverse effect can be reduced by careful attention to several factors. The Forest Service at the Mendocino National Forest has observed all areas to return to normal within 3-6 years following certain procedures.

To mitigate the initial increase in erosion, sedimentation, and runoff turbidity resulting from prescribed burning, several steps should be taken. First, it will be recognized that some soils are so erosive and some geologic formations are so unstable that prescribed burning would cause erosion and sedimentation damage; these are therefore, unsuited for prescribed burning. Where such risks can be avoided, a management plan to minimize fire and geologic risks should be developed. Potential fire damages for alternative plans would be evaluated to select the best management plan. Second, the possibility of both water erosion and landslides which increase greatly with increasing slope must be evaluated. For each soil type, a limiting slope will be established above which burning will be avoided wherever possible.

Third, timing burns to reduce the possibility of heavy rainfall on burned areas before the soils stabilize and grass is established will be done to the extent possible. Fortunately, light spring or early summer burns are also desirable for other reasons, particularly since they accomplish an excellent brush kill.

Vegetative Management by State Water Project

Following the June 1980 workshop, the Commission passed a motion asking DWR to prepare a report on the potential for prescribed burning at major Department reservoirs and adjacent watersheds. The report was to provide a program proposal for a multi-agency project to conduct prescribed burns. We asked that the report:

1. Identify DWR lands and adjacent watersheds where prescribed burning may be beneficial,
2. Provide preliminary estimates of water yield
3. Identify local, State, and Federal entities which may participate in the program.

Ronald B. Robie, Director, DWR, forwarded a report to the Commission on August 1, 1980, which included the following information:

The Department made preliminary estimates of additional runoff which indicated a potential 300,000 acre feet per year at existing and possible future State Water Project facilities. There is an additional potential of about 600,000 acre feet at other existing storage reservoirs within the Central Valley drainage basin. Increased runoff potential is not necessarily directly convertible to increased safe dependable water supply (yield gross), although in some instances it may be. The report pointed out that more work is needed to refine the estimates and determine the true lasting impacts on project water supplies.

Because the entire Central Valley drains to the Delta, it is possible that vegetative management on land outside the watersheds of SWP reservoirs could also produce additional water supplies for the Delta to help meet the Delta outflow requirements. DWR subsequently retained a consultant during 1980-81 to aid the Department in determining how vegetative management could best provide an increased water supply and to better estimate the amount of runoff that might be realized. DWR sees its role on brush conversion as a catalyst to guide and possibly accelerate the work of the California Department of Forestry, the U. S. Forest Service, and the Bureau of Land Management.

Forestry has historically had an ongoing program which includes authorization to burn State lands and to conduct cooperative burning of private lands. Stimulated by the recent passage of Senate Bill 1704, Forestry developed a goal of burning 120,000 acres of brush every year for

the next twenty years. Water Resources will work with Forestry and the Board of Forestry by providing input on water supply benefits and priorities.

The Forest Service is developing management plans for each national forest which will be available during the next three years. Water Resources is working with them to assure proper consideration of vegetative management, including brush control, in the plans. The Forest Service will conduct burning on its lands. The State's involvement could include advising the Forest Service of the State's priorities and helping to establish monitoring programs to measure increased runoff.

Water Resources believes the most effective way to attain potential water supply benefits from brush conversion is to initiate a State program to influence and support efforts of CDF, USFS, and BLM. In FY 1980-81, DWR initiated a program in cooperation with CDF, DFG, USFS, using State Water Project funds. The Department has initiated a pilot area study in the Feather River watershed above Oroville Reservoir, where it increased runoff of about 25,000 to 100,000 acre feet per year. The potential water salvage will be identified more closely through careful evaluation of vegetation types, erosion hazard, land ownership, access problems, and other factors.

Chapter 525, Statutes of 1980 (SB 1704 - Keene) authorized Forestry to conduct prescribed burning in cooperation with landowners and other agencies. The Department anticipates that prescribed burning will be conducted in the Feather River watershed as part of this program.

Vegetative Management at Hansen Dam, Los Angeles County

On October 24, 1980, the Commission held a public meeting to review the public interest and necessity to investigate the desirability of removing sediment from Hansen Dam in Los Angeles County. Hansen Dam is an earth-fill structure, 97 feet high and 10,475 feet long, on the Tujunga Wash about miles upstream of its junction with Los Angeles County. The dam can impound 29,700 acre feet of flood water. Facilities for recreation, which were developed by the City of Los Angeles, consist of a 125-acre lake with boat launching ramps and a swimming beach, picnic areas, riding and hiking trails, golf course, and baseball field. The primary purpose of the dam is flood control. The Corps of Engineers cooperates with the City of Los Angeles to operate the public park and recreation facilities in the reservoir area.

Due to the devastating fire in the upstream watershed that occurred in 1975, and three subsequent back-to-back, extremely wet winters, the dam is loaded with debris in the form of sand and vegetable matter, and in the near future could seriously jeopardize its flood control capability, which could cause loss of water conservation and

recreation activities.

The Department of Water and Power (LADWP) of the City of Los Angeles could lose approximately 10,000 to 15,000 acre feet of potential ground water recharge annually if the present situation continues. This amount of water has a projected worth, in 1984 dollars, of almost two million dollars (replacement cost from the Metropolitan Water District). The City Council of the City of Los Angeles has approved a resolution which seeks sponsorship of federal legislation to add recreation and water conservation to the authorized purposes of Hansen Dam. The resolution would authorize a prompt cost estimate and feasibility study to clean out the silt, sand, and gravel. Assemblyman Richard Katz introduced Assembly Joint Resolution 14 to support such a study. The Commission asked that AJR 14 be amended to include vegetative management in the upper stream watershed. The Commission feels that with vegetative management in tributary areas, the inflow of silt and sediment to the reservoir can be more closely managed.

Governor's Vegetative Management Program

In December 1980, Governor Edmund G. Brown Jr., held a press conference in Los Angeles to

announce his proposed \$4 million Renewable Resources Investment Program in California to break the fire/flood cycle that has plagued Southern California and an immediate grant program to clean and replant the fire-damaged areas in the Panorama fire in San Bernardino National Forest. He also announced the creation of a task force on chaparral fire and flood risk management. The task force will make recommendations supporting use of prescribed burning and related techniques for controlling large volumes of brush in rural and urban areas.

The investment program for chaparral management takes the entire environmental system and the fire/flood cycle into consideration. A program of controlled burning and revegetation will not only help prevent forest fires and mudslides, but will benefit wildlife, recreational values, and water supplies. It will reduce air pollution, erosion, and the cost of firefighting, and the damages resulting from fires and floods.

The new program will be based on controlled burning of overgrown fire-hazardous areas in winter months when fires can be easily controlled. The program will use helicopter-helitorch devices to burn precisely defined areas. The controlled burning will reduce dangerous fuel supplies and old chaparral stands and will provide fire breaks to help in the control of wildfires.