

VII - WATER CONTROL PLAN

7-01 General Objectives. Fullerton Dam and Reservoir is a single purpose flood control facility. It provides local flood protection for the City of Fullerton, and it is operated independently of any other flood control facility or system. Flood waters are stored on a short term basis, and released as soon as available downstream channel capacity permits. The maximum channel capacity immediately downstream of the dam is 500 cfs. Channel capacities are schematically illustrated on plate 4-18. Allocation of storage is depicted on plate 7-01.

7-02 Major Constraints. Constraints that impact the regulation of Fullerton Dam and Reservoir are:

a. Channel Capacity. The channel capacity may be constricted immediately downstream of the dam by a wooden footbridge crossing Fullerton Creek, heavy vegetation buildup in the channel, and an 8 feet x 12 feet RCB culvert under Bastanchury Road. Individually, these two structures are capable of safely passing the full range of Fullerton Dam releases, but with the combination of additional local inflow from Bastanchury Drain and the backwater effect of the culvert or the footbridge, channel capacity could be sufficiently lessened to require a reduction in release from Fullerton Dam. This backwater effect might inundate the dam tender's residence, or cause the channel to overflow into Associated Road. Channel observers should be dispatched to this location whenever dam releases of 400 cfs or greater are anticipated.

b. Reservoir Deficiency. The SPF cannot be contained by Fullerton Dam and Reservoir, and would result in damaging spillway flow. The outlet works can only discharge a maximum of 590 cfs, and cannot evacuate the available flood control storage space quickly, relative to the rapidly responding Fullerton Reservoir watershed. As a result, the operational emphasis of the project is to release stored water as quickly as downstream channel capacity and outlet capability permit, in order to maintain the maximum flood control space possible.

c. Downstream Flooding. Local runoff alone is capable of exceeding the downstream channel capacity. Outflow from Fullerton Dam primarily influences the downstream channel for approximately 4 miles. Beyond this, the Fullerton Creek channel capacity is more than ten times greater than the maximum Fullerton Dam release. Within this reach there are some channel sections that cannot carry the Q_{100} (as determined by OCEMA). These include reaches along Victoria Drive. If flooding is observed in the 4 mile reach downstream of the dam, and flood control storage still exists in Fullerton Reservoir, releases should be reduced to a minimum.

d. Spillway Flow. Spillway flow should be avoided because of its damage potential. Immediately downstream of the Fullerton Dam spillway is a tennis court complex that would sustain damage. Flow would then combine with Bastanchury Drain flow and attempt to rejoin Fullerton Creek upstream of the Bastanchury Road culvert. Flow breakouts are possible all along this route (see pl. 4-19), and flow could reach the campus of California State University at Fullerton.

e. Debris. Debris collection on the trash racks can be an operational concern. During small inflow events vegetative debris is primarily caught by the Loftus Diversion Channel debris basin and the natural stand of vegetation upstream of the outlet works. Larger inflows release much of this as a single plug of debris that catches on the trash racks. This debris interferes with visual reading of water surface elevation and can alter the outlet elevation-discharge relationship.

f. Recreational Facilities. Moderate to high water surface elevations will inundate recreational facilities in Craig Regional Park (see pl. 2-03). This is not a reservoir regulation constraint because easements are available for all reservoir lands.

7-03 Overall Plan for Water Control. Fullerton Dam and Reservoir is operated for local flood control of Fullerton Creek. Because the facility does not provide SPF protection, the operational emphasis is to release stored water as soon as possible, thereby maintaining the greatest available flood control space. Opposing this objective, is concern for the potential of flooding downstream of Fullerton Dam due entirely to local runoff. Outflow from Fullerton Dam should be reduced as much as possible if the downstream channel capacity is being exceeded.

The reservoir regulation schedule (Exhibit B) attempts to address these concerns by monitoring rainfall and downstream flow along with reservoir water surface elevation. These three parameters are used on a real-time basis as input to the reservoir regulation schedule, which takes the form of a decision algorithm. The schedule generally recommends a release of as much as 450 cfs, the maximum non-damaging release from the dam. However, if spillway flow appears imminent (water surface elevation of 289.5 ft. NGVD or greater), releases may be increased to 500 cfs in an effort to avoid this event. When releases greater than or equal to 400 cfs are indicated, channel observers should be dispatched to critical channel locations. If downstream flow and/or significant rainfall indicate that the channel capacity may be nearly full, the schedule advises a reduction in dam discharges.

Generally, the schedule assumes that every event is a SPF-type event and regulates it accordingly. The schedule does not follow this objective blindly, however, as the additional hydrologic information allows for flexibility in adjusting to local constraints.

During the early stages of an inflow event, a small debris pool is formed behind the dam by leaving the gates at the standby setting of 1.1 feet. When a water surface elevation of 267 ft. NGVD is attained, the gates are completely opened and vegetative debris that has collected on the trash rack is, hopefully, churned into smaller pieces that can pass through the outlet works. The gates are returned to the standby setting at the end of an impoundment period, when doing so will not significantly reduce outflow.

7-04 Standing Instructions to the Project Operator. The standing instructions to the project operator for regulation of Fullerton Dam and Reservoir are given in Exhibit A. During periods of normal communications, the dam tender will receive operating instructions from the Reservoir

Regulation Section, located at the District Office in Los Angeles. In the event communication with the District Office is interrupted, the dam tender should follow the standing instructions in Exhibit A.

7-05 Flood Control. Regulation of Fullerton Dam and application of the reservoir regulation schedule are described in this section. The schedule should be used as the best available guidance, and results of implementing the schedule should be examined after the reservoir is drained to ensure that proper regulation of the reservoir has been achieved.

At the onset of a rainfall-runoff event, the gates at Fullerton Dam are at a standby setting of 1.1 feet, and the reservoir is normally dry. Due to the short lag time between rainfall and basin runoff, it is probable that the reservoir will have impounded some water prior to the dam tender arriving at the dam. The schedule accounts for an initial impoundment of 21 AF, and, prior to this level of storage, no gate changes are required. Upon the dam tender's arrival at the dam the reservoir elevation and precipitation readings should be transmitted to the ROC, and a reporting interval established.

At this point, ROC personnel will determine the latest measurements from the FCKR stream gauge and the precipitation gauge at Fullerton Dam (FLTN) and, along with the current reservoir elevation and use this information with the reservoir regulation schedule to determine the appropriate release. By knowing the desired release and the elevation, the correct gate setting can be established, either through the use of plates contained in this manual or by using the RESCAL computer program. This procedure should be repeated each time the dam tender makes a report. Reports should be taken at least every half hour, or more frequently when conditions are rapidly changing.

The reservoir regulation schedule can be implemented (i.e., a recommended release can be determined) with reservoir elevation information alone or in combination with precipitation and/or downstream flow information. Should contact be lost between the ROC and the dam, the dam tender should refer to Exhibit A, "Standing Instructions to the Project Operator for Water Control."

When the reservoir regulation schedule calls for releases of 400 cfs or more, channel observers should be sent out to monitor flow in Fullerton Creek. The primary location to be manned is Bastanchury Road directly below Fullerton Dam. Other primary locations to be monitored include the Chapman Avenue culvert and the vicinity of Victoria Drive. OCEMA channel patrols may be able to assist with this task, along with LAD channel observers. Channel observation is important, because the effect of local inflow on available channel capacity may be different from the situation assumed by the schedule. Development of any potential problems involving downstream flow should be communicated to the ROC as quickly as possible, so that the release from the dam can be adjusted accordingly.

Releases from Fullerton Dam should not be altered by more than 100 cfs in one gate change. When the reservoir regulation schedule indicates a change in reservoir outflow, either an increasing or decreasing of more than 100 cfs, the gate change should be undertaken in two steps, allowing discharge from the

first step of the gate change to stabilize downstream before completing the gate change on the second step. Exception to this guidance may be appropriate in the case of an emergency.

In the event of imminent spillway flow, the dam tender should be requested to make reports to the ROC on an interval of 5 minutes or less. The operational emphasis at this point is to make releases of 500 cfs in an attempt to avoid spillway flow. When spillway flow begins, total outflow from the dam should still be maintained at 500 cfs. If the combined spillway flow and ungated outflow are less than 500 cfs, the difference should be made up with gated outflow releases. If the total uncontrolled outflow from the dam (spillway plus ungated outlet) exceeds 500 cfs, the gates should be closed.

The reservoir regulation schedule can be applied to the rising and falling limb of a flood event. The gates can be returned to a standby setting of 1.1 feet when this action will no longer significantly reduce outflow from the dam.

7-06 Recreation and Cultural Resources. There is no aspect of Fullerton's reservoir regulation that can provide recreational use or benefit. Impoundments can impact the recreational facilities in Craig Regional Park, but this is not normally a water control consideration. The entire Fullerton Dam flood control basin has been surveyed by LAD staff archaeologists for the presence of cultural resources. No cultural resources have been identified within the basin.

7-07 Water Quality. The surface water flow is normally composed of urban and agricultural runoff, and some perennial flow from the mountains. Under low flow conditions, the concentrations of nutrients (nitrogen and phosphorus) and trace metals are elevated, as is common in urban and agricultural runoff. Following storms, the quality of initial runoff is usually poor (high concentrations of trace metals, oil and grease, nutrients, turbidity and coliform bacteria), because storm drains are flushed and accumulated pollutants are washed from roads and lawns. As the storm progresses, quality (except for turbidity) of the runoff improves because of dilution. Retention time of water at the dam is short (i.e., one day), and has no effect on water quality. The dam may be used to contain chemical spills or an oil spill in the event an oil well malfunctioned in the Fullerton watershed.

7-08 Fish and Wildlife. The primary land use within Fullerton reservoir is a maintained urban park. A small (less than 100 feet long and 20 feet wide) and highly disturbed riparian plant community occurs at low elevations in the reservoir in response to the greater availability of water. The riparian plant community at Fullerton Dam is composed of an overstory of medium sized (less than 25 feet tall) black willow trees, and understory of primarily mulefat and willow shrubs. The riparian habitat supports wildlife typical of urban environments. Included in the wildlife are snakes, ground squirrels, gophers, rabbits, skunks, and a variety of birds, including mockingbird, common crow, starling, and wrens, among other species. The area below the dam is a severely disturbed riparian/exotic grassland community intermixed with urbanization. No threatened or endangered species were observed or are

expected to occur at Fullerton Dam. The Environmental Assessment that accompanies this water control manual contains more detailed information on species types found within the Fullerton Dam project area.

7-09 Deviation from Normal Regulation. There may be instances when it is necessary for the operation of Fullerton Dam to deviate from the established flood control plan. Prior approval of deviations is required from the Reservoir Regulation Section, LAD, except for emergencies and minor deviations as discussed in subparagraphs a and b, below:

a. Emergencies. Emergencies may take the form of drownings or other accidents, chemical spills, and failure of operation facilities. Necessary action should be taken immediately, so long as this does not create a worsened overall condition. In any action taken, assessment of the situation by the dam tender should rely on his knowledge of the dangers involved. The Reservoir Regulation Section, LAD, should be informed of any deviations due to emergencies as soon as practical.

b. Unplanned Minor Deviations. Instances arise where there is a need for minor deviations from the normal regulation of the reservoir, although they are not considered emergencies. Construction activities are the primary source of these deviations. Downstream maintenance of culverts and channel sections are another reason for minor regulation changes. Each request is analyzed on its own merits. Consideration is given to the potential of flooding and possible alternative measures. Approval for these minor deviations should be obtained from the Reservoir Regulation Section, LAD.

c. Planned Deviations. There are planned instances which require deviations from normal regulation. Each condition is to be judged on its own merits. One possible deviation may involve impounding water for the purpose of making test releases to correlate the gate rating curves with measured outflow. Requests for planned deviations would most likely originate from either the Reservoir Regulation Section (LAD) or OCEMA. Any planned deviations would require the approval of the Reservoir Regulation Section (LAD).

7-10 Drought Contingency Plan. Fullerton Dam and Reservoir does not contain any storage allocation for water supply or water conservation. Fullerton Creek downstream from the dam is mostly concrete lined and does not contain any ground water recharge facilities. However, in the event of a drought, the possibility of impounding water for water conservation would be considered. Any such plan would be evaluated to ensure that the flood control purpose of the project would not be compromised.