5.8. Element 8: Channel Modification Assessment.

Information for this section contributed by Dick Link, Geologist, USBR, Boise, Idaho.

The issues of flood control, storm water management, and maximum/minimum stream flows in the Jackson Creek watershed are closely related. Flood control and storm water management problems have been exacerbated due to channelization of much of the creek, along with increased urban and residential development. The same factors that make flooding and stormwater management a problem also increase the difference between maximum and minimum flows in the creek.

Usually a stream is channelized to increase the drainage rate of the system, so that water moves through the stream at a greater speed. Channelization is also done to prevent lateral migration of a stream, so that structures such as roads are not impacted by erosion. Though channelization increases the velocity of water flow, it also decreases the storage capacity of the stream, because channelization involves shortening the length of a stream. The longer the stream, the greater its volume for water storage. Also, channelization usually results in loss of a stream's natural flood plain. Flood plains serve as pathways for high flows, and also absorb flood water for slow release to the stream after the flood has receded. In an unaltered stream, floodplains have a *50%* probability of receiving some streamflow each year. In a channelized stream, the probability of flooding is less than *50%* every year (because of channel deepening that normally accompanies channelization), but flood events are more catastrophic. This is because in an unaltered stream, the flood plain essentially acts as a buffer between developed property and the stream. Few channelized streams have any buffer between them and developed property.

Almost all of the stream channels in the Jackson Creek watershed have been altered extensively, especially below Jacksonville Reservoir. One prominent example is that early maps show that Daisy Creek and the stream draining the Jacksonville landfill site, and Griffin Creek once flowed into Jackson Creek (1854 Surveyors map of T. 37 S. R. 2 W. and other documents). These creeks now flow into Griffin Creek, which parallels Jackson Creek.

In later years, a portion of lower Griffin Creek, in sections 15 and 22, was likely re-routed to parallel Jackson Creek, rather than join it. Griffin Creek was then re-connected to a minor stream that enters Bear Creek upstream from the Jackson Creek - Bear Creek confluence.

5.8.1. Methodology For Assessing Channel Modification.

Channel modifications for Jackson Creek and key tributaries (Cantrall Gulch, South Fork, and Walker Creek) were identified through stereoscopic analysis of aerial photos, and mapped. A field visit was conducted to verify the aerial photo interpretation and evaluate on-site conditions. The area ranged from the headwaters through Jacksonville to Central Point.

Sources of channel modification included the following features:

- reservoirs, irrigation dams, and artificial impoundments
- small agricultural impoundments, cattle ponds, fire ponds
- dikes, levees (flood control)
- channelization (straightening, hardening, relocation, dredged channels)
- stream-bank protection (riprap, pilings, bulkheads)
- built-up areas in floodplains, wetlands
- extensive fill associated with road crossings and roads next to streams
- sand and gravel mining in/near channels, tailings deposits.

5.8.2. Findings.

The majority of noted channel modification areas were due to road interference/crossings, rural residences/farms, irrigation diversions and/or check structures, and urban zones. Impacts observed in the urban areas (Jacksonville and Central Point) were numerous and have been considered as one modification for the purpose of this assessment. Most channel modifications occur as point modifications and do not affect channel reaches. In addition to numerous bridge and culvert crossings, an extensive network of roadways parallel Jackson Creek for the majority of its length. Impacts from these roadways are more difficult to assess, as the heavy stands of blackberry vines along the channel prevent direct observation of fill encroachment into the channel in both the aerial photo interpretation and the ground verification completed for this study. Channel modifications due to fill encroachment have only been noted where the roadways occur in very close proximity to the stream channel.

The relatively dense vegetation along much of the stream channels obscures channel conditions both in the aerial photo interpretation and the ground reconnaissance and it is likely that some modifications have not been detected in this analysis. Channel modifications are numerous within the urban zones of Jacksonville and Central Point, but poor access to the channel in these areas prevented detailed mapping of these modifications. In particular, activities such as bank hardening and armoring, channel straightening and/or relocation, etc., are poorly known in the urban areas.

Increased urbanization and residential development leads to a decrease in permeable surfaces in the watershed, which increases the surges in runoff. This makes the flow in Jackson Creek flashier so that its response to storms is faster and more dramatic, and increases the probability of floods in the waterhed. Some possible options for reducing the risk of floods, improving stormwater management, and reducing the difference between minimum and maximum flows are:

(1) *Re-establishing a flood plain and meandering channel for the area downstream of Jacksonville*. This is technically feasible, but may require re-routing some existing roadways, moving some structures away from the creek channel, and/or land acquisition.

(2) *Develop off-channel storage for storm flows.* This option is also technically feasible, but would require construction of water impoundments and drainage channels. It would also require land acquisitions.

(3) *Improve the infiltration capacity of developed areas and partially re-establish flood plain/meandering channel.* This option is technically feasible, but would require improving the infiltration capacity of parking areas and other areas (e.g., using permeable pavement, drilling drain holes, using grassed roadways, using infiltration basins). Combining this with re-establishing floodplains/meandering channel in the publicly owned reaches of the stream may be sufficient to achieve the desired flood control and stormwater management improvements.

Identified channel modifications have been tabulated individually on the attached Channel Modification Inventory (see Form CM-1, in Appendix B). Additional analysis on channel modifications is needed, and at present, resources were not available to complete this analysis.