



Vegetative conditions such as surfed or toppled trees, freshly exposed, or barked over roots are useful in estimating the degree of instability and progress towards recovery.

### *Outfalls and Infrastructure Crossings*

The outfall and crossing themes locate in-stream or near stream infrastructure. The location of outfalls, bridges, and culverts is essential when considering design limitations and construction access. In addition, the condition of in-stream infrastructure can also provide clues to past and present channel conditions. For example, culverts and crossings can also act as process indicators. Undermined outfalls and culverts indicate the extent of channel incision while discontinuities in energy distribution and sediment transport can be inferred from the depth and consolidation of deposits in culvert or bridge bays.

### *Photos and Notes*

The last two themes mainly include supporting or miscellaneous information. Notes generally consist of short site descriptions or information that does not otherwise fit into any of the previously mentioned themes. Photos are taken at regular intervals, not only for internal quality assurance and quality control practices, but also to provide the user with a virtual walk through of the study reach.

## 3.3 Sugar Creek Evaluation

### 3.3.1 Geomorphic Field Investigation

Most of Sugar Creek is unstable. **Figure 3.3.1** illustrates the dominant processes throughout the mainstem. This stream, including its tributaries has the steep banks and U-shaped cross section that is typical of incised streams. Trees perched on the bank 5-8 feet above the flow line with their exposed barked-over roots indicate that some of these incision episodes occurred years ago. This stream may have worked through the phases of channel evolution many times. Active knick points in the channel bed indicate that some reaches are continuing to incise. Both channelization which steepened the bed slope and increased the shear stress acting on the channel and the increased flow from urban development are the primary causes of the streams' poor physical condition today.

In the upper watershed, instability most commonly occurs as incision, a downward cutting of the channel, migrating upstream from the lower main stem and extending through the tributaries. It is important to note that tributaries and gullies match grade with their receiving waters. This means that an incision event near the bottom of the basin has the potential to migrate through the entire stream network. As the incision moves upstream through the tributaries, some of the sediment generated there is transported down to the mainstem. Between the One Mile Creek confluence and Baytree Road, transient bar building and widening predominate. In the lower reaches, particularly below Baytree Road, deposition is the dominant process.