CHAPTER FIVE
Identification of Problems

Pierce County is responsible for addressing flooding and stormwater quality problems, as well as fish/aquatic habitat impacted by stormwater runoff and stormwater facilities in unincorporated portions of the County that are not federally managed or commercial forest land. The following sections discuss issues identified during the Phase I basin characterization that could potentially be addressed during Phase II of the basin planning process. A screening process will be implemented in Phase II to determine which of the following issues should be addressed by Pierce County Water Programs and which of the issues should be addressed by other entities.

5.1 FLOODING

Flood hazard mitigation planning in Pierce County takes place within the context of the *Puyallup River Basin Comprehensive Flood Control Management Plan*. One goal of the flood control management plan is to establish a more comprehensive approach to flood control management than the strictly structural approach characteristic of prior times. Structural and nonstructural recommendations of the plan include the following:

- Coordinate and standardize floodplain regulations for all municipalities in the basin.
- Regulate floodplain development.
- Develop a flood warning system.
- Begin a public awareness program,
- Construct setback levees and other structural alternatives further away from the river to allow a more natural riverine environment.

These broad goals are reflected in the 2005 CIP plan (for the 2006–2011 period) for river improvement, which contains the following noncapital improvement project alternatives for achieving the river improvement level of service (LOS) (100-year flood recurrence interval):

- Alternative 1: Land acquisition program (606 acres purchased through 2004)
- Alternative 2: Flood warning program
- Alternative 3: Public awareness program
- Alternative 4: Revision of existing floodplain regulations to prohibit development in the 100-year floodplain areas by revising definitions and reviewing the "zero-rise" criterion
- Alternative 5: Mud Mountain Dam operations modification (would require act of Congress to change operation of dam, which could reduce the size of the floodplain)

For capital facilities, the CIP plan identifies improving an additional 0.95 levee miles (in Pierce County as a whole, not just the White River Basin) to the 100-year LOS, at a cost of $1.52 million, which would bring the total number of levee miles at the LOS to 10.6 out of 45.8 miles.

The following levee segments on the White River have been identified for inclusion in the levee setback project and have been assigned priority values (list provided by Pierce County, priority value in parentheses):

- County Line Site (55)
- Pacific Avenue setback (53)
- 24th Street East Pointbar (47)
- Pacific Pointbar (45)
- Interurban-White Site (43)
- 8th Street East Setback (29)

None of these potential projects appear as yet in the CIP plan.

Flood hazard reduction planning for the White River Basin could focus on the following key areas:

1. Continuance of the floodplain property acquisition program to reduce potential flood damage.
2. Identification of further opportunities to combine flood protection with habitat and stream rehabilitation through the levee setback program.

5.2 WATER QUALITY DEGRADATION

Recent water quality complaints in Lake Tapps are few. The SRS had three septic service calls in the Lake Tapps region during 2004 and an additional three septic complaints in Greenwater and along Mountain Beaver Drive (east of the West Fork of the White River). In addition, during URS' windshield survey, sewage was observed in Salmon Creek near 162nd Avenue East, and the odor of sewage was noted in Tributary 0040 at 136th Avenue East.

Water quality degradation requiring action can result from local pollution (stormwater non-point pollution and septic systems) and basin-level conditions. The current overall water quality in the White River is generally good (WCC 1999), except for pH and temperature. Water quality in the tributaries is variable and marginal for parameters such as temperature, turbidity, and dissolved oxygen, as shown by recent measurement and samples analysis Pierce County did on selected tributaries (Appendix G).

5.2.1 Lake Tapps

Water quality monitoring conducted during 2004-2005 found that water quality in Lake Tapps was generally good. Nitrogen to phosphorus ratios indicate that phosphorus is the key nutrient limiting algal growth in the lake. The total phosphorus and chlorophyll-a values were relatively

low, indicting that the lake was not eutrophic. Lake water quality was generally good even though flows through the lake were low compared to historic flows.

During the 2004-2005 monitoring, the White River appeared to be the main source of phosphorus entering the lake. TP and fecal coliform concentrations in the embayments were relatively low despite the numerous septic systems and stormwater outfalls along their shorelines. This suggests that septic systems and stormwater discharges are not major sources of TP or bacteria at present. However, septic system effluent and urban stormwater runoff often contain elevated concentrations of TP, bacteria, and other pollutants. Consequently, septic systems and stormwater discharges could affect lake water quality in the future.

There are more than two thousand septic systems around Lake Tapps. Septic system effluent typically contains high concentrations of phosphorus and bacteria. Septic system drainfields tend to clog over time. Severe clogging can result in surface failures and allow inadequately treated effluent to flow overland into the lake, with little contaminant removal en route. In general, the risk of failures is generally greater for older systems.

Septic systems can also contribute phosphorus to the lake via groundwater. Phosphorus usually moves very slowly in soil and groundwater because it adsorbs on soil particles and forms chemical complexes with low solubilities. It is possible that phosphorus plumes from shoreline drainfields exist but have not reached the lake yet. If these septic systems remain in use, phosphorus plumes could eventually reach the lake via groundwater.

Water quality in Lake Tapps may be affected by operations of the diversion dam and lake outlet. As discussed in Section 4, the "operating rules" for Lake Tapps are the subject of on-going negotiations involving multiple parties. Pierce County Water Programs does not own the lake and does not have authority over its operation. However, Water Programs can perform water quality management activities, such as non-point pollution source control, water quality monitoring, and implementation of stormwater quality Best Management Practices. Water Programs' activities will need to be tailored to the lake operating rules that result from the negotiations cited above.

Additional monitoring of Lake Tapps would help Water Programs gain a better understanding of its existing water quality and the potential effects of changes in lake operations. Monitoring would also help Water Programs identify source control needs and evaluate water quality trends over time.

5.3 HABITAT AND FISH PASSAGE

Habitat and fish passage assets and problems vary according to the location and the conditions in the White River Basin. Issues as they relate to current conditions and areas of opportunity are discussed below. The potential restoration opportunities presented here describe the types of actions that could be implemented by the jurisdiction responsible for the surface water features. Many of the streams in the lower White River Basin are within the incorporated cities of Sumner and Auburn as well as King County, and most of the streams in the upper White River Basin are within federal lands or commercial forest lands. There are opportunities for Pierce County to work in partnership with these other jurisdictions to address water resources issues in the Basin.

5.3.1 White River Mainstem

The primary fisheries issues on the White River mainstem are related to low stream flows in the bypass reach (reach between the Buckley diversion canal and the Dieringer Canal). Elevated stream temperatures in the bypass reach may be a result of low flows and have the potential to limit rearing capacity for bull trout and juvenile anadromous salmonids. Low flows resulting from the Buckley diversion and Mud Mountain Dam also have the potential to create both temperature and physical barriers to fish passage.

Low flows and elevated water temperatures in late summer can delay the upstream migration of adult salmon spawners (particularly chinook salmon) and result in the mortality of mature adults prior to spawning. Low flows and elevated water temperatures can also reduce available rearing habitat for both bull trout and chinook salmon, particularly spring-run chinook that have extended freshwater juvenile rearing periods. Smolt mortality during downstream passage through the dams can also be an issue, although recent modifications to the dams have improved this situation. Because bull trout and anadromous salmonids are trapped below the Buckley diversion and trucked above Mud Mountain Dam, the use of the reach between the two dams by salmonids is limited to juveniles and smolts that were produced in the watershed above Mud Mountain Dam and that have migrated downstream. This reach is no longer used by spawning salmonids (other than resident trout).

Elevated summer water temperatures also have a negative impact on bull trout rearing in the mainstem of the Lower White River. Rearing bull trout avoid water temperatures in excess of 15°C to 16ºC. Bull trout spawners in the lower river are trapped below the Buckley diversion dam and transported above Mud Mountain Dam. All bull trout spawning occurs in headwater tributaries above Mud Mountain Dam, and smolts migrate downstream to rear to maturity in the mainstem, possibly entering saltwater during the spring and early summer on foraging migrations. The reach of the White River between the Buckley diversion dam and Mud Mountain Dam is not accessible to upstream bull trout migrants, and bull trout that rear to maturity in the reach between the two dams do not have access to spawning habitat above Mud Mountain Dam.

Other fisheries issues on the mainstem related to the two dams on the White River include the loss of pool habitat, recruitment of spawning gravels, and the lack of LWD recruitment. Urbanization along Reaches 01 through 03 of the White River has also reduced the potential for recruitment of LWD into the mainstem.

Types of Restoration Opportunities

- Where possible, pullback levees could be installed to permit more lateral channel migration and create forested buffers with the potential to eventually provide recruitment of LWD to the stream channel.
- Engineered logjams and other structures in the White River mainstem have the potential to increase channel diversity and pool frequency. This would increase rearing capacity for juvenile salmonids and provide refuge to juvenile salmonids from high flows and summer low flows and elevated temperatures.

- In many areas of Reaches 01 though 03, agricultural fields, industrial parks, or (in one case) a golf course extend all the way to the top edge of the incised river channel. This leaves only a few yards of low-growing shrubs along the steep bank of the incision as riparian cover. Even a narrow row of trees planted along the river would contribute greatly to bank stability, canopy cover, and potential LWD recruitment.
- Numerous pipes in fields and industrial parks channel untreated stormwater runoff directly into the river. Agricultural and residential runoff increases nutrient loading of the lower river and contains pesticides and herbicides that potentially impact salmonids and their ability to navigate during migrations. Runoff from roads and parking lots includes dissolved metals and other chemical that are toxic to salmonids and other fishes. This is particularly an issue during the first heavy stormwater runoff in the fall. Increased detention and new methods of treatment for pollutants would reduce impacts to fish and aquatic wildlife.
- Connectivity with side channel habitat has been reduced as has the amount of available side channel habitat within the White River floodplain. Restoration of connectivity and the creation of new side channel habitat have the potential to increase rearing capacity for juvenile anadromous salmonids.

5.3.2 Tributaries to White River Mainstem

Many of the channels of the larger tributaries west of Lake Tapps have been channelized into straight ditches with no channel complexity. Untreated runoff from pastures, failing septic fields, and roadside ditches probably contributes to nutrient loading of these streams, and runoff from roads may contain pollutants that impact fish when stormwater runoff occurs during the first fall freshets.

Types of Restoration Opportunities

- Increasing the sinuosity of these streams would increase the amount of available fish habitat and result in increased channel complexity due to the formation of pools at bends in the stream channels.
- Establishing buffers of streamside trees along these streams would help to stabilize banks, provide cover for rearing salmonids, increase the delivery of organic nutrients through leaf fall, and increase the recruitment of LWD. Increased channel complexity also has the potential to increase available spawning gravels at the tailouts of new pools. Forested buffers as little as 50 feet wide or a single row of streamside trees can make a significant difference in aquatic habitat quality.
- Increased detention and treatment of stormwater runoff from fields, residences, parking lots, and roads would reduce impacts to fish and aquatic wildlife from nutrient enrichment and pollutants such as dissolved metals, solvents, pesticides, and herbicides.
- The constructed wetland on Tributary 004005 is not accessible to rearing juvenile salmonids. Several other wetlands on tributaries of the Lower White River are not accessible to rearing juvenile salmonids. Increasing the accessibility of suitable coho salmon-rearing habitat in wetlands would benefit coho salmon populations.

- Many of the tributaries west of Lake Tapps have suitable habitat for rearing salmonids (particularly coho salmon) but either lack suitable spawning gravel or culverts prevent access to upstream spawning gravels. Restoring higher gradient reaches of streams with the potential to provide spawning gravel, in close association with suitable accessible rearing habitat in lower gradient stream reaches and connected wetlands, is essential to fully using available rearing habitat.
- All of the tributaries east of Lake Tapps have non-structural passage barriers (drops up to 6 feet) into the White River, which preclude anadromous fish population use of these streams. Removal of these short cascades has the potential of creating new coho spawning and rearing habitat. However, it may be beyond the scope of the Pierce County Water Programs to remove natural fish passage barriers.
- A number of drain pipes extend from the horse pasture bordering Reach 04 of Tributary 0052. Drainage from this and other developments along Reaches 04 and 05 likely increases the nutrient loading in this stream. Increased detention, infiltration, and treatment of stormwater runoff from pastures and residential yards would reduce nutrient enrichment.
- Jovita Creek (0033) has the potential to provide better rearing habitat for coho salmon and other salmonids if channel complexity is increased. The placement of physical structures to create pools and better hydraulic conditions to maintain spawning gravels have the potential to significantly increase salmonid production (particularly coho salmon).

5.3.3 Culvert Issues

Priority tributaries were surveyed to identify potential physical blockages to fish passage (Section 4.6). The following are specific blockages in the priority tributaries.

- Artificial passage problems exist at the culvert under the Burlington Northern railroad tracks (Tributary 0038) and at the concrete control structure diverting water to constructed wetlands (Tributary 0040). The latter barrier could be considered a Pierce County responsibility.
- Jovita Creek, a tributary to 0032, contains the only salmon spawning habitat in the Lower White River Subbasin. Much of Jovita Creek can be characterized as natural. Fish passage through several culverts under State Route 167 is questionable, but Pierce County culverts all appear to be passable. Downstream of the West Valley Highway, an active headcut caused by increased flow rates may create a fish passage barrier.
- Along the surveyed reaches of the Greenwater River, no Pierce County drainage facilities create limitations for support of anadromous and resident fish populations.
- Along the surveyed reaches of the West Fork of the White River, no Pierce County drainage facilities create limitations for support of anadromous and resident fish populations.

5.3.4 Data Gaps

Phase I surveys evaluated stream channel habitat and barriers to fish passage but did not evaluate water quality requirements for salmonids, such as summer water temperatures and dissolved oxygen. Fish presence was evaluated visually and from the available literature, but data gaps exist, particularly concerning life-history forms present. Stream surveys were conducted primarily during a period of low precipitation and low flows during the late fall and provided less than optimum information about seasonal connectivity between the White River mainstem and side- or off-channel habitat. Additional data could be collected by Pierce County and other responsible jurisdictions to address these data gaps.