

CHAPTER 10. FUTURE TRENDS

This section highlights potential future natural resource trends, based on information contained in the preceding chapters and new information developed by the BLM regarding future conditions on public lands within the study area. Future trends represent the projected conditions of natural resources based on available data, and attempt to determine whether the state of natural resources is improving, declining, or staying the same. Future trends are estimated under the assumptions that trends during the recent past will continue into the future, and current policies and management goals will remain the same. Consequently, they provide a “best guess” of future conditions, and may be influenced by unanticipated changes in the future, either human-caused or otherwise. We have attempted to project future trends based on indications from the source data. In some cases there was insufficient information available and no trend was reported.

Primary drivers of future trends in watershed condition include population growth, natural resource management policies and plans, and socio-economic conditions. Projected trajectories of natural resource conditions may be altered by efforts to improve the watershed by individuals, agencies, and organizations such as the North Santiam Watershed Council. Information regarding the specific effects of land use on future trends for the natural resource conditions in the Lower and Middle Reaches is largely lacking, but recent changes in forest and agricultural management practices will hopefully continue the process of improvement in aquatic habitat, water quality, and hydrologic conditions.

Timber harvest on public lands has declined over the past 15 years. One primary management objective on public lands for the future is to increase older forest structure and multi-layered stands (see Appendix 1). In general, forest management practices over the past decade have been modified to better achieve ecological objectives, which will hopefully result in continued improvement in natural resource conditions. Similarly, agricultural practices are undergoing re-examination with respect to their influence on streams and riparian zones, including the introduction of Total Maximum Daily Loads (TMDLs) for water pollutants, and the 4(d) ruling, which will hopefully lead to a trend of improvement in the conditions of riparian zones. Likely future changes in water quantity, water quality and stream and riparian zone habitat conditions are as follows:

- **Hydrology.** It is unlikely that there will be a change in the trend for hydrological conditions in the Lower and Middle Reaches, although a slight improvement is possible. A dominant factor affecting hydrological conditions is the USACE's management of the Detroit and Big Cliff Reservoirs. The USACE is currently preparing a Biological Opinion for the Big Cliff and Detroit Dams which will address remediation of hydrological concerns.
- **Water Use.** Water use is likely to increase. Water use from future population growth, especially from the City of Salem, may result in water demand that exceeds minimum streamflows during the dry season in the Lower Reach (see Chapter 4).
- **Sediment Sources.** There is insufficient information to determine the future trend for sediment and erosion, but recent forest and agricultural management policies suggest the potential for an improving trend. According to the BLM analysis, road densities are expected to increase slightly on commercial timberland. Current management guidelines for federal lands call for no net increase in roaded miles. A net decrease in road density on federal lands is likely in the future (see Appendix 1).
- **Water Quality.** Water quality conditions will probably stay the same, or improve slightly. The most significant concern is water temperature in the mainstem of the North Santiam and Santiam Rivers. The forthcoming Biological Opinion from the USACE will address the issue of whether or not to retrofit the Detroit Dam with a water temperature control structure. However, even if the USACE recommends the construction of a temperature control structure, it is unlikely to be built in the next 10 to 20 years (C. Willis, USACE, pers. comm., 2002). Prior to construction, funding must be appropriated by the U. S. Congress, and a thorough examination of the effectiveness of the Cougar Reservoir temperature control structure (which is currently under construction in the McKenzie River watershed) will need to be completed, which could take many years ((C. Willis, USACE, pers. comm., 2002). The USACE Biological Opinion will also address other means of improving conditions for spring chinook and winter steelhead, including fish passage and aquatic habitat enhancement ((C. Willis, USACE, pers. comm., 2002).

Other efforts to improve water quality include the development of a TMDL for the upper Willamette River watershed (including the North Santiam watershed), which will set limits for maximum water temperature. In addition to temperature, water quality in lower portions of the Lower Reach is considered moderately impaired for phosphorus, nitrogen and fecal coliform bacteria, and impaired for dissolved oxygen at the sampling site below the confluence of the North and South Santiam Rivers (see Chapter 6). As the human population grows throughout the watershed, managing point and non-point source water pollution will become an increasingly greater challenge.

- **Fisheries.** Trend information for fish species is only available for a few threatened, endangered or sensitive species. The native winter steelhead population trend is uncertain. Although it declined throughout the 1980s and 1990s, the past two years have shown marked increases in the population. Whether the recent population increases signal a change to an increasing trend in the winter steelhead population, or if they are anomalous years in a trend of continuing decline, remains to be seen. Recent trends for spring chinook suggest the possibility of an increasing trend. Since 1996, counts at the Bennett Dams have increased, perhaps due to favorable ocean conditions. Dam modifications and habitat improvement projects in the watershed are likely to assist in a trend of increasing population. However, even if populations increase, the potential population sizes for spring chinook and winter steelhead are severely limited by the loss of upstream habitat caused by construction of the Big Cliff and Detroit Dams. Additionally, spring chinook population potential is limited by warm water released from the reservoirs, causing premature development of the eggs (see Chapter 7). The Oregon chub population in the North Santiam and Santiam Rivers has been declining, although ODFW is actively working to stabilize the population. The population trends for coho, rainbow trout, and cutthroat trout are unknown.
- **Aquatic Habitats.** The trend for aquatic habitat conditions is not well documented for the recent past, but over the past century there has been a significant decline in habitat quality (see Chapter 8). Information regarding future trends for wetland conditions and channel modification is lacking. Riparian shade is likely to increase in the Middle Reach

as conifers along the stream banks grow and shade the stream. In the Lower Reach, however, riparian shade is not likely to change significantly in the near future, except in areas where restoration projects plant streamside vegetation. Large woody debris (LWD) conditions are not likely to improve in the foreseeable future without active introduction of LWD. Natural sources of LWD, such as large trees on the streambanks, are uncommon, and will likely remain so for many decades. Fish passage for salmon and steelhead will likely be improved due to the City of Salem's proposed fish passage structure at the Upper and Lower Bennett Dams, and efforts to replace impassable culverts. In general, we expect that conditions will probably improve as more habitat enhancement projects are implemented within the watershed.