Mike Gray

Coquille River Subbasin Plan

Prepared for: **NOAA Fisheries Service**
June, 2007
Order No. AB-133F-05-SE-4942

Prepared by: **Coquille Indian Tribe**

While this analysis focuses on limiting factors and threats operating within the subbasin, it is not intended to diminish the importance of broader-scale events relating to regional changes in geology or global changes in climate and ocean productivity.

4.5.1 Terminology and Definitions

The terminology used to describe the relationships between population viability and the conditions affecting population recovery has evolved over time and is still changing. Therefore, the terminology used in documents produced by different agencies, or by the same agency at different times, is not directly comparable. For example, the term "limiting factor" is used by ODFW, NMFS, NOAA Fisheries, and others, but has been applied differently by each entity over time. The Subbasin Plan uses the current NOAA Fisheries terminology relating to limiting factors analysis. In an attempt to reduce confusion, definitions of three terms used in the Subbasin Plan are provided below.

- *Threats* - the human actions or natural events (e.g., road building, floodplain development, fish harvest, hatchery influences, and volcanoes) that cause or contribute to limiting factors. Threats may be caused by the continuing results of past events and actions, as well as by present and anticipated future events and actions.
- *Limiting factors* - the physical, biological, or chemical features (e.g., inadequate spawning habitat, insufficient prey resources, high water temperature) experienced by fish at the population, intermediate (e.g., stratum or major population grouping), or ESU levels that result in reductions in VSP parameters (i.e., abundance, productivity, spatial structure, and diversity) at any life stage.
- *Key limiting factors* - are the limiting factors with the greatest impacts on a population's ability to reach its desired status.

4.5.2 Threats and Limiting Factors

Prior to European settlement, the subbasin contained an array of mountain, valley and estuarine streams. The natural structure and function of the estuary and various stream types provided highly abundant and diverse aquatic and riparian habitats. Streams accessed their floodplains and formed complex channels with abundant shade, woody debris and pools. Large woody debris was recruited to mountain stream channels and transported, over time, to lower stream reaches. Stream migration within the valley floodplain was relatively slow due to the broad floodplain and the abundance of trees and woody debris. All life stages of coho had access to a subbasin-wide network of diverse and productive habitats.

Beaver were a keystone species, shaping the landscape in ways that benefited many aquatic and riparian species, particularly coho. Beaver ponds created rearing habitat for summer and winter parr. Beaver dams increased water storage which improved late season flows and summer water temperature, benefiting summer parr production. Beaver ponds in the lowest gradient reaches, such as found in the Coquille River Valley, provided slow-water refuge from high winter flows- a habitat condition needed by coho during the critical overwintering period. Pollock et al. (2004) investigated the current and historic distribution and abundance of beaver ponds in a large Pacific Northwest drainage basin and demonstrated that the historic loss of beaver ponds has greatly reduced abundance of coho smolts.

However, as the subbasin was developed, the ecosystem was changed. Many human activities occurred which contributed to the reduction in coho abundance. Some of these initial impacts have already recovered; some are in the process of recovering and will eventually recover fully; some will slowly recover, but not fully; and others will never recover. Some of these legacy impacts have been partially addressed through improvements in management, but other impacts are not reversible. For example, the Coast highway, which traverses the Coquille River Valley and greatly altered coho habitat, is an essential part of the area's transportation system and will not likely be significantly changed. On the other hand, current road management practices throughout the subbasin have greatly improved and have successfully reversed some of the adverse impacts from the past.

It is not possible to precisely quantify the impact that each activity exerted on reducing coho abundance. However, based on a review of Sections 3.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3 and A.1-A.7, it is possible to qualitatively describe the general impacts. This is required to identify the limiting factors. Seven threat categories have been identified as follows:

- floodplain development
- exotic fish management
- fishing
- forestry
- historic channeling for navigation
- road management
- historic removal of large woody debris

Each of these threat categories is discussed below, including its spatial context; the coho life stage affected; and the resulting limiting factor. All of these threats are now making strides to repair their legacy impacts and to minimize the impacts of their ongoing practices. This information is summarized in Table 4-3.

Floodplain Development

This threat involves all aspects of altering floodplains for the purposes of agricultural and urban development. Activities include: channeling streams and diking and filling of stream-connected wetlands; altering water runoff patterns; withdrawing water from streams and ground water sources; removing stream riparian vegetation; removing woody debris from stream channels, floodplains and recruitment areas; and killing beaver and reducing their food supply. Much of these activities were focused in the Coquille River Valley, the area used by the majority of winter parr produced in the subbasin

Much of the tidal and freshwater marshes that occupied much of the Coquille River Valley were drained and converted to farmland by 1870. Today, only 373 acres or 3-4% of the marshes remain (ODFW Draft Coquille Basin Fish Habitat Management Plan 1992). Many dikes were constructed for flood control. Local Drainage Districts conducted most of the flood control activities, which included levee construction for flood control on several tracts in the Lower Coquille Watershed. In 1942, for example, a district drained 5,100 acres by constructing canals and outlet conduits with tide gates. In addition some private land owners installed and maintained drainage conduits (Corps et al.1972). Extensive channeling,

diking, and filling of stream-connected wetlands and tidelands occurred through the 1960's under several federal programs and authorities. The majority of dikes were constructed by the early 1900's, but some construction continued until about 1960. By 1970, 94% of the tidal wetlands and 81% of the total estuary were lost. While most of these habitat alterations are being maintained to support today's agricultural industry, some productive wetlands, such as those in the Beaver Slough drainage, have been restored through the efforts of the Coquille Watershed Association, NRCS, private landowners and others.

Many other changes have resulted in improved conditions. Today, a 50' riparian buffer is required on agricultural lands (Coos County Zoning and Land Development Ordinance 2007). This allows for some recovery of streambank stability, water temperature, and recruitment of woody debris. Pesticides used today are much less harmful to aquatic life and are better regulated than in the past. Improvements in fertilizer and animal waste management have also improved water quality. Soil erosion is much better controlled today than historically. Some landowners have allowed beaver to reestablish into suitable areas and others have modified their tide gates to allow for fish passage. Also, several state and federal programs are now available to help landowners improve their lands for fish and wildlife.

Limiting factors: *depleted slow-water refugia* and *elevated water temperature* - The legacy impacts described above reduced slow-water refugia and stream shade. Research and modeling work by the State (CCA 2005) determined adult abundance is directly tied to smolt production (i.e., survival). In particular, smolt production is tied to habitat conditions experienced by winter parr (CCA 2005). Based on this work, the habitat feature most critical to winter parr survival, and adult abundance, is available slow-water refugia. Therefore, actions which reduce slow-water refugia needed for survival of winter parr, contribute to lower abundance.

Some summer parr currently use suitable habitats within the Lower Coquille Watershed. It is, therefore, plausible that the summer parr life stage may also be affected. Historic removal of riparian vegetation and straightening of stream channels to facilitate farming practices could certainly have isolated some cold water sources. In addition, withdrawal of water for irrigation reduced the water table which further reduced access to cold water refugia, decreased residual pool depth, and increased water temperature (see Section 5.1.2).

Based on the work done in the CCA (2005), water quality (i.e., elevated water temperature), was identified as the second most important limiting factor affecting nearly all populations within the ESU, including the Coquille population. The State determined elevated water temperature does not prevent the Coquille population from achieving the desired status. However, once the key limiting factor (i.e., depleted slow-water refugia) is improved, improvements in water temperature would allow the population to increase above the desired status level.

Exotic Fish Management

Many fish species have been introduced into the subbasin, either intentionally or accidentally, which have the potential to reduce abundance through predation or competition (see Section 3.1.3). To some extent, their impacts to coho abundance can be controlled