CHAPTER 2 - THE COQUILLE FISHERY

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

APPENDICES REFERENCED

CHAPTER 2 - THE COQUILLE FISHERY

A. INTRODUCTION[1]

The Coquille River ranks high in current statewide assessments for fishery production, and the existing fishery condition allows optimism for the successful restoration and enhancement of a viable fishery. Figure 2-1 depicts the life histories of anadromous salmonids native to the Coquille River basin. A complete list of fish and shellfish species found in the watershed can be found in Appendix C.

The decline of wild populations of anadromous salmonids in Oregon waters, including the Coquille Basin, is a combination of many factors. These factors, which have affected different species and regions to varying degrees, include rearing and spawning habitat degradation, reduction in summer streamflow, passage impacts, a decrease in productivity of ocean habitat, and excessive fishing. Impacts caused by hatchery programs has also been implicated in most of the declines and extinctions of coho salmon populations in Oregon (ODFW, Wild Fish Management Plan, 1995).

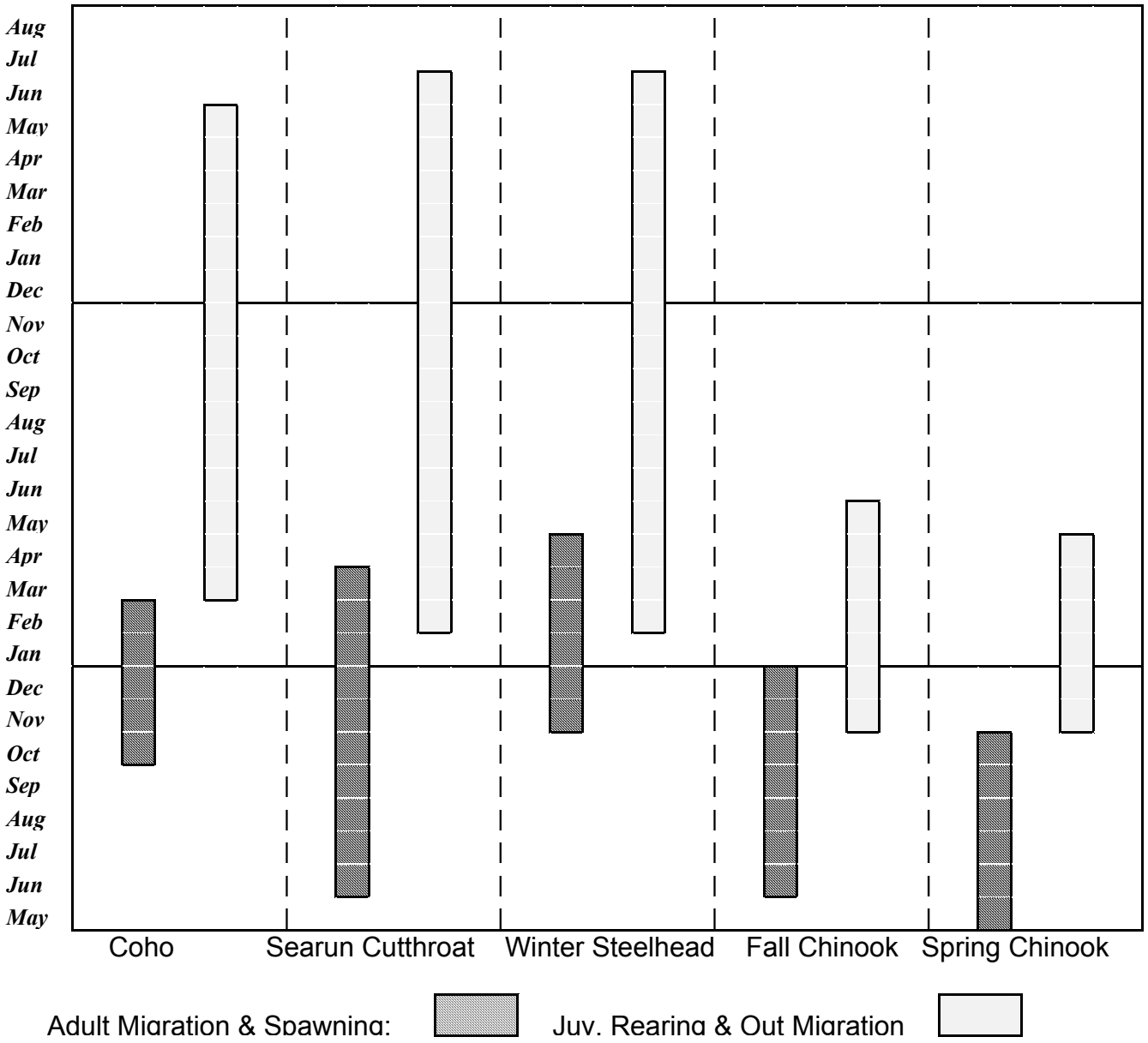
Salmonids evolved in freshwater ecosystems that were historically characterized by a high degree of structural complexity including large wood complexes in streams, flood plains, braided channels, beaver ponds and, in some cases, lakes. Anthropogenic activities, including timber harvest, mining, water withdrawals, livestock grazing, road construction, stream channelization, diking of wetlands, waste disposal, gravel removal, farming, urbanization, and splash dam logging have altered most freshwater ecosystems.

In the last 15 years, the productivity of the marine environment used by Oregon salmonids has also declined. This current decline in ocean productivity appears to be part of a long-term, apparently natural cycle in ocean conditions that is outside of management influence. These decreases in freshwater and marine habitat productivity have coincided with several decades of increasing releases of hatchery coho salmon and sustained high harvest rates. Wild populations have declined in size, and the range of most salmon stocks in Oregon has contracted concurrent with these activities and processes.

Actions expected to help in the recovery of the Coquille's salmon stocks are covered in Chapter 4 of this document and Chapter 17 sections C, D, E, G, H, I, J, and K of the Oregon Plan. The Coquille Watershed Association will help coordinate these activities in the local area.

[1] Much of this material was abridged from the Wild Fish Management Plan. ODFW. 1995.

Figure 2-1: Life Histories of Anadromous Salmonids in the Coquille River Watershed



1. COHO SALMON

The coho salmon (Oncorhynchus kisutch) is an anadromous species that rears for part of its life in the Pacific Ocean and spawns in freshwater streams in North America from Point Hope, Alaska, to Monterey Bay, California. Mature fish migrate into fresh water in the fall, typically spawning from November through February. They may spend several weeks to several months in fresh water before spawning, depending on the distance they migrate to reach their spawning grounds. All adults die within two weeks after spawning. Juveniles normally spend one summer and one winter in fresh water, then migrate to the ocean in the spring, generally one year after emergence, as silvery smolts about four to five inches long.

The Coquille Basin historically supported a large and healthy wild population of coho salmon, but their abundance has declined significantly since 1950, with most of the decrease occurring in the 1950s and 1960s (see Figure 2-2). Harvest rates of Coquille populations were high historically, particularly in the 1970s, which probably impacted the wild populations. Harvest rates declined after adoption of the Oregon Coho Management Plan (1982), then dropped to incidental harvest in the chinook fishery in 1994.

Counts from standard spawning surveys conducted in the Coquille River since 1958 vary considerably, but a decline is evident over the long term. In recent years, as portrayed in Table 2-1, the short term spawner escapement has also varied considerably, with a sharp increase occurring in 1996.

The abundance of coho salmon and spawning habitats are not uniform throughout the Coquille River system. The North Fork is believed to produce a higher proportion of coho salmon than the other forks because good spawning gravel and rearing habitat is found in both the upper main-stem and several of its tributaries. The main-stem East Fork has little spawning gravel for coho, but several tributaries hold suitable amounts. The Middle Fork also has little spawning gravel in the main stem, but, like the East Fork, there are several major tributaries with areas well suited for spawning coho. The main stem South Fork appears to be largely a winter steelhead and chinook salmon stream, but some of the tributaries hold gravel suitable for coho.

Figure 2-2: Coho packed or landed on the Coquille River (Mullen 1981)

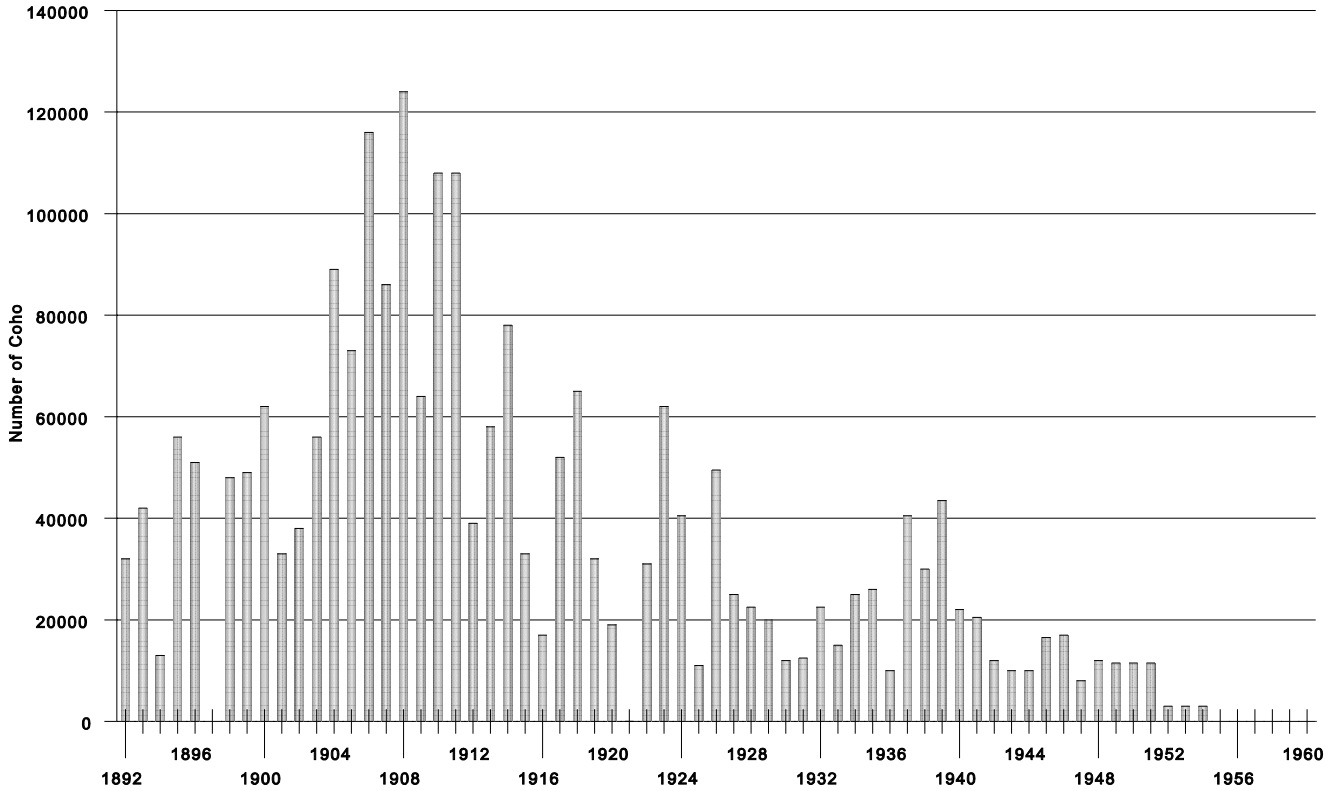


TABLE 2-1[2]
ESTIMATES OF ADULT SPAWNER ESCAPEMENT

Basin	Spawning Miles	Adjusted SRS Population Estimates*							1990-96 Mean
		1990	1991	1992	1993	1994	1995	1996**	
Coquille	331	2,712	5,651	2,116	7,384	5,035	2,116	16,169	5,883

* Population estimates adjusted for visual observation bias by multiplying estimate by 1.33
** Estimates for 1996 are preliminary

2. WINTER STEELHEAD

The life histories of winter steelhead normally include two to three years in fresh water and two to three years in salt water. The population structure is typically 80% "2-salts" (two years in the ocean) and 20% "3-salts" (three years in the ocean). Older age fish tend to enter fresh water before the younger ones. Spawning occurs from late December through June in tributaries of all the major forks in the Coquille River system.

Unlike coho and chinook salmon, not all adults die after spawning, and a portion survive to spawn again in subsequent years. The proportion of the adults that are repeat spawners vary from year to year, with about 10% to 25% spawning a second time, 1% to 3% spawning a third time, and rarely a few spawning a fourth time.

With the exception of the Umpqua River, winter steelhead populations in all mid-coast streams appear to have experienced a mild decline from historical levels, but all steelhead populations are thought to be smaller than they were historically. The recent down trend observed in coastal steelhead populations are probably influenced by the current low ocean productivity.

Hatchery steelhead smolts, using a broodstock developed from the Alsea River, were used to supplement the wild run since at least 1948. Straying of hatchery steelhead into unstocked streams has been well documented, and is probably due to the practice of rearing the hatchery fish at a single location (Alsea Hatchery), then transferring them to locations where they are released directly into the stream. Based on scale samples collected during a volunteer scale program, adult populations have averaged about 65% to 75% hatchery fish. In order to reduce straying, starting in 1990 smolts have been acclimated prior to release, and all broodstock has been collected from Coquille River populations since 1994.

3. FALL CHINOOK

Chinook salmon exhibit a wide range of life history, with variation in the date, size and age at juvenile ocean entry; in ocean migration patterns; and in adult migration season, spawning

[2] ODFW Annual Surveys

habitat selection, age at maturity and size (Nicholas and Hankin 1989; Healey 1994). Generally, subyearling juveniles rear in streams from three to six months and rear in estuaries from one week to five months, and nearly all enter the ocean during their first summer or fall.

Adult fall chinook salmon enter tidewater beginning as early as late July, continue through mid-December, with a peak usually in early October. Spawning occurs from early October through mid-January, but usually peaks in mid-November. Based on spawning ground surveys (see Figure 2-3), the population has expanded since the late 1950's and appears to be in good condition. Adults are most commonly 4 or 5 years old, but also include 3 to 6-year-olds or 4 to 6-year-olds and, rarely, 7-year-olds. Some males mature as 2 or 3-year-old "jacks" or "precocious males" that are smaller than other adults. The general size range is 10-40 pounds, but fall chinook in the Coos Bay and Coquille systems tend to be relatively small with an age at maturity that is intermediate compared to other coastal populations (Nicholas and Hankin 1989).

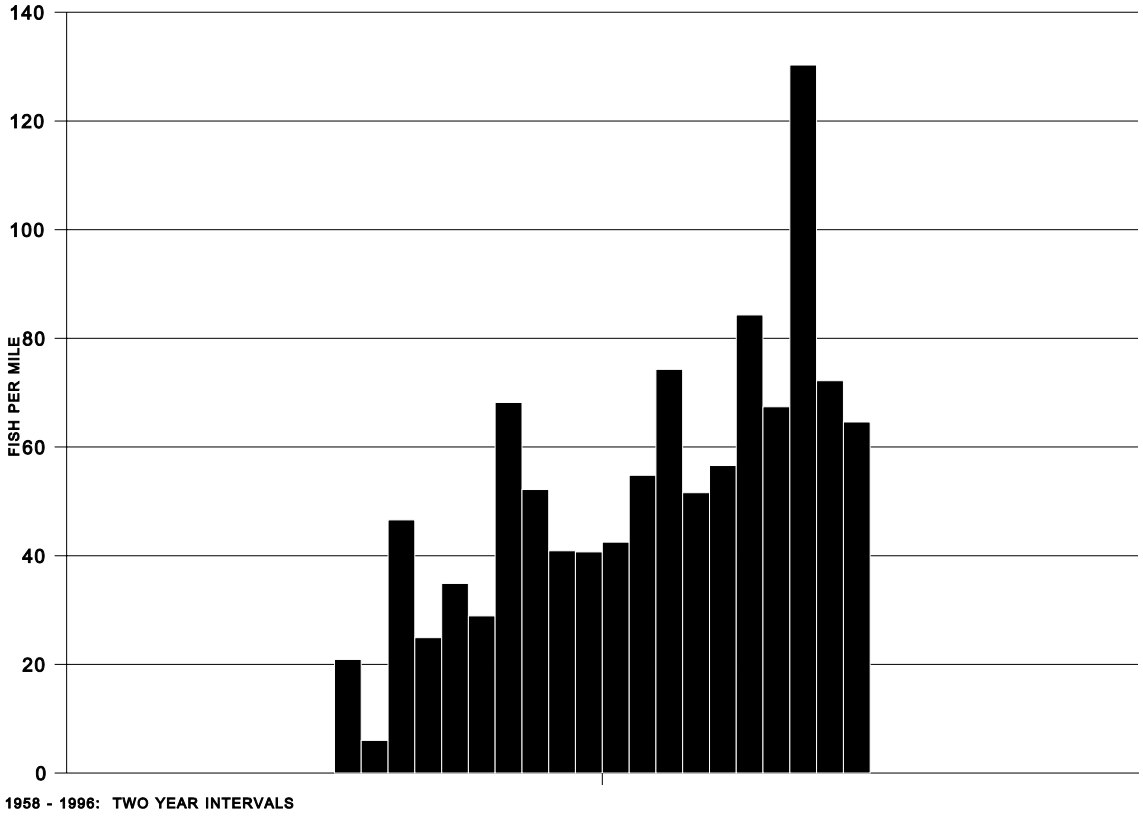
The Coquille commercial catch of chinook ranged from 1,000 to 19,000 fish annually from the 1890s to 1924, then declined until the fishery was closed in 1957 (Nicholas and Hankin 1989). Fall chinook abundance increased steadily during the 1960s, then stabilized, followed by an upward trend into the 1990s. Current population sizes cannot be accurately measured, but are estimated to range from 1,800 to 7,500. Figure 2.3 portrays the Coquille River spawner escapement in two year intervals from 1958 to 1996.

The South Fork of the Coquille River is a gravel-rich system and spawning habitat is not believed to be a limiting factor for natural production of fall chinook salmon. Spawning gravel in the East, North, and Middle forks of the Coquille River is less abundant, and production may be affected where the quantity and quality of spawning riffles are inadequate when return numbers are high. Fisheries biologists have observed chinook spawning on riffles at such high densities that egg survival is likely to be decreased due to competition for spawning sites and super-imposed redds.

Fall chinook salmon fry have been released from hatchboxes and widely distributed throughout the drainage since 1981. Starting in the fall of 1984, smolt releases were started and distributed widely in the basin. In 1991, all releases of smolts were confined to tributaries in the lower estuary (Ferry Creek and Sevenmile Creek) to avoid interaction with the wild population upstream.

FIGURE 2-3[3]

CHINOOK SPAWNING GROUND SURVEYS FOR THE COQUILLE RIVER



[3] ODFW Annual Surveys

4. SPRING CHINOOK

There are two spring chinook populations in the Coquille Basin that are currently very small, based on recent observations by ODFW district staff. The breeding populations are probably smaller than 200 fish each. The reasons for their decline are similar to those of the other salmonids, but there is also concern that poaching and harassment has contributed to their decline. Beginning in summer, returning adults hold in deep pools for up to several months before they spawn, making them extremely susceptible to poaching.

Instream habitat in the system does not appear to be any more limiting than that for the abundant fall chinook because they use the same spawning and rearing areas. However, higher water temperatures that occur during the periods that Spring Chinook brood hold in the river, especially during late summer, has probably affected their health and survival. These high temperatures are also likely to affect juveniles attempting to rear in the lower system and estuary until autumn.

Since 1983, a hatchery smolt program has been conducted with spring chinook in the Coquille in an attempt to supplement the wild production with releases at a variety of sites in the drainage in the South fork, East Fork, and in tidewater at Coquille. However, based on a

recent study (Ryman and Laikre, 1991) which suggests that the hatchery smolt program may be narrowing the genetic base and causing negative impacts to the wild population, the program was discontinued in 1995.

5. COASTAL CUTTHROAT TROUT

This species includes both anadromous and resident forms. Searun individuals often are silvery in color, and the characteristic spotting may be masked. Coastal cutthroat trout that remain in fresh water throughout their life usually are darker than anadromous individuals and may have a "coppery" coloration. Searun cutthroat trout in Oregon rarely exceed a length of 20 inches or a weight of four pounds.

Coastal cutthroat trout exhibit diverse patterns in life history and migration behaviors that are probably the most complex of any salmonid in Oregon. They show marked differences in their preferred rearing environments (river, lake, estuary, or ocean); size and age at migration; timing of migrations; age at maturity; and frequency of repeat spawning. The following major life history patterns are common to this species on the Oregon coast:

- Anadromous or searun populations migrate to the ocean (or estuary) for usually less than a year before returning to fresh water. Anadromous cutthroat trout either spawn during the first winter or spring after their return or undergo a second ocean migration before maturing and spawning in fresh water.

- Fluvial (potanadromous) populations, undergo in-river migrations between small spawning tributaries and main river sections downstream, similar to the ocean migrations of searun cutthroat trout.

- Adfluvial populations migrate between spawning tributaries and lakes or reservoirs. Migrations may involve inlet or outlet streams. Juveniles may spend from one to three years in tributaries before migrating into the lake.

- Nonmigratory (resident) forms of coastal cutthroat trout occur in small headwater streams, often above barriers, and exhibit little instream movement. They generally are smaller, become sexually mature at a younger age, and may have a shorter life span than migratory cutthroat trout populations.

Genetic analysis during 1991 of several populations in the Coquille basin indicated that an exceptionally high level of genetic divergence exists among populations in the basin. In some cases, this divergence was explained by the presence of natural physical barriers between populations in the form of waterfalls. In other cases, however, a high level of genetic divergence was observed in the absence of any physical barriers. This result suggests that some cutthroat populations move about and mix very little with adjacent populations even though they have the opportunity to do so.

Relative to historical levels, the current status of the cutthroat trout population is unknown, although we believe the numbers are presently lower, based on anecdotal accounts. A

population decline most likely occurred for the same reasons affecting other salmonids as listed above.

Beginning in the 1950s, cutthroat trout from Coquille River stock were released in the system. From 1975 to 1985, legal-sized Alsea River cutthroat trout were planted in the system, but releases were discontinued in 1985.

6. CHUM SALMON

The Coquille River is on the extreme southern edge of the natural range of chum salmon, and they may never have been more than an occasional visitor in the basin. No chum salmon have been raised or released from hatcheries on the Coquille River.

The spawning distribution of chum salmon includes tidewater areas. Juveniles rear for a very short time (1 to 4 weeks) in fresh and estuarine water before migrating to the ocean in spring.

7. RAINBOW TROUT

Resident rainbow trout are thought to be native to the Coquille River basin in a few isolated locations above the falls on the upper South Fork and it's tributaries (Eden Valley). In the past, legal-sized hatchery reared rainbow trout were released to provide recreational fisheries in all forks of the Coquille River system, Powers Pond, and Squaw Lake. The practice of stocking rainbow trout in the Coquille River, other than in isolated ponds, was ended in the mid 1970's, due to the potential negative impacts on wild cutthroat trout and winter steelhead.

8. STURGEON

Both white and green sturgeon are known to be present in the Coquille River system, although the population appears to be relatively small. White sturgeon are quite mobile and move freely from one estuary to another. Most of the sturgeon in the Coquille River system are immigrants from elsewhere and little, if any, natural reproduction occurs in the Coquille River system.

9. WARMWATER FISH SPECIES

Introductions of non-native warmwater species including Black crappie, Bluegill, Brown bullhead, Largemouth bass and Mosquito Fish probably began in the 1930s.

Brown bullhead, Largemouth bass, Bluegill, and Mosquito Fish are presently thought to inhabit the upper tidal portions of the Coquille River, including sloughs, and backwaters such as Fat Elk Creek, Beaver Slough, and floodplain ponds. Brown bullhead are also present in Cedar Swamp on Lockhart Creek in the South Fork of the Coquille. The only confirmed population of Black crappie is confined to Powers Pond.

10. SOFTSHELL AND GAPER CLAMS

Softshell clams were introduced to the Pacific coast in the 1870s and are now found in all estuaries in Oregon. Softshell clams are more tolerant than native clams of the reduced salinity levels which commonly occur in the Coquille River estuary in winter. The Coquille River estuary supports the southernmost populations of softshell and gaper clams in Oregon.

The lower Coquille River estuary is currently classified by the Oregon State Health Division as a prohibited area for commercial shellfish harvest for human consumption. A variety of concerns, including elevated fecal Coliform levels and episodes of contaminant inputs by riverside industries have prompted this classification.