

II. Historical Conditions Assessment

Historical information can provide important clues to the changes that have effected the watershed since European settlement and how the changes have led to the current conditions. Information was gathered from a variety of sources including agency documents, historical society records, literature, and interviews. Focus was directed on information that documented landscape conditions, aquatic and riparian habitat, fish populations, and water quality. The scope of issues explored includes early exploration and settlement patterns, direct impacts to stream channels, natural and human caused disturbance, fish presence and distribution, and resource exploitation. Understanding the factors that have led to the current conditions is important when considering restoration opportunities and monitoring plans.

Methodology

Literary searches were conducted at the Portland State University library, as well as the Oregon Department of Fish and Game's Clackamas Library and the Columbia County historical library. Interviews were conducted with local area residents and agency personnel. The information gathered has been organized into a time line and historical narrative. This section serves to define the background leading to the current conditions within the subbasin. Many of the issues discussed in this section are covered in more detail in sections that follow. For instance, historical channel modifications are mentioned here however the topic is more thoroughly investigated in the channel modifications section of the assessment.

Time Line

The historical conditions time line provides a chronological list of natural and human-caused events that have helped shape the watershed. The events in the time line are included in the historical narrative.

Pre-settlement	Native American population approximated as 50,000 along Columbia River (Cone and Ridlington 1996).
1792	Captain Robert Gray becomes the first European to discover the Columbia River and successfully cross the bar.
1805	Lewis and Clark Expedition.
1830	Europeans begin to exploit the salmon fishery.
1840's	Oregon Fever, settlers from Mississippi pour into Willamette Valley.
1851	Native American population reaches a low of 8,280, only 1/6 th of pre-settlement level (Smith, 1979).
1851	Streams begin to be used for log drives.
1867	First cannery on Columbia River located at Eagle Cliff, Washington.
1871	American shad and striped bass introduced to San Francisco (Smith, 1979).
1873	Oregon and Washington Fish Propagation Company organized.
1877	First hatchery within the Columbia River system opened on the Clackamas River.
1879	Competition and over-harvesting of chinook salmon populations results in decreased profits for many of the canning companies within the Columbia River.
1879	Fish wheel brought to the Columbia River increasing the efficiency of the salmon harvest within the Columbia River and its tributaries.
1882	Tide Creek used for log drive.
1883	Extensive clearing of streams and riparian vegetation for log drives.
1883	Highest catch of chinook salmon ever recorded on the Columbia River.
1883	Northern Pacific Railroad line completed between Portland and Goble.
1884	Peak in Columbia River salmon canning industry; canning market is saturated with salmon.
1886	Army Corps begins extension of Columbia River jetty.

1894	Highest recorded flood on Columbia River.
1897	Clatskanie River utilized for steamboat transportation.
1903	American shad a nuisance to fisherman in Columbia River (Smith, 1979).
1908	Diking of floodplains in the northern region of the subbasin.
1911	Catch for all salmon species peaked at 47 million pounds on the Columbia River.
1911	Oregon Board of Health declares the Willamette River to be unsuitable for humans and fish (Cone and Ridlington, 1996).
1914	Log drives ended on Clatskanie River.
1915	Opening of Dalles-Celilo canal.
1925	Columbia River salmon begin to show a steady and appreciable decline (Cone and Ridlington, 1996).
1926	Fish wheels outlawed by Oregon; Washington outlaws the fish wheel by 1934.
1930	Construction of first dam on Columbia River begins.
1933	Completion of the Bonneville dam, the first mainstream dam on the Columbia River.
1933	OK Creek floods.
1934	Clatskanie dikes raised to flood level of 1894.
1937	Dam constructed between Westport Slough and Clatskanie River.
1948	Vanport flood.
1949-1970's	ODFW conducts stream cleaning project in Clatskanie River.
1957	The Dalles dam completed flooding Celilo Falls.
1963	Construction of U.S. Highway 30 from Clatskanie to Westport.
1965	Clatskanie Hatchery project begins.
1970	Clatskanie Hatchery closed.
1980	Eruption of Mt. St. Helens.
1983	Lowest salmon catch on record for Columbia River.
1995	Coho salmon Lower Columbia River/Southwest Washington ESU designated a candidate for listing.
1996-1997	Floods cause debris flows and landslides throughout the North West.
1998	Steelhead Lower Columbia River ESU listed as threatened.
1999	Chum salmon Columbia River ESU listed as threatened.
1999	Chinook salmon Lower Columbia River ESU listed as threatened.
1999	Sea-run cutthroat trout Lower Columbia River/Southwest Washington ESU proposed for listing as threatened.

Historical Narrative

Pre-European Settlement

When explorers first navigated the lower Columbia River they found numerous villages along the banks of the free-flowing river. The villages, each one independent yet all sharing a common dialect, were home to the people known as the Chinooks (Thompson, 2001). Chinookan peoples once thrived in the Lower Columbia River harvesting the abundant salmon and building their canoes and villages with wood from the lush forests. Paleological studies have indicated that people hunted Pacific salmon as early as 9,000 years ago (Lichatowich, 1999). By the onset of the 19th century the population of Native Americans is estimated to be around 50,000 along the Columbia River (Cone and Ridlington, 1996).

The Chinook peoples were skilled at trading and the Columbia River served as a major trade route. They traded goods and services from the mouth of the river upstream to Celilo. Tribes came from inland valleys and as far away as the Great Plains to trade salmon, bone, obsidian, shells, grasses, roots and slaves (Thompson, 2001). From their position on the Columbia River, the Chinook peoples controlled much of the access to the Columbia River fisheries. river was used as the main trade route with other tribes traveling from the coast and inland valleys to trade. Some estimates indicate that these people harvested nearly 41 million

pounds of salmon a year, of which a large portion was traded to interior tribes (Cone and Ridlington, 1996).

Within the Lower Columbia-Clatskanie Subbasin, there were at least four villages located near the present day sites of Port Westward and Crims Island, Rainier, and St. Helens (Thompson, 2001). The tribes hunted fish and game, gathered roots and berries from the forests, and constructed their homes and canoes from cedar logs. Cedar bark was used for fish nets and women's skirts. They wove hats out of spruce roots and sewed fur caps with them as well. Cattail reeds were used for mats, and canoes (Miller, 1958). Native societies were shaped by the environment and in such dependent on its resources. Although the salmon runs peaked for only a brief number of days each season, it is reasonable to assume that native peoples had some degree of dependence on salmon. Fishing was heaviest at certain natural obstacle on the Columbia and at similar points in its tributaries. A variety of techniques were utilized including dip nets, two-pronged spears, weirs or traps, seines, and gill nets.

As early as 1775 the Native American peoples began to suffer from diseases carried by the European settlers. In 1851 a census of the population estimated that there were only 8,280 Native Americans in the Lower Columbia region, 1/6th the number that existed when Europeans first arrived (Smith, 1979).

European Exploration/Settlement

For generations before the Columbia River was discovered by Europeans, vague rumors circulated of a mighty river somewhere in the region that was later to be known as Oregon Country. The search for the mighty river of the West was conducted by the Spanish and British as well as the newly formed United States. Explorers ventured up the Oregon coast as early as 1543 but failed to locate the mouth of the Columbia River. These expeditions continued through the 16th, 17th and 18th centuries until 1792 when Captain Robert Gray of the United States crossed the bar of the river in his ship the Columbia. Captain Gray and his party explored in vicinity of present day Astoria, but did not venture further upriver. It was the Spanish lieutenant William Robert Broughton who ventured as far upriver as Portland mapping and giving name to the various features of the Lower Columbia River (Miller, 1958).

The event that opened the Oregon Country to settlement was Meriwether Lewis and William Clark's expedition. In 1803 the expedition left St. Louis in hopes of finding a trade route across the continent with the Orient. By 1805 they had reached the Lower Columbia River and made contact with the native peoples. From this point in history on the settlement of the region advanced rapidly. The first settlers were trappers and fur traders. The Hudson's Bay Company played a major role in developing trade with native peoples as well as other nations. Oregon Fever in 1840 brought settlers from the farmlands of Mississippi to the Willamette Valley. These settlers displaced an already decimated Native American population. The first settlements within the Lower Columbia-Clatskanie Subbasin were along the floodplains of the Columbia River in the vicinity of St. Helens and Clatskanie. Though trapping was the first industry, timber and fisheries were the driving forces behind the settlement of the north coast.

Fisheries

Through its connection with the Columbia River, this subbasin becomes part of a much larger picture. Subwatersheds can be delineated and analyzed based on the conditions within their boundaries, however all of the streams within the Columbia River system have experienced the human influences and management activities directed at the whole system. For instance,

hydroelectric developments have impacted tributary streams through imposing migration barriers and a loss of habitat. Within the Lower Columbia-Clatskanie subbasin the streams have experienced unsuccessful hatchery programs and misguided habitat restoration, directly related to mitigation. The connect between the subbasin and the Columbia River system gives us reason to consider factors on a grander scale.

As the first settlers arrived in the region they made use of its many resources not to mention the abundant food source of salmon. Earliest accounts of exploitation date back to 1830; salmon were dried and salted for storage and transportation. The salmon industry did not realize full potential until canning was introduced. Eagle Cliff, on the Washington side of the river across from Clatskanie, was the site of the first cannery in 1867. Additional canneries sprung up in logging towns up and down the river. By 1883 the number of canneries had reached its peak at fifty-five on or near the Columbia River. This was also the year that the harvest of chinook salmon peaked at 630,000 cases of 48 one pound cans. Like any natural resource the competition became fierce and the resource overexploited. Chinook salmon were the primary catch up until the late 1800's when other species began to be utilized. By 1911 the catch of all species had peaked at 47 million pounds (Cone, 1996).

While the salmon industry was experiencing a boom, the timber industry was doing likewise and affecting the riparian and instream habitats. Within the subbasin streams were being exploited for log drives. Tide Creek was the first stream within the subbasin to be used for log drives (Farnell, 1980). Streams were cleared of debris, temporary dams were constructed (splash-dams), and the raw timber was piled up behind them. With the winter freshets the splash dams were blasted and the torrent of water flushed the logs, and anything else in the channel, downstream. Though it was a relatively inexpensive and efficient way to transport raw timber, the practice decimated riparian and instream habitats, directly impacting salmon populations. The practice of log driving was eliminated by 1914 with the Clatskanie River being the last stream in which it was conducted.

Another impact on fisheries has been the introduction of non-native fish. American shad were first introduced to San Francisco in 1871. By 1903 fishermen in the Columbia River reported that American shad had become so numerous in their nets that they were a nuisance. In addition to this species there are non-native warm water fish such as blue-gill, crappie, and bass found abundantly in the lower reaches of many streams. Sloughs are ideal habitat for these species, and they have been found throughout the Columbia River floodplains of the subbasin (Fies, 1971).

With the onset of hydroelectric developments the Lower Columbia River became slated as a production zone for salmon. Habitat and water upstream of Bonneville was rapidly being lost to hydroelectric and agricultural developments. Mitigation for the losses caused by dams came from the Mitchell Act of 1948 which created a system of hatcheries within the lower Columbia River. The first hatchery in the Columbia River system was on the Clackamas River. Though it was unsuccessful at large, the hatchery idea was seen as the solution to overfishing, habitat loss, and hydroelectric developments. The Clatskanie River had a hatchery program from 1965 to 1970. Gnat Creek located to the west of the subbasin has been in operation for many years, supplying fish to the Clatskanie River.

The impacts of hatcheries on native fish runs has been studied by many and the consensus is that hatchery fish compete with native fish and often stray from their natal streams.

These strays may breed with native fish thus adding their genetic material to the gene pool. The genetic diversity that has developed from a long evolution has been polluted with these hatchery fish. Until recently hatcheries would utilize the first fish to return and reach their quota of fish early in the season. This led to fish that would return early each year. In short the fish were being bred for this characteristic. In addition to this hatcheries would often buy fish from other hatcheries introducing other problems to the gene pool. Salmonids within different regions of the Northwest and even within different sections of the Columbia River Basin are considered to be genetically and behaviorally distinct. Hatchery programs in some areas have reduced the genetic variability of native runs by introducing competition from inbred stocks.

Salmonid populations in the Columbia River and its tributaries have shown a steady decline since the early 20th century. In light of this, several species have been listed as either threatened or endangered under the Endangered Species Act. The convention for listing is to identify evolutionarily significant units (ESU's). These represent "distinct population segments" which are "substantially reproductively isolated" and "contain genetic variability that is a product of past evolutionary events and which represents the reservoir upon which future evolutionary potential depends" (NMFS, Nov. 20, 1991). The Lower Columbia-Clatskanie Subbasin has been included as critical habitat for chinook salmon, chum salmon, and steelhead ESU's. Coho salmon is listed as a candidate and sea-run cutthroat is proposed for listing. As stated earlier in the introduction, the Lower Columbia-Clatskanie Subbasin is listed under nine separate ESU's as critical habitat.

"Critical habitat is defined in section 3(5)(A) of the ESA as (I) the specific areas within the geographical area occupied by the species...on which are found those physical or biological features (i) essential to the conservation of the species and (ii) which may require special management consideration or protection; and (ii) specific areas outside the geographical area occupied by the species...upon a determination by the Secretary [of Commerce (Secretary)] that such areas are essential for the conservation of the species." (NMFS, Feb. 16, 2000)

In addition to the federal status of these species the State of Oregon has listed Lower Columbia River coho salmon as endangered. Given this picture of the status of anadromous salmonids in the subbasin, it is safe to assume that there are no "healthy" runs of salmonids within the subbasin. The remaining sections of this assessment, including the section on fish and fish habitat, will explore this issue in more depth.

Forestry

The first settlers in the region relied on an abundance of raw timber to build their homes and provide fuel for cooking and warmth. The harvest of timber began with the first settlers and grew rapidly into an industry. The Lower Columbia River, including Columbia and Clatsop Counties, was the first major source of timber. Timber was initially harvested along the floodplain of the Columbia River and in adjacent streams where access was easy and tributary streams could be used to transport logs down to the sloughs of the Columbia River. These same streams were used to power early mills and carry away mill waste.

The first lumber mills were small operations where the manager worked along side his employees. Most of the cities and small towns within the subbasin began as mill towns. In the middle 1800's logging practices were primitive. Trees were felled by hand from the forests near the mill, and bordering the stream on which the mill was situated. Ox teams and log drives were

used to transport wood from distant sites down to mills or as raw timber to the market. Many of the streams in the subbasin were utilized for log drives. By 1883 any stream that was large enough for log drives was cleared of obstructions so that logs could be run down them during the winter freshets (Farnell, 1980).

With the introduction of more efficient techniques the rate at which the old growth forests were being logged increased. The steam donkey and high line replaced the oxen and were in general use by 1900. Population growth in Portland and nearby cities increased the demand for lumber, providing a market for local mills. As the demand increased and the techniques grew more efficient the distance between standing timber and the streams intensified the problem of transporting logs to mills. The logging locomotives came to the north coast in the 1880's (Miller, 1958). By the 1890's the hills and valleys of the north coast were covered with networks of logging railroads. By the end of the century extensive railroad lines enabled loggers to reach timber in the mountains that was previously inaccessible.

In addition to these logging railroads, other lines in the mid to late 1800's linked the Pacific Northwest making it possible for mills to ship their product to regional and world markets. In 1883 the Northern Pacific Railroad Line was completed providing a link between Portland and the Puget Sound. The line ran along the Columbia River to the town of Goble where trains were transferred by ferry across the Columbia River to Kalama, Washington.

In 1929 a group of loggers used trucks for the first time to haul logs near Brownsmead, Oregon. A significant change took place with the introduction of the truck; railroads and high-lead methods were being replaced by logging trucks and tractors.

Early accounts of the North Coast of Oregon indicate that dense coniferous forests covered it. By 1914 seventy percent of the subbasin had been harvested (Figure 2.1). Today there are no remaining stands of old growth timber within the subbasin (Figure 2.2). Secondary growth timber provides the raw material for local lumber and paper mills. Figure 2.2 shows that there is a scattering of large trees, greater than 30 inch DBH, on state lands in the northwestern part of the subbasin. The remainder of the subbasin is comprised of secondary growth stands of conifers and hardwoods that have less than a 30 inch DBH. The areas identified as open ground consist of land uses other than forestry as well as clear cuts. The ancient forests were characterized by diversity in species and age class, but the tree farms that have replaced them are mostly even-aged stands of Douglas-fir.

Farming

Early settlers maintained farms for subsistence, but the farm industry was never very big in the subbasin. By the 1890's farming was starting in the interior valleys, having already gained a foothold on the floodplains of the Columbia River. Columbia County in 1894 had 12,000 acres of land under cultivation, though it is not known how many of these acres were within the subbasin. All through the 1890's lands were being cleared of trees, slash was burned, and the stumps were removed for farms. Most of this activity was taking place in the floodplains of Westport Slough and Beaver Slough, as well as the inland valleys and floodplains of streams within the eastern half of the subbasin. The current land use pattern of rural residential and pastureland reflect, to a degree, earlier agricultural developments in the Beaver Creek and Tide

Data source: Original map produced by Elliot, F.A. 1914. Oregon State Forestry Board.
Digitized by the Oregon State Service Center for GIS.

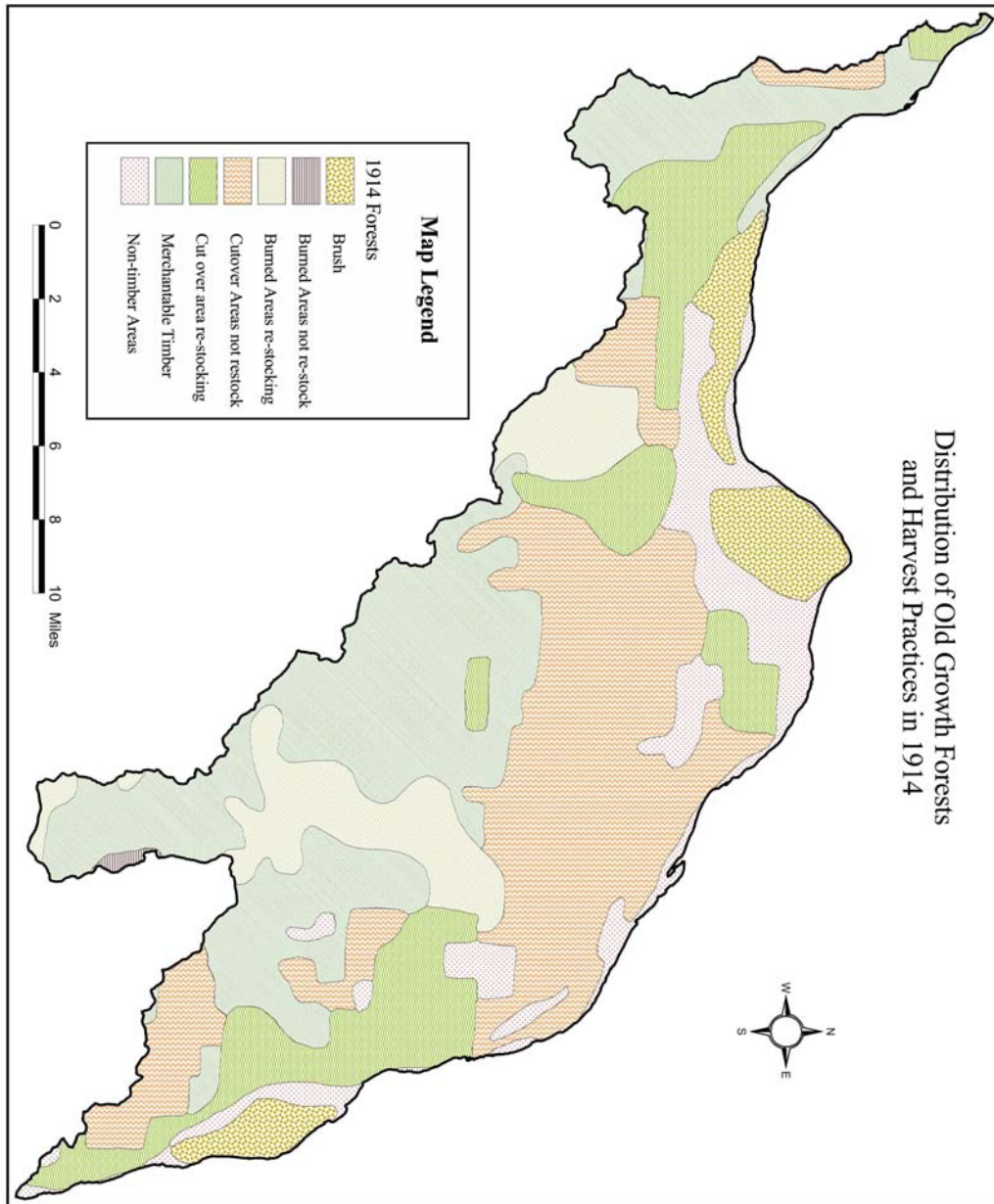


Figure 2.1: Distribution of old growth forests and harvest practices around 1914.

Creek areas. The interior valleys of the subbasin no longer support crops as a land use. The few areas that once supported crops have been converted to other land uses.

Fires

Shortly after most of the virgin timber was removed from the middle and southern parts of the subbasin, the area was subjected to devastating fires in the early 1900's (State of Oregon Fish Commission, 1951). Figure 2.2 indicates that by 1914 there were large tracts of land that had been burned following clearcutting. Reseeding within parts of the subbasin was slow because of a lack of nearby seed trees. Fire has also been utilized as a management tool in forestry for many years; clear cuts were burned to remove slash. Broadcast burns can still be used as a management tool, however slash pile burning is the only fire management being used in the subbasin (Mike Simek, Forester with ODF, personal communication May 17, 1999). The assumption drawn from this information is that there are no historical or recent broadcast burns within the subbasin that are currently impacting streams.

Floods, Navigation, and Channel Modifications

There are few accounts of historic floods within the subbasin. Most of the floods were directly associated with log drives. "In January 1901 [on the Clatskanie River] the freshet came out with such force, because of a [log] jam on one of the river's tributaries, that the Tichenor Mill Company of Clatskanie was buried in ten to twenty feet of logs and debris..." (Farnell, 1980). Martha Colvin, a resident of the subbasin, recalls a flood on OK Creek in 1933, "a 12 foot wall of water, logs and boulders thundered down,...it swept bare the creek bottom destroying everything in its path, and cleared out the canyon to a great height." The highest recorded flood on the Columbia River was in 1894, however there were no records found of flooding within the streams of the subbasin.

Floods have had recent impacts within the subbasin. During the winters of 1996 and 1997 there were several debris flows triggered by slope failures within the subbasin. Debris flows scoured the streambeds and riparian zones of Conyers Creek, Graham Creek, and OK Creek. Landslides and debris flows are not uncommon in the Pacific Northwest. They are largely influenced by soil properties, slope, drainage density, and human activities. Though forest roads and timber harvests are known to increase the frequency and intensity of landslides, the watersheds of the North West have experienced such events throughout their history (Amaranthus et al, 1985; Beshcta, 1978; Rice and Lewis, 1991).

Flood control within the subbasin has included diking and dredging of estuarine habitats and wetlands within the floodplains near Clatskanie, Rainier, and Deer Island. The floodplains of the Westport Slough-Clatskanie River-Beaver Creek complex were diked and drained for agricultural use and navigation. "In 1901 the Army Corps of Engineers dredged the lower channel in order to reduce its twisting length by two miles and remove the silt and debris which shoaled the channel after winter freshets (Farnell, 1980)." The lower Clatskanie River is still maintained for a length of four miles at a depth of six feet and width of forty feet. As mentioned earlier many of the streams within the subbasin were utilized for transport of raw timber to mills. Another form of transportation that utilized the streams was the steamboat. The Clatskanie River was plied for steamboats beginning in the last half of the nineteenth century (Farnell, 1980). The Shaver Transportation Company ran steamboats between Portland and Clatskanie during the 1880's and 1890's. Steamboats were mainly used to transport logs that had been driven down river from the watersheds interior forests.

Data source: Bureau of Land Management, Oregon Office. 1993.
Western Oregon Digital Image Project.

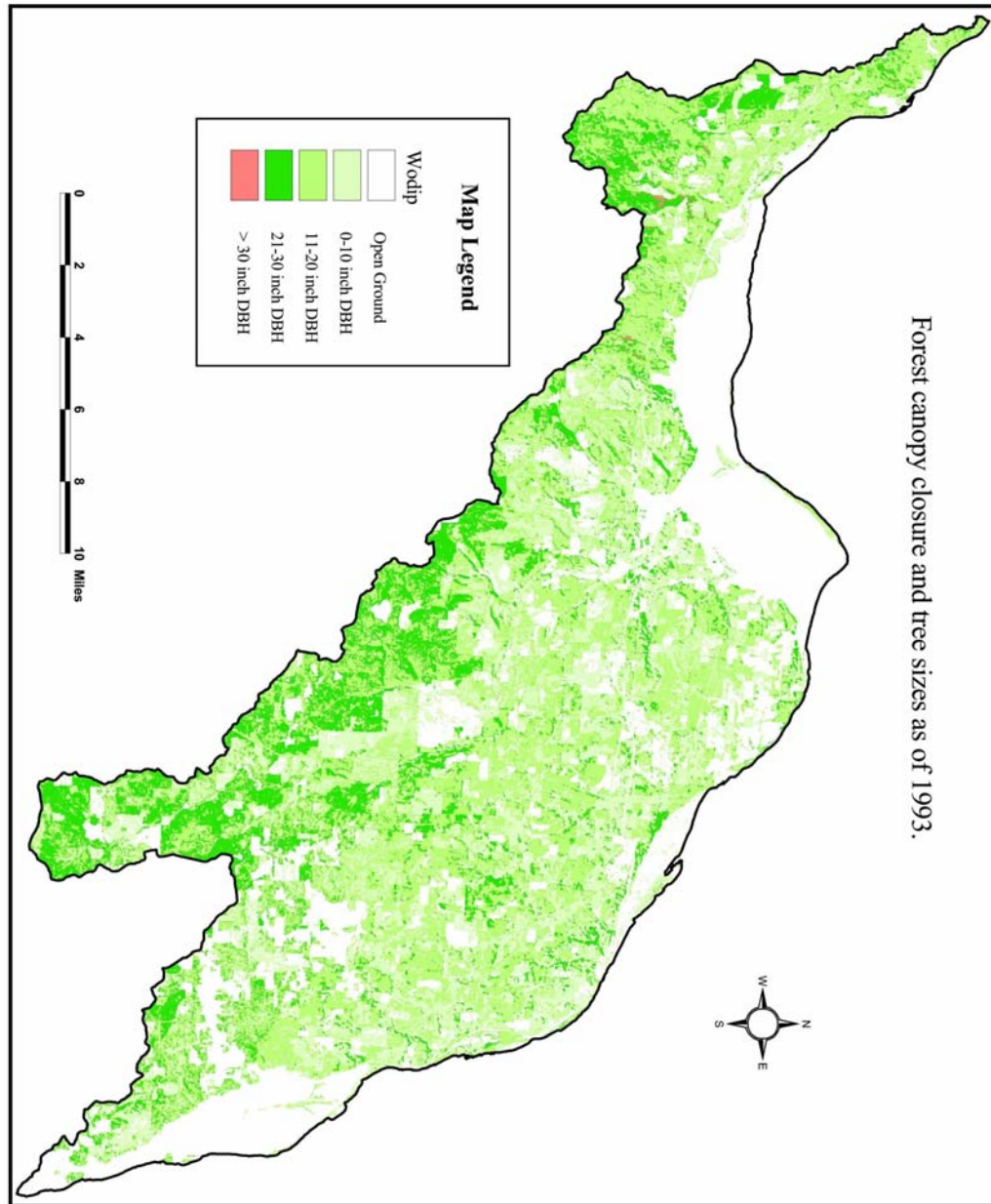


Figure 2.2: Forest canopy closure and tree size based on satellite imagery taken in 1993.

Historic channel modifications include log drives, dikes and dredging. As previously mentioned log drives were practiced in many of the streams within the subbasin. Due to the extensive use of the Clatskanie as a highway for commerce and for vessel navigation the State has claim to the bed up to river mile 14. Streamflow in these lower miles of the Clatskanie River was high enough for unaided log drives; splash dams were not required to move the logs. Tide Creek and Beaver Creek were also used extensively for log driving, however splash dams were used more widely on these streams to aid the transport of logs.

The practice of log drives required that the streams be clear of woody debris. In addition to this the use of splash dams sent torrent of wood, debris, and water rushing down stream channel effectively scouring the beds and removing riparian vegetation. Log drives were not the only motivation to remove large woody debris from streams. The Oregon Fish Commission (now the Oregon Department of Fish and Wildlife) conducted a stream-cleaning project in 1949. The purpose of the project was to open up habitat to salmonid spawning and rearing. It was believed at the time that one of the major factors limiting salmonid productivity was the lack of access to suitable habitat. The Clatskanie River was cleaned of woody debris along most of its length. Heavy equipment was brought down to the stream channel to remove wood from the bed. With the removal of woody debris from the streams the complexity of the instream habitat was reduced, and the rate of flow increased. These two factors have proven to have negative impacts on salmonid productivity.

A more detailed analysis of channel habitat modifications will be presented in section seven of this watershed assessment.

Conclusions

Natural processes and human influences have shaped the streams and landscape of the subbasin leading to the current conditions. Fish have adapted to the changes brought on by naturally occurring catastrophic events in the history of the region, however the same can not be said about the changes brought on by humans. The effects of human induced alterations to the streams and landscape are difficult to measure. Though the cumulative effect of these changes can be seen in the declining runs and threatened status of salmonids within the Lower Columbia River. With the onset of European settlement salmonids have experienced a variety of pressures from harvests and habitat modifications. The abundant source of salmon was soon depleted by over harvesting while the habitat modifications further exacerbated the problem.

Key Findings - Historical Conditions

- Fish abundance has declined significantly since the settlement of the region.
- Hatchery fish have had a negative impact on native fish through competition and interbreeding.
- Commercial fishing contributed to declining fish runs.
- The floodplains along the Columbia River were once estuarine and wetland habitats.
- Timber harvests have removed all of the old growth forests from the subbasin.
- Forest composition has changed from diverse multi-structured stands of conifers and hardwoods to mainly Douglas-fir plantations.
- Log drives were conducted in many of the streams within the subbasin.

Data Gaps

1. Historical accounts of fish runs prior to hatchery developments are non-existent.
2. Historical land use distribution was not gathered for this assessment.
3. The General Land Office survey records were not obtained.
4. Tax records were not analyzed.
5. Location and frequency of log drives and splash dams was not readily available. There are some accounts of which streams were being used but not the frequency of use or the location of the splash dams.

Confidence Evaluation

Moderate. While there are many accounts of the history of the northwest, few documents pertain directly to the Lower Columbia-Clatskanie Subbasin. In regards to this data was gathered from various sources to piece together a picture of the historic conditions and changes within the subbasin. Data was gathered from multiple sources including state and university libraries, county historical societies, long time residents, and agency personnel. The information presented in this section is an overview of the human influences that have played a part in shaping the subbasin. There are many excellent accounts of the people and families that settled this region, however they have not been included here.

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