

Watershed Modeling

Joshua Reed

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1 Intro

I have decided to model or discuss two watersheds local to my area. The Tualatin and Willamette watersheds. The Tualatin is the watershed for the ecosystem I visited, and it is also the watershed of my home city. The Willamette watershed is the largest watershed in the Portland area, and its dense population makes it an interesting study.

One note is that I felt trying to fit all of the watershed information on one map was too compact and restrictive. I believe that the format below is sufficient to build a model of the watersheds under study.

2 Tualatin Watershed

2.1 Overview

The Tualatin Watershed covers 14 cities. Figure 1 provides a broad overview of the Tualatin watershed, and its location in relation to Oregon's borders. Figure 2 shows a more geographic overview of the Tualatin watershed, and figure 3 shows the sub-watersheds within the greater Tualatin watershed. For scale purposes I will actually just focus on the Tualatin River Watershed itself, though I may mention some of the other sub-watersheds as well as they all contribute to the Tualatin River Watershed.

Figure 1: Tualatin Watershed—Epa.gov



Figure 2: Tualatin Watershed—ArcGis & Clean Water Services

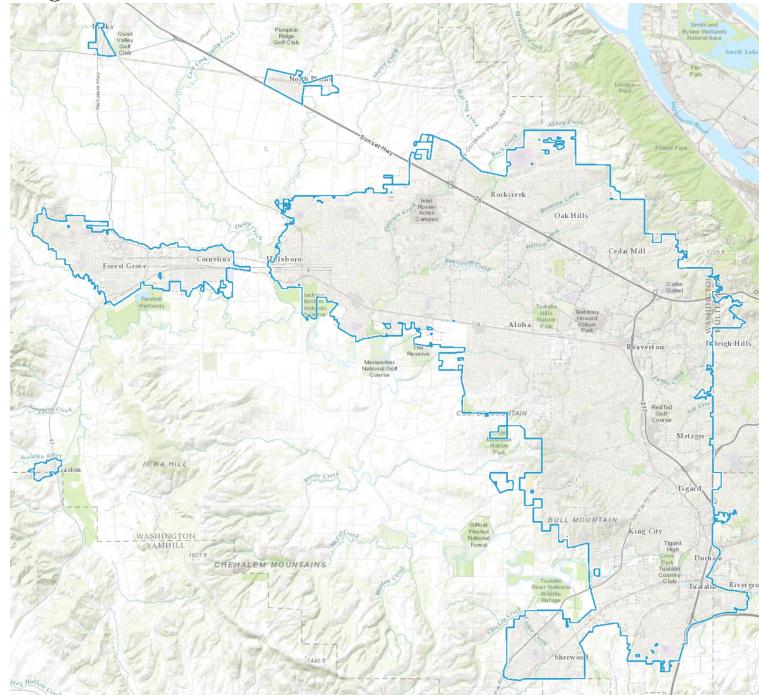
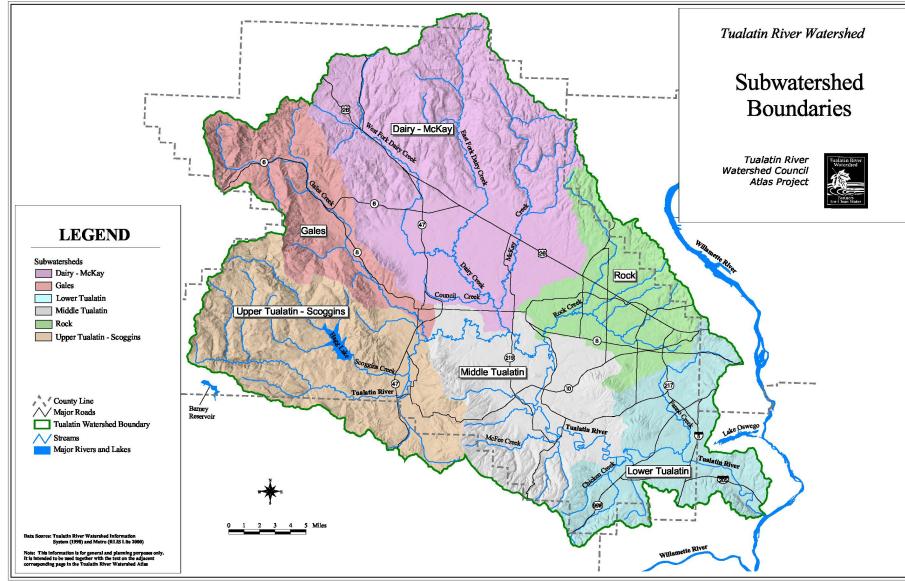
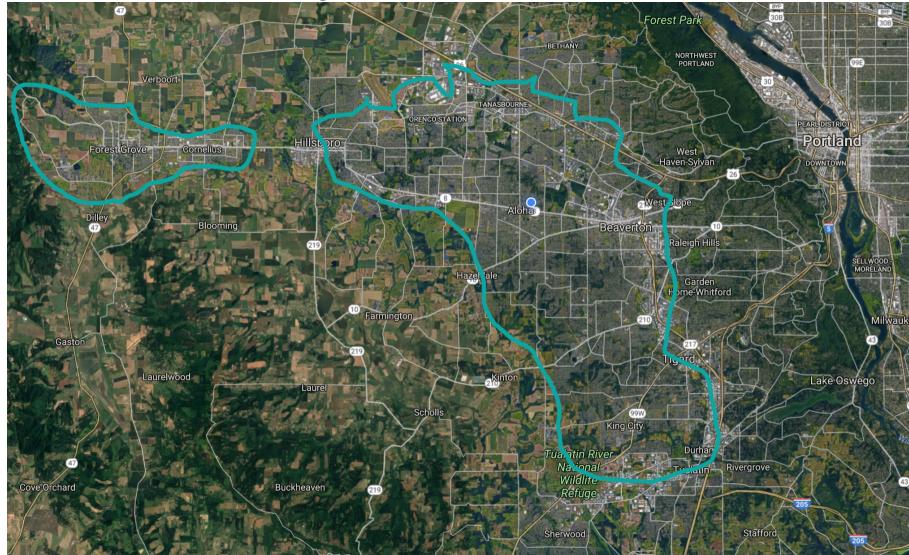


Figure 3: Sub-Watersheds — Source



Finally, for overview images, I've included figure 4 to fulfill the google maps requirement. Here I've attempted to trace the area of the watershed myself.

Figure 4: Tualatin Watershed



The Tualatin watershed covers approximately 1350 square miles and consists of 6 sub-watersheds. Most of these sub-watersheds drain into the Tualatin River. Which itself is a tributary of the Willamette!

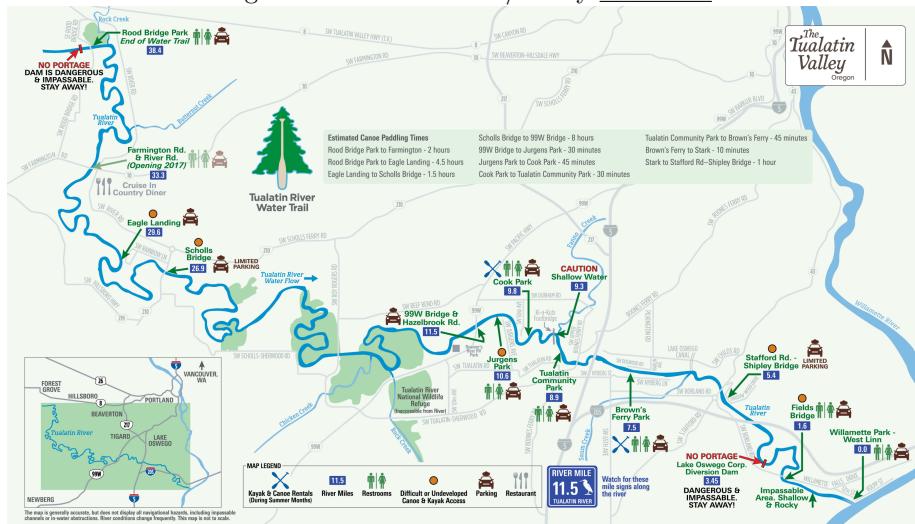
2.2 Features and Uses

The Tualatin river is 83 miles long, and drains an area called Tualatin Valley. It is considered a farming region, but these days the area is becoming more and more populated. In fact, 20% of the land that drains into the river is populated with a total population of 500,000 people.

As for the majority of land that composes the Tualatin Valley watershed, 30% is agricultural, and 50% is forest.

As can be seen in figure 5 the Tualatin River really snakes around. Also, the figure gives a better idea of what is meant by the Tualatin Valley, and another feature this watershed provides, recreation! The river drains from the coastal mountains.

Figure 5: Tualatin River/Valley — Source

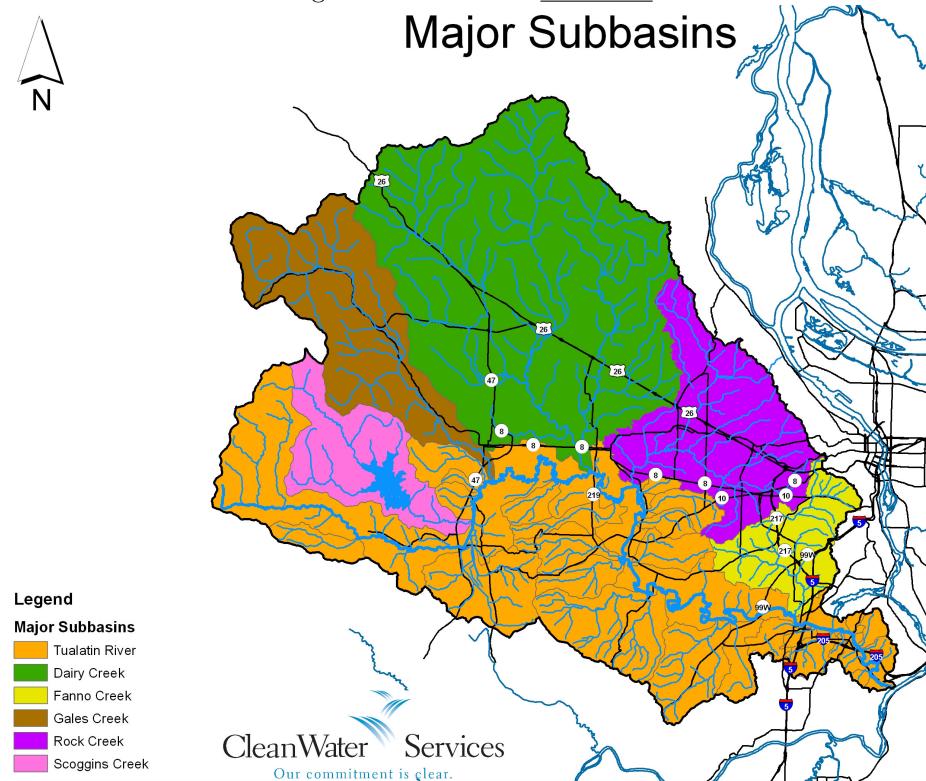


As noted in the above figure, the Tualatin River is raised a few feet by the Scoggins dam owned by the Lake Oswego Corp. This dam is in place to increase the water level and thus water pressure such that land downstream can use the water for irrigation and farming purposes.

The dam also creates what is known as Hag Lake, a local fishing and recreation spot.

The Tualatin River has five major tributaries: Scoggins Creek, Gales Creek, Dairy Creek, Rock Creek, Beaverton Creek. The tributaries can be seen in figure 6.

Figure 6: Tributaries — Source



It's clear that this watershed is vital to my home town. It supports both agriculture and residency. With only 20% of the watershed's land occupied by people, it isn't a watershed that needs a ton of remediation, but does still warrant care. The watershed's river and tributaries are monitored for common farming chemicals like fertilizers and pesticides.

3 Willamette Watershed

3.1 Overview

Unlike the Tualatin Watershed, the Willamette Watershed doesn't even cover an entire city! Of course that's just silly human boundaries as it still covers nearly the same area and is vital to an even greater population. As before, figure 7 shows the broad view of this watershed and its location relative to Oregon's borders.

Figure 7: Willamette Watershed—Epa.gov



Which is again a sub-watershed of a greater system as shown in figure 8.

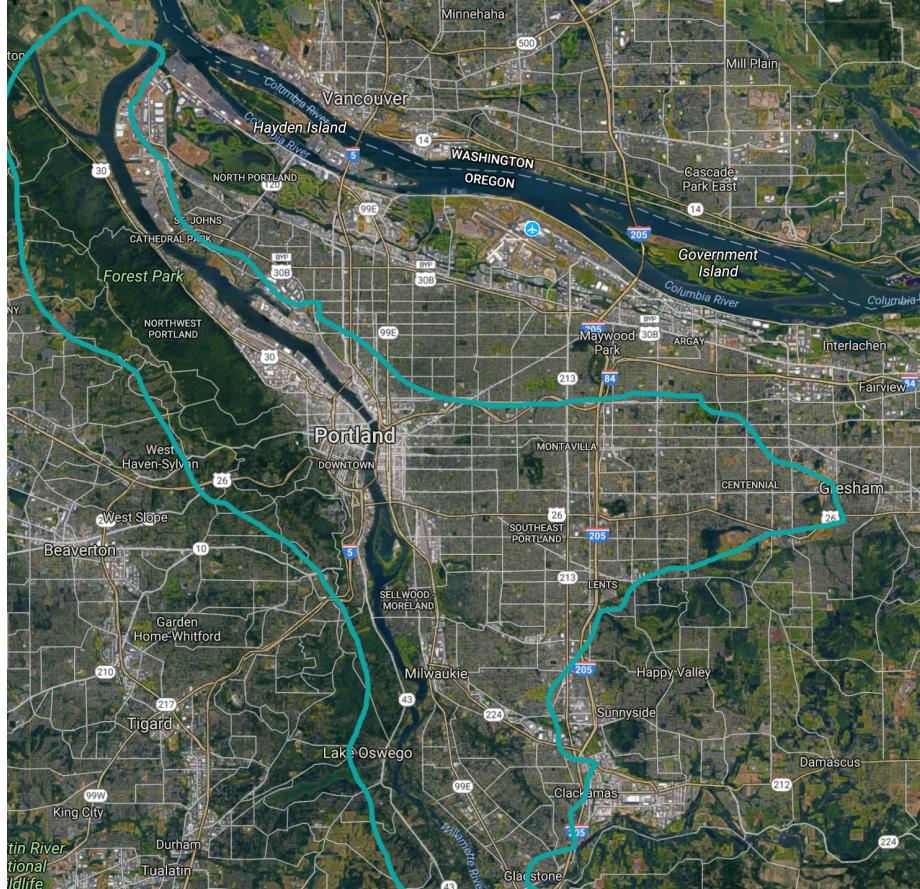
Figure 8: Willamette Watershed—City of Portland



In the figure 9, I've again drawn a border over a google map image of

the water shed. In this map, it is quite easy to see the main features of the watershed which include the Willamette River, Forest Park, and occupied areas of Portland.

Figure 9: Google Maps of Willamette Watershed



3.2 Features

3.2.1 Portland

Portland is actually only a small portion of the greater watershed. About 17 miles of the Willamette runs through the city. The Willamette actually meets with the Columbia river within Portland. The city is highly populated, yet it is still to the watershed as a whole. This part of the watershed is said to act as

a gateway to fish and wildlife.

Urban areas require special care to prevent watershed pollution and dysfunction. At any one point in time, there are usually several watershed enhancement projects occurring. Despite the large amount of water flowing through the Willamette watershed, the city actually uses the Bull Mountain watershed for water supply.

More below... (bad formatting)

3.2.2 Willamette River

The Willamette River actually originates near Eugene. This and the river's major tributaries can be seen in figure 10. The river is a source of recreation and more for the city. For example, several dams are used to generate electricity.

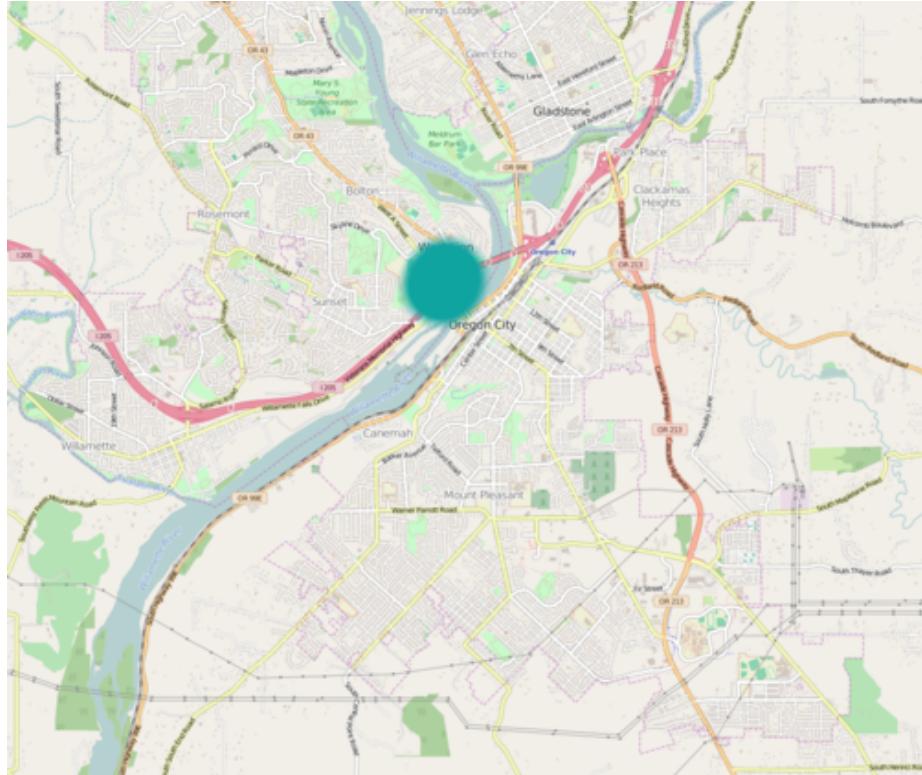
Figure 10: Willamette River and Tributaries — Source



3.2.3 Dams

There are over 20 dams on the Willamette river and tributaries. There is also extensive use of levees, dikes, and channels for flow control. The only dam on the River itself is the Willamette Falls Locks located near Oregon City as shown in figure 11

Figure 11: Willamette Falls Locks



3.2.4 Forrest Park

Forrest park is just as it sounds a large forested park. It is over 5100 square acres, and drains into the Willamette. It is known as a rich natural preserve with more than 112 bird species and 62 mammals. About 40 inches of rain falls on the park per year.

3.2.5 Harbor

The Willamette river is home to a harbor called the Port of Portland. This portion of the river is subject to dredging and maintenance to maintain sailability to cargo ships. Portland of course only developed as a consequence of the Columbia and Willamette Rivers.

Clearly the Willamette Watershed is a huge vital watershed with strongly differing maintenance needs from that of the Tualatin watershed. The city depends on the river for cargo transport, fish depend on it for passage, and most of the drainage comes from occupied land or forestry as opposed to farmland.