

Forests and Water

The most important watersheds around the entire world are all forested. Watersheds are the link between rain and snow and rivers and lakes. Continuously flowing rivers are born in forested hills and mountains. Mountains collect rain and snow because higher terrain forces passing clouds to release moisture. The clouds which stream off the Pacific over the coast ranges to the Sierra, across Nevada and on to the Rockies are the source of nearly all the water which falls on California and much of the water which irrigates the West.

Northern California's coast ranges, like the Santa Cruz Mountains, stop a lot of rain. An average of 55 inches of rain falls here in Lompico during the roughly six month rainy season. In flood years this total can more than double. Intense storms in which five to ten inches fall in a single day are not uncommon. It is the response of a landscape to this heavy rain that is the first sign of a healthy watershed. Forested watersheds which are undisturbed are now rare, but where they exist the streams run clearer when the rain falls hard. This is because forests moderate and promote the absorption of rain and reduce soil erosion. Rain falling on an intact forest first strikes the trees which stand tall over the surface of the land. Impact erosion on the surface soils is thus greatly reduced by heavy forest cover and the deep leaf litter which covers the surface of the ground. When rain first begins to fall the needles and leaves of the trees collect the rain. This is, of course, why when it starts to rain, if there is no lightning, we run under trees to stay dry. As the rain continues to fall the trees become laden with water and begin to release the drops onto the forest floor. After the rain stops, water continues to fall from the trees to the ground. This is one example of how forests help to increase the absorptive capacity of the land because a forest stretches out the time that the water is falling to the forest floor and allows more water to be absorbed. Redwood trees are one of the few species of tree that can absorb water directly through their needles. Redwoods only grow naturally near the ocean in the cool fog belt where they can get moisture directly from the condensation of fog. The trees also cause the fog to condense to the point that it falls to the ground and sends water into the roots of the trees. Some water will be evaporated from the trees depending on weather conditions. This evaporated water helps re-charge the cloud moisture and will help produce more rain down wind perhaps on the next set of hills that the clouds pass over.

The deep leaf litter on the floor of forests is another important moderating factor in the way forested land absorbs water. Redwood forests have particularly deep leaf litter. This mat of decaying conifer needles and leaves acts like a sponge when rain falls. As the leaf litter becomes laden with rain water, the water begins to percolate down into the soil and recharges the soil mantle and then deeper underground aquifers. In areas where the forest has been removed and the bare soil is exposed and scraped up by bulldozers for road building and other industrial reasons, soil erosion increases dramatically and the ability of the earth to absorb and retain water is reduced, sometimes to a considerable degree. This is very important in Lompico since all the water used by canyon residents starts as rain falling on this watershed.

There are other ways that the forests are linked to the ability of the land to absorb water. Forests grow with extensive root systems. These roots penetrate and aerate the soil keeping it from becoming too compacted. Loose living soil can absorb water much better than compacted soil that has lost the extensive microbial, fungal and animal life that burrows through and mixes the soil. People have their lawns aerated mechanically to imitate the natural process that living forest soils are continuously going through. The Santa Cruz Mountains are famous for the extensive fungal forms that are found here. Some of this fungal life works symbiotically with tree roots to increase the ability of the trees to absorb water. The fungus benefits from receiving food from the tree roots.

Since Lompico draws water from Lompico Creek it is important that the creek flow steadily all year. It is in August and September that our creek's flow is at it's lowest. Lompico does not have any important reservoir or any good place to build one. The land it's self is our reservoir. It is the flow of the creek which is the Canyon's most important source of water followed by the ground water that is pumped from wells, most of which are higher up in the canyon. We need a healthy watershed to insure that we do not suffer from water shortages. The Lompico County Water District has been under a State ordered moratorium preventing the release of any new water connections since 1974 because of our limited water supply.

Trees certainly use water. The only reason that we have big forests here is because there is enough rain to support them. Some have suggested that if you log forests you will reduce the amount of water that is used by the forests and leave more water in the ground. There are several problems with this hypothesis. While it is true that trees use water, you cannot have both the watershed benefits of intact healthy forest and not have the trees using water. Over all, the argument that you can recover more water from the land if you cut the forest collapses because the benefits of forested watersheds far outweigh the idea that it is good to remove trees because they soak up water. I saw this problem illustrated for me years ago when I visited Costa Rica. Much of this Country has had its original rainforest removed for agriculture. One can move along a mountain range and see dry agricultural land that has been cleared for coffee plantations. On the same mountain range at the same elevation, when you reach a patch of undisturbed forest (now only in the extensive National Park System and private reserves) you find wet soggy forests and flowing streams. The forests help rain to fall and the forests keep the land wet by protecting it from the drying effects of sun and wind. In many areas around the world, the destruction of forests has led to the drying up of the river systems which drained the forested areas and a parallel increase in catastrophic floods as the missing forest cover can no longer help the land to retain rain and snow melt and moderate the runoff from large storm events. Increased flooding in Washington State has been blamed on deforestation. The argument that one should cut trees to get more water results from the efforts of the timber industry to confuse the public and protect their economic interests. It is similar to the argument that we should log to reduce fire danger. An idea which has been proven false by numerous studies in the National Forests.

Nearly all of the Lompico Creek drainage and certainly the Islandia area is comprised of highly erosive soils much of which is simply sand and sandy loam. Disturbance of natural conditions causes soil erosion rates to increase dramatically. Islandia and the rest of these mountain areas need forest cover to protect against soil erosion. The 1979 San Lorenzo River Management Plan stated that soil erosion from disturbance of original conditions has increased sediment in the San Lorenzo River by over 4 times what the land would produce of it were undisturbed. Soil erosion makes the production of clean water by water supply systems more difficult. In the 1998 rainy season the City of Santa Cruz Water Department was having trouble producing enough drinking water in part because their filtration system could not clean the silt laden water that they were pumping from the San Lorenzo River and Loch Lomond. (Santa Cruz back pumps water from the River to Loch Lomond to supplement the water that falls on the drainage of Newell Creek and would fill the reservoir naturally.)

The Santa Cruz Mountains are very young in geological terms. These mountains are comprised of ocean bottom sediments that have been uplifted by tectonic

pressure The "rock" and soil these mountains are built from is young, poorly consolidated, and mostly sandy. This is the principle reason that these mountains are highly erosive, and it is the reason that it is important to keep healthy forest cover over our watershed to protect it from erosion. Soil erosion into Lompico Creek and the entire San Lorenzo Drainage is one of the principle reasons for the decline of anadromous fish (Coho Salmon and Steelhead). These fish swim up the river from the Pacific to spawn in the stream of their birth. They lay their eggs in nests that they hollow out of the stream bottom. When the creek is filled with sand and soil, the eggs will not get enough oxygen and die. These fish need stream gravels to make their nests in. The more soil that flows off the land into the creeks, the more likely that their nests will be smothered with dirt. Up into the 1960's, the San Lorenzo was a famous Steelhead stream to which anglers came from long distances to fish. Steelhead and down to an estimated one thousand returning adults and Coho are functionally extinct in the San Lorenzo. Both animals are listed under the federal Endangered Species Act.

This is only a brief explanation of the link between healthy forests and good watershed conditions, but I hope it explains why the Lompico Watershed Conservancy is so interested in the protection of the Islandia Headwaters Area. This land is the most important single part of the Lompico Creek Watershed and it is in a restored condition that makes it a crucial asset to all the people who live in this area.