2014

Good Fire vs Bad Fire

Charley reed

Klamath Tribal Youth Program

7/1/2014

Charley Reed
August 1, 2014

Good Fire vs Bad Fire

Introduction:

Growing up, I was taught at a very young age that our fish will always be an essential necessity for survival. I was also taught fire wasn't always necessarily bad. Fire was also essential to our survival as a people because fire provided many natural resources to live off of, like our fisheries. On July 31st, 2014 a fire started on the Lower Salmon River Basin and continued to burn upstream. This fire gave local scientists and water quality managers an opportunity to study how fires in the ecosystem can impact our fisheries. (Robinson, 2013) In a theoretically "perfect" world there should never be a "bad" fire. For example, back before the Europeans and foreigners arrived, long before forest service was around, the native people used fire so frequently that when lightning would touch down that all the lightning would do nothing but burn all the unwanted brush or tress that wasn't useful and using a lot of groundwater that can also be generated more toward the old growth. It wasn't until the forest service came around where the fire suppression began to occur which prevented us Natives from practicing some traditional burns to help all of our natural resources who depended on fire. Many natural resources depended on frequent burning to ensure successful productivity. My main focus for this project I will be discussing how the proper fire management can help restore our fisheries while we are experiencing this drought caused by climate change. I will also be discussing the negative impacts that fire can have on our watershed as well.

This article is seeking to address the differences between negative impacts and positive impacts fire can have on our fisheries if done correctly and frequently enough. Another purpose for this paper is to educate my community of Somes Bar, California as well as all of northern California, which fire needs to be in our ecosystem to prevent these catastrophic events. And that not all fires are necessarily "bad." Local Klamath River Tribes, such as the Klamath Tribes, Karuk Tribe, Yurok Tribe and the Hoopa Tribe have used fire as a tool for hundreds of years to survive and provide food for their families as well as safety precautions. Spreading the word that Traditional Ecological Knowledge and Scientific research is the formula to adjusting our lifestyle with the upcoming climatic changes.

Methods: Most of the information I will be gathering will be provided by interviewing Biologists, Water Quality Managers, Traditional Fisherman, elders from the Mid-Klamath River Basin and last but not least water quality managers from the Salmon River Restoration Council. I will also be using some northern California applicable articles I have been given access to including data and how fire management is beneficial or harmful to our fisheries expertise from published authors. I will be using some data and chart graphs gathered from local water

resource managers of time periods where fire may have had an influence on our watershed. Common knowledge that I have been privileged to learn over the course of my entire life will have a great influence on the following information provided.

Results: Under the right circumstances, positive effects of fire management is more often occurring than negative impacts on our fisheries. The proper circumstances would be very low fuel beds, very limited wind, and plenty of moisture. Thus, very low intensity to ensure that no old growth trees or roots will be burned off. But experiencing this climate change, it seems to be that fire in our ecosystem is nothing but bad news. This wasn't ever the case back before the Smokey the Bear Era, where it was made illegal to have frequent fire on our ecosystem and "only you can prevent forest fires." When really they were provoking wildfires the whole time. Sure, they were preventing fires from the human standpoint but in the long term aspect of everything, they really made things worse by illegalizing cool burning. The tribal/ traditional burn was and still is our way to maintain our forests to prevent massive fires that we are experiencing today. We now can be convicted for arson for practicing our sovereignty right as a tribe. Which is to believe why we are going through such tragic and catastrophic events that happen so frequently. Furthermore, the reasons, other than fire prevention, why we used to use fire so frequently is to help our fisheries out when the river may be dropping water levels and increasing to lethal water temperatures. Although, everyone makes mistakes, we need to collaborate and make things right again. There are still more benefits from these wildfires we are having today. For instance, Fire can also eliminate any unwanted shrubs, brush and trees that aren't as water efficient as hardwoods and oaks. The charcoal is also full of nutrients that benefit our soil and entire watershed. Rich soil is very great for vegetation growth that will reduce the chances of eroding into our rivers, creeks and streams.

Smoke cover can lower water temperatures because the smoke will prevent the hot sun from beaming down on the surface water allowing fish to travel to a much cooler refuge. Thus, resulting in the water temperature dropping very drastically during the days of smoke cover. In August 2013 large fires in the Karuk Aboriginal Territory were correlated with a drop in river temperatures and presumably were beneficial to adult and juvenile salmon because lowering water temperatures decreases risk of a disease outbreak. However, in the years since fire suppression has occurred in Karuk Aboriginal Territory, catastrophic fires have increased (Miller et al., 2012). Fear of catastrophic fires and the ecological impacts of resource damage when they occur are further negative effects of the exclusion of fire from the landscape.

Another example would be, in the summer of 2013 HOBO temperature probes and Stream Discharge were recorded out of Knownothing Lake every 20 minutes. (Figure 1, 2)(Robinson, 2013) July 30th to September 19, 2013 the water temperature dropped up to 4 degrees Celsius over that time frame. Studies show that moke cover can be the difference between survival and death for fish in such a hot and dry year. A few variables that you must

consider for fire effects are they depend on the burn intensity, spatial pattern of the burn, stream size, stream network complexity, watershed topography, normal temperature ranges of affected stream reaches, and life history stage of the organisms present at the time of the fire. (Albin, 1979) In the Yellowstone National Park two wildfires burned 481-506 ha that effected two streams. After 25 years the Yellowstone cutthroat trout appeared to emerge four days sooner from the gravel in the burned watershed; egg incubated time estimated to be four days shorten in burned watershed. After wildfires, large wood may persist in stream channels through the period of forest reestablishment (Swanson and Lienkaemper 1978). As a consequence, the rate of pool formation usually increases, and habitat structure may be altered to the benefit of fishes (Swanson and Lienkaemper 1978; Sedell and Dahm 1984; Minshall et al. 1997)

Fire management is also very useful in the aspect of getting rid of understory brush. When you suppress the forest for hundreds of years, disallowing fire to manage our resources, you get a ton of unwanted, nonproducing plants and shrubs that take over a lot of space and water. With the proper management applied you could supply your ecosystem with plentiful amounts of natural resources from naturally producing berries and fruits. Not only fruits and berries but instead of water going to unnecessary plants and invasive species all of the water is now going to a very productive use. The water table is now higher because less water is being absorbed and more is available to the creeks and streams that are a huge impact in our fisheries. Especially, when we are going through some dramatic climate changes. When we experience droughts like we are today, is when it would be very much needed to have as much water possible for the survival for our fisheries and species who rely heavily on these fisheries, including us humans.

Traditionally, every aspect of the fire was beneficial in some way, shape or form. The left over burned trees and branches leaves behind charcoal. Charcoal is known as a water purifier. Having a sit down interview with Ron Reed, cultural biologist from the Karuk Tribe, he was saying after every fire that burned a particular area, charcoal was always left behind. Charcoal is made of carbon. When it rains on the charcoal it releases very nutritious nutrients into the soil for every drop that lands on one piece of charcoal. It also can purify the air we breathe. It can hide very strong stenches. Certainly, this doesn't have a direct effect on the fisheries. But that nutrient filled drop of carbon can cause for very superb nutrients to the streams that may be nearby.

Topic 2: Just like anything in life, with the positive effects of fire management comes negative impacts when done improperly. Fire can have a huge negative impact with all the fuel loads and buildup we have over the course of hundreds of years of fire suppression this can and will lead to high intense wild fires that are very dangerous and hard to contain in a timely manner. Which means that when lightning strikes the mountains that are full of fire fuel which causes

too high intense of fire that our forest goes up in flames. Instead of a cool understory burn, we are now introducing fire into our tree canopy. When such high intense fire occurs that's when negative impacts come into the scene, causing erosion, unwanted sediment in our streams, burning tree habitat along riverside and increasing water temperature to a lethal degree.

High intensity burns can cause a lot of unwanted sediment in our streams. The area affected by fire is related to fire size and intensity, and physical and climatic variables that influence the spread and intensity of fire. Erosional effects are most extreme where the majority of vegetation and duff has been consumed by fire, soils are highly erosive, and large precipitation events occur soon after the fire (Swanson 1981; McNabb and Swanson 1990; Swanston 1991). Therefore, the magnitude and scale of effects are related to the size and severity of fire; geology, topography, and size of the stream system; and amount, magnitude, and timing of post fire precipitation events. Results suggested that in highly erosive landscapes with frequent fires of high intensity (e.g., steep land chaparral), more than 70% of the long-term sediment yield occurred during and immediately following fires. (Swanson 1981; Meyer et al. 1992; Meyer et al. 1995)Furthermore, The presence of chemical constituents in smoke and ash can have a substantial influence on stream water chemistry until the fire is extinguished. Clayton (1976) reported that concentrations of calcium, magnesium, potassium, sodium, and total nitrogen in precipitation that fell during periods of high smoke in Idaho were 20–70 times greater than concentrations in precipitation collected during nonfire periods. The absence of fire itself is a negative impact on our ecosystem. (Minshall et al. 1989) hypothesized that successional development of riparian and terrestrial vegetation would reduce water yield and erosion, allowing macro-invertebrate and periphyton production to increase above pre-fire levels. In the absence of disturbance, however, increased shading associated with conifer growth eventually reduces riparian production and allochthonous inputs. (Minshall et al. 1989)

Physical properties of soil that control water retention are altered by heating, and in some cases, soils become water repellent after severe burns. The amount of vegetation remaining in the watershed directly influences runoff and erosion by physically mediating the force of precipitation on soil surfaces, altering the evapotranspiration cycle, and providing soil stability through root systems. (Gresswell 1999)

Fire can increase water temperatures—another important physical effect of fire is elevates water temperature resulting from the reduction in streamside vegetation and associated increases in insolation. (Minshall et al. 1989) speculated that chemical toxicity from smoke or ash would cause fish mortality in second- and third-order streams. During an experimental burn bordering a small stream in Washington, ''distress'' among yearling rainbow trout and several species of native fishes and mortality of native chinook salmon were attributed to fire-induced changes in stream.

All fires are not always beneficial to our fisheries because with wildfires nowadays they burn way too much trees and vegetation along the riverside that may lead to too much water discharge into streams that are in the watershed in where the fire occurred. For example, at Beaver Creek, Montana (Missouri River basin), an intense rainstorm occurred just 1 day after wildfire burned 26% of the lower drainage, and the associated stream discharge exceeded that of a 100-year flood event (Novak and White 1990). Estimates revealed a drastic decrease in abundance (.99%) and biomass (.98%) of brown trout Salmon rainbow trout (Novak and White 1990) when vegetation is removed very thoroughly from the watershed, it can cause removal of native fish to a particular watershed. The water isn't being distributed enough throughout the vegetation. Thus leaving too much water in the stream too quickly to allow the juvenile fishes to find calm waters and avoid the flash flood during the rainstorm.

Another problem with missing trees and vegetation is when the trees that don't get completely burned down but the tree canopy dos get burned. For instance, Robert Gresswell states, "The reduction or removal of the overhead canopy in riparian areas is frequently associated with a decrease in stream shading and a concomitant increase in water temperature."

Coming into summer of 2014 we had an all-time low of 0 inches of snow pack. Some may say it all comes with Climate Change and those people would be right. But another variable to consider is that the high intense burns that occur high in the watershed have a huge effect on the accumulation on the snow pack over the course of the Spring and into the Summer to help provide much need water for the fisheries. With trees living and growing there, they allow snow to accumulate and pack. Whereas, when the trees are burned the snow will fall on the ground and melt a lot quicker. This would cause more of a flooding type of run off and not last as long as we need.

Discussion: Being raised alongside the river my entire life and raised by a traditional dip net fisherman, I picked up a lot of traditional knowledge along the way. My experience growing up down at the Ishi Pishi Falls really gave me an edge to learn a lot of real life things that many kids wouldn't be able to learn through their textbooks. Seeing water levels, and water temperatures change overnight was one of the weekly observations I encountered. I was always taught that our fisheries was essential to our survival as a people for hundreds of years and if there wasn't fish to live off of then we would simply not live. I always wondered if that were true, why we are allowing fish kills by such huge numbers. Questions began to rise, who was responsible for these massive fish kills or were we failing to take care of our fisheries? Then I began to think. How did my ancestors manage our fisheries? The answer was obvious. Fire. Fire was an essential necessity based on our survival and more importantly, the survival of our fish. But there isn't a thing us, traditional people, can do about it. We were restricted by the laws of the U.S Forest Service. They made laws against burning not knowing that is how we maintained such a beautiful piece of earth. Burning is what we used long before their arrival to maintain

our aboriginal territory. Our watershed and fisheries is very important to many people in our Somes Bar community. And for many of us, it all we ever knew, it is in our blood, traditions and our responsibility. But it is now time we collaborate and make things right and most importantly make our forests and fisheries right, once and for all.

The cultural importance of our fisheries is covered by Ron Reed in the Following: Ron Reed describes how the activity of fishing is a forum for passing on both physical qualities, such as balance, and cultural tradition to his sons: “Fishing down at Ishi Pishi Falls you learn how to gain your balance. You learn the traditional values down there, the taboos and things like that, because it is a sacred fishery and there are certain rules that you abide by.” The activity of fishing provides an opportunity for young boys to spend time with and learn from fathers and older members of the community. Learning to dip net fish also serves as an informal rite of passage as boys begin early with easier tasks and move through a sequence of skills on their way to dipping fish. As Ron Reed notes “It’s not just about fish. It’s about the traditions, the culture, the quality of life that we are lacking.” The act of eating salmon from the Klamath River affirms sense of place, identity, connection and community. This orientation draws individuals into relationships of responsibility to care for the fish. Such a world view and set of relationships are in stark contrast to the separate, individualistic modality of the dominant culture in which plants and animals are “resources” and people are expected to watch out for their individual interests

Climate change is thought to be posing significant threats to salmon (Mote et al. 2003,Dittmer 2013; Grah and Beaulieu 2013; Beechie et al. 2012). Salmon is central to the lives of many indigenous peoples, providing spiritual, physical and cultural well-being (Dittmer 2013). Over the past two centuries, overharvest, habitat degradation, urbanization, and water diversion for a variety of human uses have led to dramatic declines in salmon populations (Mote et al.2003), with profound effects on the peoples whose lives and cultures are intertwined with them. For some tribes, the loss was rapid and absolute: in the last few years, the Colville Tribes lost access to both salmon and their traditional fishing grounds following the construction of the Grand Coulee Dam on the Columbia River and the filling of the reservoir behind it (McKay and Renk 2002). Now, the rapidity of climate change may be exacerbating existing stressors and creating new ones, including extremes in stream flows and water temperatures that limit the survival of salmon fry (Mantua et al. 2010).

The Karuk People have be entitled responsibility ever since the great Creator let us live on earth. Fish is apart of us Karuk People, it is who we are. In order to survive we must have an abundant amount of fish in our rivers, creeks, and streams. Existence to our people would be impossible without our fish. Our ancestors never had a problem with the chance of our fisheries being unhealthy. The difference is fire. They didn’t have any restrictions when it came to the use of fire. They took care of every last berry on the bush, every last salmon in the river, and

every last acorn on the ground. They knew the importance of every natural resource out there. The U.S Forest Service is having a hard time having that personal connection with the forest that Native American people do. But it is also our Native American people's responsibility to educate our fellow community agencies to what needs to be done in order to revive our beautiful forests back to what they looked like before hundred years of suppression.

Recommendations: I honestly believe that each and every community member wants our grandchildren to live in this special very, beautiful, and rural place we all call home. None of us want our forests to burn down or our fish to go belly up. A lot of people rely on the ecosystem that we live in, some longer than others, but the fact of the matter is we need to help educate them on our Tribal Practices and knowledge to help resolve this climatic change that we all are approaching. We need more youth and younger adults to collaborate with local agencies like the Fish and Wildlife Services and the Forest Service to build that relationship in order to see the changes that need to be made. For example, Merv George Jr., a member of the Hoopa Valley Tribe and chairman of his tribe for four years. Soon after, Merv joined the Forest Service in 2008 working as the Regional Tribal Relations Program Manager for the Pacific Southwest Region where he worked with all 18 National Forests and all California tribes. He recently just earned the title of Six Rivers National Forest Deputy Supervisor. He is also the youngest Native American to hold that permanent position. Merv George Jr., is a walking example of a tribal relationship between native communities and federal agencies that are really building a bridge to try and do the right thing for our forest. He is a huge inspiration to his tribe and other native communities. There are many other Native Americans that are working with federal agencies to help barricade that barrier between tribal communities and the government. I believe that we as human beings, are heading in the right direction. As long as we work together and unite as on entity, we will all live in bliss and harmony.

Conclusion: Fire is one of the most destructive natural causes in the world. But when applied correctly it could be the most efficient tool known to mankind. When most people think about fire the first things that come to mind is dangerous and destructive. In reality, fire is a natural cause. Which means there must be a purpose for it. That purpose is to utilize it and apply it to our ecosystem to help prevent horrific and catastrophic fires. Another use fire is to help maintain our forests and fisheries. Without fire in our ecosystem we end up with a forest full of under growth that has trouble producing berries and old growth being strangled by the Douglas fir, leading to water stressed oaks and hardwoods. Fire on the ground means more water in the rivers, creeks and streams. It also means that the water table will be higher because less trees and plants will be competing for that water. However, with hundreds year of suppression it is a much different story when you put fire to land. With all of the fire fuel in our forests we will scorch them clean. And when that natural lightning touches down. Boom. Up in flames goes our forest. It is the formula for pure disaster. It causes high intense fires that burn the tree canopies all the way down to the roots, completely removing all vegetation. When that

occurs it cause erosion and unwanted sediment into our rivers, creeks and streams. Another con to high intense fire is when a fire is riverside it will burn a lot of fish habitat and shade cover. In another sense those trees helped maintain the water discharge to prevent flooding events from occurring. Fire in the high mountain country can have a pivotal outcome based on the intensity of the fire. With a very high intense fire, we can be in big trouble. Causing the tree canopy to be destroyed. Which in turn makes is much more difficult to accumulate snow out in the open. Which causes little to no snowpack.

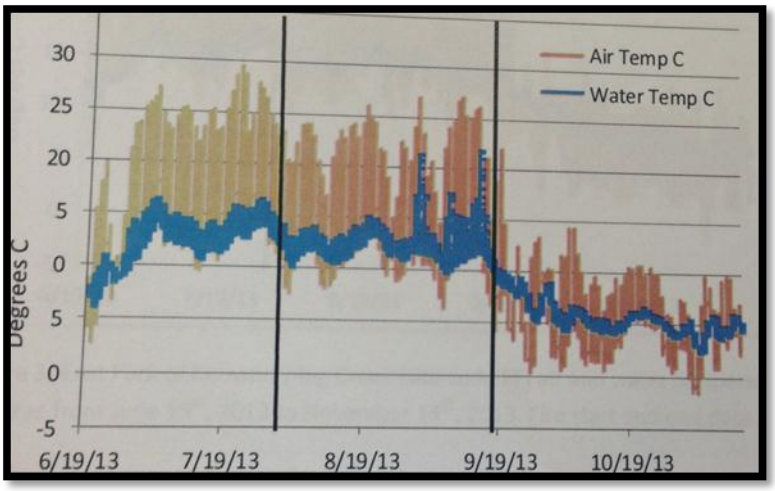

Figure 1: Outlet of Knownothing Lake(site code KO) air and water temperature collected every 20 minutes June 19th, 2013 through November 14th, 2013. Fire start and end date are indicted by the black lines.

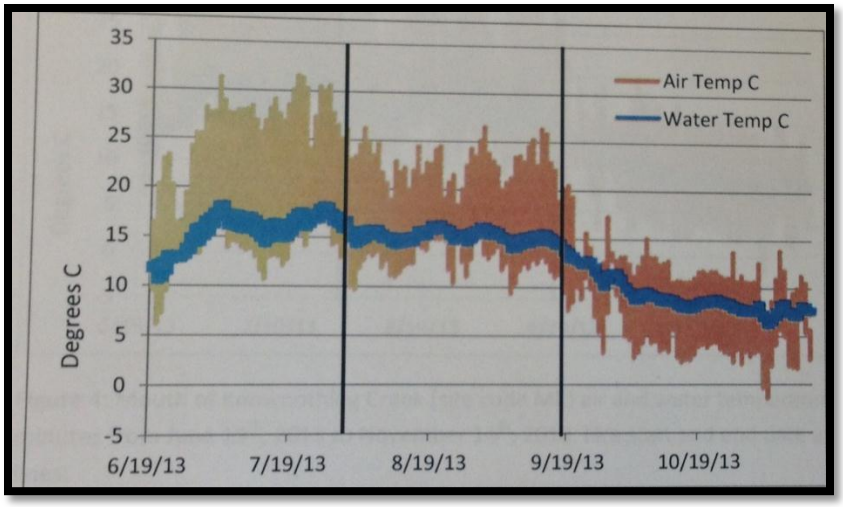

Figure 2: West Fork of Knownothing Creek (side code WF) air and water temperature collected every 20 minutes from June 19th, 2013 to November 14th, 2013. Fire tart and end date are indicated by black lines.