

February 10, 2009

Subject: Zone 4 Stream Clearance Program

To: Santa Cruz County Board of Supervisors
701 Ocean Street
Santa Cruz, CA 95060

From: Dave Hope

Supervisors of Santa Cruz County:

This letter is intended to help you in your decision making on modifications necessary to the log jam removal policies to provide both flood protection and protection of the fisheries resources in Santa Cruz County. To be blunt the only way to protect the citizens of Santa Cruz County from log jams and flooding would be to raise all bridges above and remove houses from the floodplain. Because that is not a tenable proposal the County has in the past taken many steps to reduce further hazards. To name a few the Riparian and Erosion Control Policies Policy and restrictions on building in the floodplain. All should be lauded as they were decades ahead of their time and very effective at reducing risks in the future.

There are few others who have more knowledge of the past programs to address logjams in Santa Cruz County than I do. I ran the log jam removal program from February 19, 1980 to December 10, 1999. During my almost 20 years the program was shifted from using heavy equipment to remove the wood to hand crews, additionally great care was taken to remove only the most dangerous wood and the whole program went hand in hand with stream restoration and enhancement. The original Zone 4 log jam removal program was initiated after the floods that in 1955. The initial program I inherited (pre1979) was geared up due to pressure from the loss of the entire Watershed Management Program Budget to remove one log jam on Soquel Creek due to the loss of life of a thrill seeking young man who tried to ride a surfboard down the swollen creek and died in a log jam. This situation and the existing charter for Zone 4 left very options for removal in the early days.

Much has been learned since that period and that knowledge was put to use in redesigning the program as often as could be accomplished. Every year that it was possible the charter for Zone 4 was refined to deal with only the more dangerous logs that threatened structures. Every year we learned more and more about how important the large wood was for the stability of streams and for creating good fish habitat. That was factored into decisions for removal. But the biggest problem we faced over the years was the pressure to have us remove minor wood pieces by landowners and the threat of lawsuits if we did not remove wood. These issues need to be settled to allow for a more thoughtful and scientific inspection of "What wood should be removed".

I can tell you from experience removing every stick of wood from the streams will not provide better protection for the citizens of Santa Cruz County. Not only does this technique not eliminate log jam potential, but it causes severe bedload shifts and destabilizes stream beds and banks, which leads to further mass failures of banks and flooding. I know that this practice causes these problems because I inspected the aftermath of this type of removal in those early years. But further I personally removed every stick of wood from Soquel Creek prior to the floods of January 4, 1982 (except one midjet jam that a landowner would not let us remove), and the log jam at Soquel and Porter still occurred (Approx. 240,000 cubic feet of wood).

In inspecting all of the debris that formed behind that bridge, I noted that the vast majority of the debris was either riparian trees that immediately dislodged during the floods (which would never be removed prior to a storm) or landslide debris that entered late in the storm. This riparian debris moved in the early part of the storm and most passed the bridge before blockage occurred. The landslide debris was clearly a large proportion of the material in the jam and was a large part of the late storm inputs and that material (landslide debris) created the vast majority of log jams that I reviewed (552 as a result of the 1982 storms). A small fraction of jam material was old wood, buried deep under the streambed from old 1900s logging debris. This was scoured out of the stream bed substrate, below any view of our stream clearance crew or myself. I know we removed every stick because I personally walked every stream and supervised the removal of all wood prior to those storms. This was done specifically to have an example/control stream as a clear case to see if this technique was superior to other removal schemes. So the take away message here is we know from experience that stripping all of the wood from a stream will have no positive benefit towards reducing log jams and will lead to further destabilizing of banks and in general the streams themselves.

What we are trying to prevent is the damage that can be caused in floods which for the most part is caused by the inherited problems from poor past construction techniques and locating homes and structures in the floodway. Poor past construction techniques was clearly the main reason for the log jam at the bridge in Soquel as the footing in the center of the bridge acted as a trash rack and equally at fault the lack of capacity under the bridge. It must be noted and credit given that this bridge has been greatly improved since that time and that work alone will have more to do with reducing flooding in Soquel than any stream clearance that could have been attempted. The Soquel log jam and any other jam will form when flood flows meet the deck of the bridge. We could all see the log jam really began to form when the water reached the bottom of the bridge. It was at that point that logs began to wedge against the bridge itself and events changed for the worse very quickly. Simply stated the flow and woody debris (watershed products) could not fit under the bridge, were blocked by the bridge and immediately caused the flows to avulse out of the channel and into the streets of Town of Soquel. Prior to the log jam forming, I watched more wood than was in that huge jam move peacefully under the bridge and out to sea, not stopping to jam again, as there are no similar blockages below that point in Soquel Creek. When the Soquel Dr. bridge jammed it trapped only a small portion of what was delivered to the sea and beaches.

Inspection of the beaches after the floods confirmed that the vast majority of the flood generated wood had actually reached the coast, moved out to sea and onto the beaches. Inspection of the debris on the beach confirmed all of the previously mentioned wood sources.

In 1982 a program of limited or no removal of logs initiated in other streams to test out those differing techniques. This well thought out program showed that all wood in channel prior to the floods either left the site early in the storm, moved out past most structures and out sea or moved elsewhere or stayed in place. The type, size and placement of the wood in the stream channel was carefully documented and the results of that examination and many more observations over the twenty years, were used to refine what wood should be left and what should be removed. This led to a well thought out program that removed only “most dangerous debris” and a program to protect the habitat quality of Santa Cruz County streams.

What does all this tell us?

1. No amount of log removal will stop log jams from forming at inadequately sized stream crossings.
2. No home or structure in the floodway can be made safe by even the most aggressive wood removal program as debris from slides and riparian sources will be delivered to the stream, making removal of existing logs in channel a fruitless effort.
3. Wood that we see in the bankfull channel either stays put, moves out to sea early in the storm or is only a small component of the wood caught up in jams.
4. The wood that is most problematic is landslide driven inputs and pretty much impossible to control by the log jam program. As this wood moves into the channel during the later part of storms when slopes are saturated and flows are the highest. Making it the most problematic source of wood in floods and the least able to be dealt with during storms. This makes flooding very dangerous and leaves only “getting out of the way” as the best option.
5. Programs to reduce sources of anthropogenic landslides will greatly reduce this problem (road/roof drainage control and improved road/grading practices).
6. Riparian trees need to stay on the banks for many reasons and bank stability and fisheries benefit/water quality benefits are only a few of those reasons. Riparian tree removal is untenable, a negative over all on safety and a severe impact to environment.

Now we should move to what wood will stay in place. My 30 years of experience in this field (more than any other professional), indicates that there are very few pieces of wood that need to be removed from the stream. As few pose a problem and all benefit fish and stream stability by their mere presence. Placement of homes and structures within the floodway is the true problem and Santa Cruz County has taken many steps to reduce that problem. My suggestion is that you take up the program that John Ricker has suggested and have wood carefully evaluated by a professional prior to removal of any wood.

In recognition of the importance of stream habitat for the improvement of both water quality and fisheries benefit, the Zone 4 Stream Restoration Program was initiated in the mid 1980s and generated millions of dollars to improve fish passage, reduce sedimentation and improve habitat and water quality throughout the County. That program is why you never heard complaints in the past. Careful removal of only the most dangerous wood along with a well respected stream restoration program lead to a good marriage of benefits. Santa Cruz County used to have the best stream restoration programs in the state, now it is very different. Great pride should be taken in the County's past efforts and forward thinking, but a great past program can not make up for your diminished commitment to stream restoration in the past 10 years. There good reason for criticism of the Santa Cruz County efforts by the NOAA fishery biologists. If good things were happening alongside your existing stream clearance program, like in the past, I doubt this problem would have arisen.

Sincerely

Dave Hope Senior Environmental Scientist
Registered Professional Forester
Certified Professional Soil Erosion and Sediment Control Specialist
Superior Court Designated Expert on Log Jams (1983-1986)