

The Ugly, the Bad, and (Maybe) the Good?

by By Hezekiah Allen, Mattole Restoration Council and Scott Greacen, Friends of the Eel River
April 17, 2012

Over recent months, many people have been engaging in an increasingly public conversation about the environmental impacts of marijuana cultivation, particularly those on our watersheds. Environmental groups, folks from every ridge and valley, and even elected officials are striving to address the sometimes alarming consequences--especially for fish--of the regional boom in pot growing since the passage of Prop 215. Kyle Keegan's widely circulated article in the December pages of this publication deserves a lot of praise for expressing in print a range of concerns that have been widely discussed, but too little addressed. It is essential reading: find it at <http://treesfoundation.org/publications/article-476>.

This January, Daniel Mintz reported County Supervisor Ryan Sundberg worrying that restoration projects are being buried by the impacts of grow-related bulldozing: "It's massive amounts, it's shocking how large and how many there are," he said. Supervisor Mark Lovelace said some damage "compares with the worst of the worst from some of the bad years of the timber industry." As 2012's net rainfall continues to point to a very dry year, the potential for a disastrous coincidence of critically low flows, a record run of Eel River Chinook salmon, and an unprecedented number and volume of water diversions is bringing these concerns into sharp focus.

In February, these issues surfaced for the first time in Sacramento, at a hearing before the joint fisheries committee of the legislature. Assemblymember Chesbro, chair of the Committee, took pains to frame the subject: "this is not an anti-marijuana conversation, it is a pro-environment conversation." We agree. The most important thing about this conversation, however, is that it's still too small to build the critical mass it takes to drive collective action toward solutions.

We're working to make sure the elected officials' attention translates into help protecting our streams, not least through a transition to a sustainable cannabis industry on the North Coast. Many observers and participants in the industry have voiced hope that a decriminalized medical marijuana industry could foster the development of market incentives for weed that's both high-quality and



Stream-side garbage

Photo: Brad Job, Arcata District, BLM

low-impact.

Unfortunately, what looked like a reasonably promising path six months ago, toward a system that could provide for transparent and verifiable practices that would benefit both educated consumers and honest producers, now looks blocked for at least the near future by the intransigence of federal officials and policies. At some point, the logjam will probably break. Until then, we can't realistically expect much more than the blunt instruments of law enforcement.

That said, the state and counties have a limited ability to drive change in the hills of the Emerald Triangle. The most important and the most effective actions are going to be the choices growers and communities make every day and every season. The most important conversations are going to be the ones between neighbors, over kitchen tables, and out in the woods, where people recognize problems and try to figure out a better way. To further these discussions, this article aims to review some specific species of impacts to watersheds and fisheries, the practices that can cause them, and some meaningful ways to reduce impacts.



A large clearing for marijuana cultivation risks sending huge amounts of sediment into a salmon-bearing stream below.

Environmental horror stories are all too commonplace in the hills of Humboldt, Trinity, and Mendocino. We've heard tales of roads graded into steep hills, with spoils slipping directly into waterways, choking spawning beds, and degrading water quality. A failing road and huge bulldozed ledge perched above important fish habitat in the Mattole are just one example of the huge potential costs imposed by development done on the cheap.

Volunteer fire-fighters respond to a dangerous backcountry structure fire and stumble over a 1" PVC pipe spewing diesel fuel straight into a creek. Clean-up crews find hundreds of pounds of powerful fertilizer dumped above a stream. Park rangers discover dozens of deer, killed by the pallets of rat poison found just down the path.



A failing, poorly engineered and un-permitted road threatens a huge salmon-bearing stream just downslope. This road led to the clearing pictured above.

Photo: Brad Job, Arcata District, BLM

Owls and rare Pacific fisher are killed by powerful bio-accumulating poisons imported from Mexico. Salmon-bearing streams are sucked dry, their fish extinguished by ever-increasing numbers of diversion pipes and pumps. Perhaps worst of all, the eerie, unexplained absence of life from a stream that only a few years earlier was a nursery for recovering salmon.

These are wretched, awful, potentially irreversible harms. And while this list represents some of the most serious problems that can result from reckless practices and poor planning, it is also important to be mindful that even pretty good practices can have significant cumulative impacts. Something as simple as multiple draws on a creek in an afternoon can wipe out a whole year of baby fish.

Some distinctions are useful, not the least of which is scale: there is a wide spectrum of growing operations, from a handful of plants to a hundred, to several hundred and a thousand, even tens of thousands of plants, with footprints that likewise range from a few square feet to a small greenhouse to several acres to hundreds of acres. It's only stating the obvious to say that the potential impact of a grow increases with the size of an operation, but it's our sense that the likelihood of serious impacts also increases dramatically beyond a certain scale. It is more time consuming and challenging to do a "good" job when the size of an operation increases.

The simple truth is that the solution is not to grow more than you can grow in a responsible and conscientious manner. But staying small is no guarantee of low impact.

Another important distinction is whether the plants are grown using natural light or artificial light. Natural light has undoubtedly the least impact on the environment. Artificial lights powered by the utility grid have an appalling carbon footprint; generators create an even more staggering carbon footprint, air and noise pollution, and add the risk of spilled diesel contaminating our watersheds. Humboldt' County's electric use has increased by 50% since Prop 215 passed, while the rest of California's has gone steadily down.

How Much Carbon?

** Assuming 22.2 pounds of carbon per gallon of diesel and 75-150 gallons of diesel per pound of bud*

** Then 1665-3330 pounds of carbon are released into the atmosphere per pound of bud of off-grid indoor weed*

** This is equivalent to 3750-7500 miles traveled in a VW Jetta or 1125-2250 miles traveled in a Ford*

F250

What about cumulative impact?

** If there are 100 operations growing 10 pounds of bud...off grid indoor growing is producing 1,665,000-3,330,000 lbs of atmospheric carbon emissions per growing cycle.*

** If there are 100 operations growing 100 pounds of bud...off grid indoor growing is producing 16,650,000-33,300,000 lbs of carbon emissions per growing cycle.*

Grow it in the sun!

Luckily, the solution is simple: grow plants in the sun. There's really no excuse on this one. Indoor marijuana cultivation, whether on or off the grid, is not and can't ever be environmentally responsible. The climate crisis is the gravest environmental threat humanity has ever faced. The fact that a very large proportion of California's increases in energy efficiency have been swamped by the increased use of power to grow plants is a crime against future generations and profoundly discouraging from a survival-of-the-biosphere perspective.

While a lot of attention is paid to the distinction between organic and non-organic products and practices, the truth of the matter is that excessive amounts of any fertilizer--even organics--is bad news for watersheds. Certainly, synthetic fertilizers are more concentrated and have some alarming compounds in them.

However, any fertilizer runoff can wreck the delicate balance of aquatic ecosystems, creating toxic conditions through the process of eutrophication. This begins with an increase in primary production, specifically algae blooms which can lead in turn to a number of negative impacts, including decreased biomass of benthic and epiphytic algae, changes in macrophyte species composition and biomass, decreases in water transparency (increased turbidity), and depletion of dissolved oxygen. All of these add up to fish kills and negative health impacts for dogs, people, and anything else that interacts with a local river. Finally, there is an overall decrease in the perceived aesthetic value of the water body: icky water fails to soothe the soul.

There are a few solutions to reduce and prevent nutrient loading. Solutions fall into two broad categories: reducing fertilizer use and disconnecting runoff from waterways. An initial first step to either approach would be to eliminate all synthetic and highly concentrated chemical fertilizers, particularly those that have water soluble copper sulfate in the mix.

Care about Coho? Use less Copper.

Copper is a common component of many synthetic fertilizers.

According to a study released in 2007, levels of copper as low as 2 parts per billion have a direct impact on the sensory systems of juvenile coho salmon.

Since the duration of storm events that cause elevated levels of copper in streams can be relatively short, juvenile coho salmon were exposed to copper for only a few hours.

Several studies have found the onset of copper neurotoxicity to salmon olfactory systems occurs within a matter of minutes. Loss of sensory function is likely reversible, but may take hours or days of

the fish being in clean water. If copper exposures are high enough to cause the death of olfactory sensory neurons, it will take several weeks to months for the fish to regenerate new neurons and recover.

Coho salmon have a hard time finding food and shelter in the murky brown water that runs through our rivers for much of the winter. A functioning sense of smell can give them a fighting chance. Very low levels of copper for very short periods of time severely inhibit their sense of smell. Worst case--with sight limited by turbidity and smell inhibited by copper--they starve. Best case they migrate out to sea malnourished and underdeveloped. Neither option helps them recover.

Reducing fertilizer use can be simple or complex. The simple method would involve just using less. The complex method--and the method preferred by agricultural operations growing other cash crops--is to measure the growing medium's ability to retain nutrients and analyze the plant's ability to use them. The grower then feeds a specific amount based on these calculations. This ensures there is never extra fertilizer to poison waterways while--at the same time--reducing fertilizer costs.

Disconnecting runoff can be achieved in a number of ways, depending on the situation. If plants are grown in pots, a tray underneath the pot to collect extra water is a simple solution. On a larger scale, grading your growing site so that runoff is collected in a basin can help. You should also plant some grass or other vegetation in this basin, so that they can help to consume the nutrients before they are released into waterways.



Water storage is already a standard element of most cultivation efforts. The challenge is to store the water before plants are in the ground. Each plant requires 3-5 gallons of water per day.

Photo: Brad Job, Arcata District, BLM

Information on retention basins is widespread on the internet; typing "agricultural runoff basin" into the search bar should produce numerous results. There are also several locals who have experience and are pushing the envelope in this regard and could help you develop solutions specific to your operation. Lastly, if you can see runoff from your grow reaching a waterway--whether it is a year round or seasonal stream--that's a serious problem, requiring immediate action. If you don't know what to do, ask for help.

While the fertilizer challenge is complex, it may seem simple against the challenge of maintaining water quantity. Altered hydrology is a pervasive and persistent problem throughout the region.

What this means is that water's natural path through our watersheds has been altered, almost always by landscape-scale clearcutting, denuding of slopes, and construction of webs of logging roads. Clearcutting disrupted millennia of accumulated biomass that worked like a sponge to retain water and help it infiltrate into the ground, where it moved slowly until it reached the streams, sometimes many months after the rain fell. Nowadays, without the sponge, water moves much faster through the system, and less water is making it into the ground. What does infiltrate often gets "daylighted" by road cuts. Once the water is on the surface, it flows much more quickly down the slopes, into streams, the river, and out into the ocean.

Additionally, the extensive over-harvesting of our local forests leaves us today with a recovering landscape packed with overcrowded second growth forests. Where an undisturbed old-growth Douglas-fir forest might have 100 trees or fewer per acre, our forests today have many more, sometimes upwards of 1000. Right now, those trees are struggling against one another to get big, and together all those trees use a lot more water than the old-growth forests used for millennia.

Finally, our climate is changing. These changes impact rainfall patterns in many ways. While it is hard to identify specific trends at this point, it generally seems that the rain is coming in more concentrated storm events which further decrease the landscape's ability to retain rainfall. Similarly, it appears that we should be ready for longer dry seasons to occur more frequently. The good news seems to be that the North Coast is likely to see less overall heating and lose less rainfall than many other parts of the American West. But the daily increasing chances that 2012 is going to see very low river flows after a dry winter reminds us that this is a landscape of extremes, where even before the timber boom streams could get lethal for salmon.



Park rangers discover dozens of deer, killed by the pallets of rat poison.

Long story short, the average grower cannot solve the low flow crisis we are experiencing in local rivers. Luckily, this is an area where proven solutions are available and pretty affordable. Having more water storage ensures you are not making the situation worse. Plus, water storage is good for your homestead in many ways. Stored water helps provide

protection from fire and makes you less vulnerable to drought. Water storage is a simple and valuable step that every single resident in the region can and should take towards minimizing the environmental footprint of your homestead. By taking steps toward increasing your storage and--eventually--completely eliminating your dry season water diversion of natural flows, you will not only ensure that you, your family, and your crops will survive the most severe drought, you will also be part of a growing community working together to give native salmon a fighting chance.

In a perfect world plants would need only sun, fertilizer, and water. This is not a perfect world. Local growers are too familiar with spider mites, powdery mildew, hungry rodents or deer, and the variety of molds that can ruin a season. Many growers make the decision to respond to these pests using chemicals, miticides, pesticide, rodenticide, or fungicides. In general, all toxins should be treated

with great care. Not only do these substances have negative impacts on the environment, they also have health implications for you and your family. So, in general, our advice is to avoid them. The high quality, connoisseur cannabis that this area was once renowned for does not involve these ingredients. If you find it necessary to use chemicals in your grow, carefully follow the application and disposal instructions provided by the supplier. Apply them in ways that absolutely minimize runoff. That rules out chemicals which are sprayed on, scattered around a grow, applied in large quantities, and watered in. So, while there are a wide variety of pests that can ruin a year for our local farmers, there is--simply put--no justification for scattering arsenic (rat poison) or spraying acaricide (miticide) in our watersheds.

Miticides

Bifenazate Acaricide and Abamectin are chemicals found in popular miticides. They are highly toxic to fish in very low quantities. They should not be sprayed on. They should only be applied in controlled settings that eliminate runoff. Be sure to follow the manufacturer's directions and to dispose of them appropriately as these are toxic to people, pets, and salmon alike.

A concern that is probably quite familiar to many residents of the North Coast is sediment. New roads and flats require a great deal of planning and thought before they are developed. Poorly built, poorly planned, and poorly maintained roads are a huge source of sediment. Sediment chokes spawning gravel and makes it more difficult for fish to find food. So what can you do? Be careful when developing new infrastructure or reopening historic logging roads and flats; hire equipment operators who are experienced and have a reputation for doing quality work, not cheap and quick work. Infrastructure is definitely worth the investment. Maintain your road! Not only is it good for the stream and the fish, it is also good for your car and ensures your road will make it through the next major storm. (See resources at www.5counties.org/docs.htm)

This is a time of flux, where we may well be able to make some real change for the better, at least from the perspective of folks who intend to still be here in a decade or two. One set of possibilities that may materialize is to work with the system, to help create a legal environment that cracks down on destructive practices and large scale operations while empowering and legitimizing family scale commercial production that is done well and transparently. We're a ways off from there, but a not entirely reasonable optimism is surely one key to all forward progress. And the genie is not going back in the bottle--change will continue on the North Coast, that's a certainty. What we may be able to do is make some decisions about how we want that change to proceed. Bottom line: cannabis is a crop that can, and should, be grown sustainably on the North Coast. We have the knowledge and the know-how. In the short to mid term, we can't afford to do otherwise.

Surely we are not the first to notice that two of the region's cottage industries can nicely complement one another. Marijuana cultivation of a scale up to small commercial is easily compatible with forest restoration and sustainable management. Larger scale requires greater care and is likely not appropriate in most circumstances. Given the amount of resource extraction and environmental degradation that took place throughout the forest resource land, it is no surprise that it requires a significant investment to restore healthy forests. Given the timeframe (30-40 years minimum) of growing timber and the depressed log market, there is little incentive for industrial timber operators to maintain and restore forests. Resident stewardship can be enabled by the marijuana industry and--if properly structured--the marijuana industry will not only continue to provide tens of thousands of jobs, but it will also help California restore the immense value of healthy forest ecosystems.

We recognize that in taking up this conversation there is the potential it will offend, divide, and anger some local residents and growers. Facing down that possibility and deciding to write this anyways took a leap of faith. We certainly don't have all the answers. But ultimately, where would we be if we did not have faith that North Coast communities are strong, creative, resilient, and--most important--deeply concerned for the health of the environment we all share and the economy upon which we all depend.



And so, in closing, we hope that this article will inspire you. Investigate your operation and make improvements where you can; talk to your neighbors, let them know your concerns, and work together to raise the bar for local growers. Talk to buyers, consumers, and dispensaries; let them know that not all ganja was grown equal. And, if you are offended, realize we did not intend to point the finger of blame at anyone; everyone (even those folks not growing weed) can make improvements. If you think we got something wrong, don't disregard the spirit of this article, speak up and let your voice strengthen the call for a legitimate and sustainable cannabis industry in California. Together we have the best chance of ensuring a prosperous future for our region--both economically and environmentally.

This article can be found online at www.treesfoundation.org/publications/article-486

Forest & River News is produced by Trees Foundation.

http://treesfoundation.org/publications/article_print_friendly-486 (cited 25/7/12)